

BUSINESS AVIATION

Special issue-supplement to the magazine «Transport Strategy-XXI century»

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Dear Colleagues, dear Readers!

The first issue of “Business Aviation” Magazine” is in front of you. This is the first expert printed edition in Russian dedicated exclusively to business aviation – the industry, which is actively developing, forming new products, increasing quality of services, enhancing level of safety. This means, it needs actual information, experts’ opinion, industry overviews. We did our best to present this all on pages of “Business Aviation”.

But this edition is oriented not only at professional readers. Another task is to present business aviation not only as a luxurious transport means available for a limited number of people, but as a modern, highly technological, reliable transport sector, which can serve and serves as effective business instrument, is necessary for medical evacuation, allows to resolve challenging tasks for business travel – number of spheres where business aviation takes its firm position is growing.

I also hope, that materials prepared for the first issue of “Business Aviation” by leading experts will be of an interest for business aircraft owners and their representatives, corporate aviation departments, charter passengers.

I want to thank all, who took part in creation of this issue and supported this initiative, and express my hope that information published on its pages is interesting, useful and applicable in work.

I wish you good reading!

Sincerely yours,
Anna Serezhkina, Ph.D.
RUBAA Executive Director

Russia's Business Aviation Industry: Current Status, Outlook and Major Challenges



Yaroslav Odintsev,
President, RUBAA

In today's Russia business aviation is an important and essential sector of economy. The aim of this article is to present the industry highlighting its achievements and prospects and pointing out major challenges that hinder its successful development.

At present, Russia's business aviation industry, which by the way is much younger than that of Europe, let alone the United States, is represented by a wide range of organizations supporting its operations, such as commercial air operators and general aviation airlines; airports and dedicated VIP terminals; maintenance and repair (MRO) organizations; flight support companies; aircraft sales and charter brokers; IT companies; catering providers; approved training organizations and service companies, etc.

Currently, Russia does not manufacture specialized business aviation aircraft known as business jets. Sukhoi Business Jet, a VIP configuration of Sukhoi Super Jet, represents Russian-built aircraft in the domestic and international markets. Bombardier, Gulfstream, Dassault, Embraer, Honda, Pilatus, Textron are the world's leading manufacturers of business jets.

Effective laws and regulations do not offer any definition for the term "business aviation". In practice business aviation means revenue or non-revenue flights operated on aircraft in VIP configurations accommodating up to 20 passengers. According to some sources, business aviation also includes operation of widebody aircraft in all business configuration (i.e. a single business class configuration) and helicopters with a VIP configuration cabin.

Business jets are definitely an expensive mode of transport; however, business aviation industry has proven itself not only as a luxurious and highly comfortable way of travel, but also as an efficient business tool and important sector of the global civil aviation industry.

In 2020, when most commercial routes, especially international ones, were canceled globally including Russia, which basically caused commercial air services to collapse, business jets were the only transport mode available. A notable contribution was made by the world's business aviation in terms of delivery of relief consignments and medication, transportation of doctors and passenger evacuation.

Medical evacuation services, i.e. passenger transportation on business jets with dedicated medical equipment, were essential in that context.

It is suggested that Russia's business aviation market should be assessed based on operational performance of Vnukovo-3 Business Aviation Center that accounts for a major share of business aviation traffic.

According to the data for January-December 2020, the most significant traffic decline was seen in April 2020 – 241 flights and 666 passengers. The number of flights dropped more than fourfold versus March 2020 (1,030 flights, 5,286 passengers). However, right after April the market demonstrated dynamic growth rates with figures exceeding 2019 levels during the same periods.

Activity peaks were observed in August (1,853 flights) and September (1,509 flights) of 2020.

As before, international flights dominated the market during the year, except for April (110 international and 141 domestic flights).

Riga, London, Nice, Dubai and Larnaca were among the most popular international destinations. In the domestic segment, the most

Effective laws and regulations do not offer any definition for the term "business aviation". In practice business aviation means revenue or non-revenue flights operated on aircraft in VIP configurations accommodating up to 20 passengers

preferred travel locations included Saint Petersburg, Sochi, Kazan, Simferopol and Yekaterinburg.

During the first seven months of 2021 (January through July inclusively) Vnukovo-3 handled 6,739 international flights, 3,412 domestic flights and 61,842 passengers in total.

In the international market, Riga, Nice and Larnaca attracted the largest share of traffic in May-July 2021. Saint Petersburg, Kazan and Sochi became the most demanded domestic destinations.

As to the structure of Russia's business aviation segment, air operators (both commercial and general aviation airlines) and infrastructure facilities represent the key organizations.

Currently, the list of Russian airlines operating business jets under an air operator certificate includes Avia Management Group, Aviaservice, AviaTIS, AeroGeo, Weltall Avia, Gazpromavia, Jet Air Group, Jet Express, Kosmos Production Association, Meridian Air Company, Rolema, RusJet Air Company, North-West Air Company, Severstal Air Company, Sirius Aero, SkyLight, Tulpar Air, Turukhan.

Dedicated business aviation terminals are only available in Moscow (Vnukovo-3 Business Aviation Center (Vnukovo), A-Group Terminal (Sheremetyevo), UTG Private Aviation (Domodedovo), International Business Aviation Center (Ramenskoye)) and Saint Petersburg (Pulkovo-3 and A-Group Pulkovo).

In all other airports business passengers are served in VIP lounges, official delegations lounges, etc. Business jet storage and maintenance facilities are also limited at airports outside the federal cities.

Among the effects of the pandemic and travel restrictions were relatively new services introduced by airlines, the so-called scheduled charters (which may sound strange, but the term "schedule" is conventionally used here to refer to the estimated time of departure) and sales on a per-seat basis which became quite popular. This may be a shift away from the traditional business aviation model representing a new approach to aircraft operation (in contrast to booking the entire seat capacity of an aircraft without any "fellow passengers" and the ability to select flight schedule and destination airport). But this model works at the moment. Probably it will become less popular as we get back to normal life and work, but still can be used as a cost saving option. Right now, the new model allows companies to continue their business operations and helps passengers reach a desired destination. In addition, it ensures utilization of the ground infrastructure and creates demand for service companies and service providers. Speaking of the industry evolution, we can mention both positive developments and factors hampering the overall dynamics and growth.

**Speaking of the industry evolution,
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the overall dynamics and growth**

Recent positive changes are described below.

Starting January 1, 2020, aircraft imported into the customs territory of the Russian Federation will be exempt from import VAT provided that the provisions of Article 150, Paragraphs 20 and 21, of the Tax Code of the Russian Federation are met (which, however, does not mean that the import VAT will be canceled altogether). Earlier, the import VAT paid for any aircraft intended for commercial service could be deducted, but to be honest the new exemption rule makes the life of airlines and aircraft owners a lot easier ensuring cost reduction.

**New market opportunities also include
a partial shift of passenger traffic
from business class to business jets
due to suspension of regular air services.
The overall flight situation has clearly
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as airlines will recapture a certain share
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a significant share of passengers
will choose to stay with us
after experiencing the benefits
of business aviation**

New market opportunities also include a partial shift of passenger traffic from business class to business jets due to suspension of regular air services. The overall flight situation has clearly boosted the demand for business jet services, but only to some extent, as airlines will recapture a certain share of traffic once the borders are opened and air services resumed. However, a significant share of passengers will choose to stay with us after experiencing the benefits of business aviation. Growing numbers of revenue passengers will inevitably result in increased aircraft acquisition rates. In this case, the market can refocus towards medium and light aircraft instead of heavy aircraft that are very popular today. But it is a matter of time.

Unfortunately, there are much more essential factors that hinder the industry growth.

One of the common problems in Russia and globally is the **problem of illegal charters**, i.e., flights operated on general aviation aircraft for passenger transport purposes. No methods to monitor and prevent such activities have been implemented so far.

Currently, the Ministry of Transport of the Russian Federation, the Federal Air Transport Agency, Russian airlines and industry associations are actively working on the implementation of the Plan of Activities

Aimed at Improving Competitiveness of Conditions for Registration of Aircraft and Yachts in the Russian Federation.

The Plan, however, is intended to create the conditions for registration of aircraft that are operated or planned for operation by Russian airlines in the State Register of Civil Aircraft of the Russian Federation. At the same time, **a ban on aircraft registration in foreign states in accordance with Article 83 bis** of the Convention on International Civil Aviation (Chicago, 1944) that has been widely discussed recently may have serious consequences for the entire civil aviation industry of Russia.

The Plan disregards a significant number of business aviation aircraft belonging to Russian beneficiaries but operated in foreign jurisdictions. Expert estimates suggest that such business aviation fleet includes 300 to 400 aircraft.

There are many underlying reasons for that; RUBAA believes that it would be beneficial for the State and the aviation industry of Russia to eliminate those reasons and lay the foundation for transferring the operation of such aircraft to Russian airlines and ensuring their registration in the State Register of Civil Aircraft of the Russian Federation.

RUBAA welcomes the initiative of transferring aircraft to the Russian Register and is ready to provide assistance. In this regard, a list of problems that prevent the transfer of aircraft belonging to Russian beneficiaries and operated in foreign jurisdictions to Russian airlines and registration of such aircraft in the Russian Register has been developed and submitted to the Ministry of Transport. In addition, RUBAA has proposed specific solutions to the problems and is working on new requests.

The industry also faces certain challenges that are detailed below.

The need to receive approval (certification) of original design modifications (supplemental type certificates) for foreign aircraft.

A proposed solution is to automatically accept, for the purposes of aircraft registration in the State Register of Civil Aircraft of the Russian Federation, an STC issued by a Type Certificate holder's state, leading regulators (FAA, EASA) or a State of aircraft manufacture and cancel the requirement related to approval of a Supplemental Type Certificate where aircraft is operated by a Russian airline under intergovernmental agreements executed pursuant to Article 83 bis of the Convention on International Civil Aviation. It should be noted that active measures are being implemented now in order to address this challenge.

Lack of capacity required for introduction of rare aircraft types. To be able to introduce a new aircraft type, an airline should have an appropriately qualified flight instructor and a cabin crew instructor available on a full-time basis. For aircraft types that have not been operated in the State before or have not been widely used, these requirements cannot be met due to lack or unavailability of such personnel. This provision prevents Russian airlines from operating modern aircraft types. A proposed solution includes an authorization for Russian pilots to receive flight training abroad and undergo proficiency checks on foreign operator aircraft conducted by foreign flight instructors. To achieve this, it is necessary to confirm such authorization by approval of an individual pilot training program (in line with the airline's training schedule) or acceptance of the airline's request and set up a group of instructors approved by the Federal Air Transport Agency who are qualified to conduct initial operating

experience training for trainee pilots of "rare" aircraft types or types that have not been operated in the Russian Federation before. In addition, it is recommended to allow foreign instructors to conduct crew training and checks and enable airlines to engage instructors of other Russian carriers for the purposes of crew training and checking without including such instructors in the staffing list.

Long certification process for foreign approved training organizations (ATOs) and MRO centers. Airlines' requests for certification of foreign ATOs and MRO centers or for changing the approval certificates have a very long processing time. As a result, maintenance of flight and cabin crew qualifications for aircraft types that are not represented by simulators in the Russian Federation (or represented by simulators with extremely high utilization rates) becomes a challenging task. To address the issue, the following measures are proposed: certification of foreign ATOs should be conducted by the Federal Air Transport Agency within 30 days, without Agency's representatives but with participation of representatives from applicants and accredited experts (as an option); new training programs should be included in ATO approval certificates in an expedient manner based on submitted documents and/or results of audits performed by applicants and accredited experts, but without any onsite visits to such ATOs; maintenance personnel should be allowed to receive type rating training at maintenance organizations approved by foreign civil aviation authorities if no maintenance organizations with a FAR-285 approval are available; the Federal Air Transport Agency should consider acceptance of OJT Worksheets approved by foreign civil aviation authorities; the Federal Air Transport Agency should ensure processing of approval requests and certification of foreign MRO centers within the following time intervals, provided that any non-conformities revealed during the audit are closed in a timely manner:

- Initial FAR-285 approval – within eight (8) months upon receiving an approval request from a relevant MRO organization;
 - Changes to a valid FAR-285 approval certificate – depending on the scope of changes, but not later than eight (8) months upon receiving an approval request from a relevant MRO organization;
- paragraph 12.a) of Chapter II and paragraph 49.a) of Chapter V of FAR-289 should be amended to state that the Federal Air Transport Agency will accept aviation personnel training programs included in the supplement to the ATO approval certificate by an applicant if no relevant training programs have been approved in accordance with the Federal Aviation Regulations.

Long certification process for newly introduced aircraft types. An approximate processing time for requests related to certification of newly introduced aircraft types is 60 calendar days, which results in prolonged downtime of such new aircraft types and airlines' financial losses and often serves as a barrier to transferring aircraft owned by Russian entities from foreign to Russian air carriers. A proposed solution is to minimize certification time for newly introduced aircraft types and make relevant amendments to FAR-246.

The need to ensure video monitoring of the objects of video surveillance in the cabin of a transport vehicle. Pursuant to the Government Resolution No. 1604 dated October 05, 2020 "On Approval of the Transport Security Regulations Addressing the Levels of Security for Air Transport Vehicles", the following measures should be implemented:

- video detection of the objects of video surveillance in the cockpit and on passageways leading to the cabin (cockpit) of a transport vehicle;
- video monitoring of the objects of video surveillance in the cabin of a transport vehicle;

– processing, accumulation and storage of visual data for at least 30 days and access to such data in accordance with data access and transmission procedure.

Implementation of this solution is associated with solid investments in aircraft modifications. But even if we leave economics behind, the requirement itself is contradictory to the mandatory principle of business aviation, which is privacy. Moreover, we believe that the level of risks related to acts of unlawful interference in business aviation is acceptable. That is why we propose that business aviation should be outside the scope of the above Resolution.

The need to ensure that an airline has at least 3 aircraft available in its fleet if it operates non-scheduled air services on aircraft with a maximum seating capacity of 20 passengers. This requirement stipulated by the Federal Aviation Regulations approved by Order of the Ministry of Transport of the Russian Federation No. 246 dated August 13, 2015 (“FAR-246”) is based on the fact that an airline should be able to provide a reserve aircraft and makes sense in case of large-scale non-scheduled passenger services. However, it is deemed burdensome and excessive for one-time charter flights operated in the business aviation segment. As a result of this requirement, Russian airlines cannot compete equally with foreign air operators present in the Russian market that are not bound by any similar requirements. A proposed solution is to make amendments to FAR-246 in order to limit the scope of this requirement to non-scheduled air services operated on aircraft accommodating over 55 passengers.

The need to provide aircraft technical facilities and equipment ensuring aircraft accessibility for passengers with reduced mobility and disabled passengers. This requirement set forth by Order of the Ministry of Transport of the Russian Federation No. 290 dated August 02, 2018 is deemed excessive for the business aviation segment. That is why we propose that business aviation should be outside the scope of the above Order.

Regulatory documents often not taking into account business aviation specifics. The terms “business aviation” and “business aviation aircraft” are not defined in the regulatory framework, so this segment cannot be easily placed outside the scope of some regulations even if it is required. A proposed solution is to define the terms “business aviation” and “business aviation aircraft” in the Air Code of the Russian Federation.

Absence of an established uniform system for continuing airworthiness management in the Russian Federation. As a solution, we propose to establish such system by developing

initial and upgrade training programs both for state inspectors and higher educational institutions engaged in the training of continuing airworthiness personnel and put in place communication processes between civil aviation authorities and aircraft operators to ensure implementation of the state supervision over continuing airworthiness procedures.

To prepare a uniform continuing airworthiness management system of the Russian Federation, it is proposed to set up a work group that will include the lawmaker's representatives, a wide range of aviation experts, aviation associations, representatives of higher educational institutions and other professionals.

In conclusion, I would like to say that today's Russian business aviation is a dynamically growing sector providing high quality transportation services and facilitating business mobility and direct connectivity between airports with no direct air services, on the one hand, and creating various jobs, particularly for high-skilled experts, and ensuring significant budget contributions, on the other.

Our business aviation industry demonstrating high performance even during the periods of crisis definitely has a huge development potential and resolution of the identified challenges will foster this development.

Today's Russian business aviation is a dynamically growing sector providing high quality transportation services and facilitating business mobility and direct connectivity between airports with no direct air services, on the one hand, and creating various jobs, particularly for high-skilled experts, and ensuring significant budget contributions, on the other

“People are Ready to Share Business Jets with Other Passengers. The Economics of Sustainable Consumption Has Done its Job”



Nikolay Ulanov,
the core shareholder of Sirius Aero

Nikolay Ulanov, the core shareholder of Sirius Aero, an international business aviation company, speaks on post-pandemic trends in the business aviation market.

The early 2000s saw the dynamic growth of Russia's business aviation market. However, the situation changed after 2014 when the market started to decline. What is happening now? How do you assess the market size?

It is not an easy question. On the one hand, today we can see that not all businessmen who are able to charter the entire airplane are actually ready to do so. The economics of sustainable consumption has done its job. On the other hand, over the past one and a half years passenger traffic of Sirius Aero has grown compared to previous periods despite a reduced total number of flights. People are ready to share business jets with other passengers flying in the same direction. What's more, they consider it reasonable, as business aviation services are of a much higher level than the services offered in a business class of a scheduled flight, but the price is the same.

There is no question that the business aviation market is going through changes, and Sirius Aero is adapting to new conditions. Our capacity is perfectly balanced with demand.

Speaking of Russia's business aviation market, its size is difficult to analyze. Most information on the number of flights or registered aircraft

within the Russian Federation is private. This information is unavailable, which may be viewed either as a benefit or a shortcoming – depending on the viewpoint. On top of that, as opposed to the European market we do not have a uniform database for monitoring of statistical parameters.

How has the market dealt with the pandemic? What are the needs of today's clients? Has the client's profile changed?

The pandemic had a direct effect on recent trends. Earlier, business jets were mainly used for corporate charter flights. The situation has changed since the spring of 2020. As our statistics show, during the quarantine period with all those restrictions leisure travel has been dominating the market: second residences (69 %), resort hotels (31 %), rented villas (17 %), private or rented yachts (10 %) and Airbnb lodgings (6 %) are the most popular accommodation options for groups of people using business aviation services. The number of business trips has dropped substantially.

Passenger traffic has grown despite the slight reduction in the number of flights. Jet sharing helped passengers who used to fly first or business class to switch to business jet seats for the same price. We have got a new client. People just didn't have a choice. Amid the suspension of air services, quarantine and border restrictions business aviation has become the only option for border crossing.

At present, countries are gradually opening their air space for scheduled flights, but the demand for our services remains strong.

Sirius Aero, the largest international business aviation company in Russia, operates domestic and international charter flights almost to any country in the world. Sirius Aero's fleet includes 18 modern foreign-built business jets with a VIP configuration cabin: Hawker 750, Hawker 850XP, Hawker 1000, Challenger 850, Legacy 600. The airline has offices in Moscow, Vienna, London, Limassol and Riga. Its base airports are located in Russia and Europe



During high tourist season we help even more people reach their leisure destinations. There is a new trend for business jet flights: passengers can enjoy enhanced travel experience with reduced time for pre-flight procedures, but the price is similar to that of a first or business class.

Are airline startups popular today globally? Has the pandemic slowed down investments into business aviation?

For the most part of the previous year, airline management meant aircraft grounding, personnel cuts and trading with governments on recovery measures in desperate attempts to avoid bankruptcy when almost all air services have come to a halt. As a consequence, the price threshold for entering this business has reduced considerably. The new class of businessmen believes that now is the best time to do the things

that seemed so hard in better circumstances, i.e. launch a new airline. New airline startups emerge in North America, Europe, South America, Africa and Asia. Based on the data provided by the aircraft leasing company Avolon Holdings Ltd., over 90 new air carriers have appeared, most of them have already raised financing and are planning to start operations before the end of the year.

Some new carriers rise from the ashes of those airlines that could not survive during the pandemic crisis. Others waited for air services to resume to show the signs of their recovery and deliver on the plans that were developed earlier. Most of these airlines hope they will be able to acquire an aircraft with a significant discount and take slots at airports that were busy one day. Sirius Aero has a significant advantage over other airlines, already existing and newly emerging: our position in the aviation



market is strong, we have taken our niche and, what's more important, operate our own fleet.

From the very outset of the industry, the availability of qualified staff, pilots in particular, has been a pressing issue. What is the situation now?

Sirius Aero is a member of an international aviation holding company with a full cycle of aircraft maintenance operations and its own flight school located in Riga. The company providing training and qualification services for our pilots currently holds type ratings for 12 aircraft types. So, we don't have any issues with highly qualified and professional pilots.

How would you describe competition in the Russian business aviation market?

In Russia, business aviation market is not able to offer a wide range of services and flexibility that you can expect on the European market. Although Russia is among the countries with a high demand for private air services, the market is underdeveloped compared to the UK or Austria. As a result, we don't have many competitors in the domestic segment. Based on our data analytics, today Sirius Aero is the largest commercial operator in Eastern Europe holding more than a 50 % share of Russia's market and the only Russian airline able to provide a reserve aircraft. If we look at statistical data on international flights from Vnukovo airport, we will see that Sirius Aero is the third biggest airline accounting for 8.16 % departures. The first two carriers are from Europe and have shares of 10.79 % and 9.9 %. At the same time, Sirius Aero have operated the largest number of outbound flights to London (14.02 %) and is among the top three airlines flying to Latvia and UAE. Therefore, we are very confident now that we are entering the European market with two sales offices in Vienna and London.

Is it necessary that companies operating in Russia's business aviation market undergo an audit procedure? What do audit results tell clients and are they actually available to them?

Airline audit is very important, necessary and accessible. It is especially true for airlines that provide aircraft management services to their clients. An airplane is quite an expensive asset requiring significant investments. In the first place, an audit is conducted to make sure that aircraft management will be associated with minimum financial losses. Any company responsible for managing an asset such as an airplane should be subjected to rigorous oversight.

In addition to standard technical and financial audits, our company has undergone a regular audit of International Business Aviation Council (IBAC) since 2017 and achieved IS-BAO Stage 3 Certification on July 30, 2021. The audit involves a thorough examination of the company's Safety Management System (SMS) and Quality Management System (QMS). Over the past 4 years, Sirius Aero has improved efficiency and cost-effectiveness of all internal processes through the implementation of international business aviation standards. Today, the airline has a team of responsible employees having a clear understanding of their duties and recognizing that the safety and quality of services depend on the efforts of each staff member and not exclusively on pilots.



Sirius Aero received IS-BAO Stage I Certification on October 2, 2017. It was the first implementation phase of the company's SMS demonstrating that the necessary infrastructure was established, documented and supported with resources. On June 30, 2019, IS-BAO Stage II accreditation was achieved by the airline proving that the SMS was functional and its performance results were measured and analyzed. During IS-BAO Stage III audit the company's safety performance assessment was not limited to document checks as the auditors focused on the systematic approach to the prevention of undesired occurrences and, among other things, conducted personnel interviews



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PRIVATE JET RENTAL

Take off 3 hours after flight
approval

Direct jet rent without any
middleman

Own aircraft fleet consisting
of 18 business jets



Moscow

London

Vienna

Limassol

Riga

Current Development Trends of Commercial Business Aviation in Russia



Mikhail Titov,
General Director, NAJET LLC

First of all, I would like to emphasize that this review will focus on commercial business aviation, i. e. commercial air services operated under an air operator certificate (AOC) issued by the Federal Air Transport Agency in accordance with the federal aviation regulations implemented by Order of the Ministry of Transport of the Russian Federation No. 246 dated August 13, 2015. We will not discuss general aviation here.

Over the past few years Russia has seen some critical milestones reshaping the power balance in the market. The foundation for this drastic change was built when the Federal Air Transport Agency and the customs authorities strengthened the oversight over commercial air services between various locations in Russia, which resulted in foreign airlines losing their positions in the country's domestic market. The next important step was to introduce a zero customs duty rate and a zero VAT for certain categories of imported aircraft and spare parts. This initiative served as a protection measure for Russian air operators and stimulated import of aircraft into the Russian Federation. At the same time, there are also certain negative factors that hold back the accelerated growth of Russia's business aviation industry.

One of them is a **problem of meeting the Type Certificate Data Sheet (TCDS)**. Business aircraft offer multiple options for engine types, avionics, other equipment, and cabin layout. With a TCDS issued for a specific aircraft modification it is almost impossible to select an aircraft of similar configuration for import.

Limited choice of aircraft types and manufacturers. Given that aircraft type certification is a costly and lengthy process, manufacturers refuse to deal with it if they do not receive a firm order for several aircraft. Therefore, Russian airlines have a very limited choice of

The important step was to introduce a zero customs duty rate and a zero VAT for certain categories of imported aircraft and spare parts. This initiative served as a protection measure for Russian air operators and stimulated import of aircraft into the Russian Federation

aircraft types because non-certificated types (which are normally the newest) are not considered for purchase or lease as they cannot be included in an AOC.

Personnel and flight crew training issues. Each airline should have an appropriate number of instructors and examiners as it cannot engage other airlines' personnel for the purposes of initial operating experience (IOE) training ("flight slavery"). As a result, airlines have to spend huge budgets on a complicated process of training and qualification of their own staff.

An outdated and **inefficient process of approval of foreign training and maintenance centers** for specific aircraft types creating logistic barriers for airlines.

And of course we have to mention the Federal Air Transport Agency's intention to rule out the possibility of having the operated aircraft registered in partner countries under intergovernmental agreements pursuant to Article 83 bis of the Convention on International Civil Aviation.

Price for air services.

This is another adverse factor in the Russian market. Apart from high lease payments, we have another important cost item influencing the total air service price, which is ground handling, I am sad to say.

Although significant steps have already been made to shift the center of gravity in business aviation operations towards Russia, we still face numerous barriers in achieving this

Conclusion.

Although significant steps have already been made to shift the center of gravity in business aviation operations towards Russia, we still face numerous barriers in achieving this.

A good example of a solution that would be convenient for operators in this sense is a register that simply approves FAA and EASA regulations without imposing its own requirements.

The share of commercial flights operated by Russian airlines has grown substantially, however we are still lagging behind our foreign competitors in the international sector. In this regard it seems strange that the procedure for admission of foreign air operators has been simplified and is now performed in the shortest possible time without coordination with Russian airlines.

An important challenge for the industry development is aircraft lease terms offered in the Russian market. Here we have short lease periods, at least 30 % share of equity capital, and high interest rates.

As a result of all these factors, business aviation market of Russia has not seen any major investors until now. Today, Russia's purely commercial business fleet is represented by nearly 40 airplanes (some of which are aged and include old models) compared to the European fleet of over 2,000 aircraft.

At the same time, we cannot leave unnoticed the heroes of today's commercial business aviation market of Russia – Sirius Aero and Weltall Avia, the national leaders of the industry dynamically expanding their aircraft fleets.

Speaking of the aircraft fleet in general, it is important to note that Russian business operators almost never utilize inexpensive aircraft classified as light jets that represent nearly 57% of all business jets operated in Europe. With the exception of extra small airplanes and airplanes without lavatory units (which is not welcomed in the Russian market), the most popular models in Europe are Cessna XLS, Phenom 300, PC-24, Premier 1, etc. In Russia this class of aircraft accounts for a minor share of operated air services. But these very aircraft will be behind the future large-scale growth of Russia's business aviation.

To make it clear, in the USA and Europe business aviation carriers make use of a well-developed infrastructure of airports and aerodromes. Handling costs at small aerodromes are not so high, which when combined with low lease payments allows business aviation carriers to even compete with scheduled air operators. In addition, innovative sales systems boost commercial aircraft utilization and seat load factor. We will discuss it in detail later.

Russian airlines, in contrast, always fly to major airports and work with special organizations supervising airport services to satisfy existing service quality requirements. In some cases they use special business aviation infrastructure where it is available. Vnukovo-3 and Pulkovo-3 are among the most widely used airports.

Now the most interesting part. Sales. The main mystery of "notorious" business aviation, as the media calls it.

How did it work in the past? Well, not only in the past actually... This is how most sales are still made now. Oh, this sweet word "broker". Who is a broker? What planet does he come from? Yes, it is him. He can do everything! He has connections in various airlines. He can ask for an airplane. And they will give him an airplane! This is what a client thinks for whom a flight on a business jet is similar to getting access to a rare product after pulling some strings. But times change...

Airlines that were reluctant to communicate with direct clients are now becoming more open. More and more information is posted on websites, new products are developed. For the second time I would like to mention Sirius Aero that is changing in a noticeable way actively implementing digital products for promotion while maintaining close cooperation with business aviation brokers present in the market.



Foto: Sirius Aero Ltd.

With the development of a dedicated state-of-the-art software and considerable standardization of passenger services, clients can now receive all necessary flight information promptly on demand, choose from various options, book selected flights, and pay by credit cards

But back to the products.

In addition to a conventional turnkey air service provided on a private jet, today clients can choose from a variety of options:

- an empty leg flight;
- a seat in an air shuttle (a business jet operating flights based on schedule);
- jet sharing (initiation of a flight with an attempt to find fellow travelers to share the price).

The key trend in sales is an online sales method which has already become traditional for many services.

With the development of a dedicated state-of-the-art software and considerable standardization of passenger services, clients can now receive all necessary flight information promptly on demand, choose from various options, book selected flights, and pay by credit cards.

I am proud to say that **www.najet.online** service announced by NAJET LLC is a leader among such services in Russia, facilitating strong sales and client growth and expansion of the fleet participating in the project.

Soon we will see the whims of business passengers fading away in the past, prices scaling down, and business jet flights becoming a very down-to-earth and highly demanded transportation service so necessary in our immense country.

Opportunities for Airplane Import: VAT Exemption



Stanislav Gallyamov,
General Director, Aviabroker LLC



Anna Serezhkina,
Executive Director, RUBAA

Successful development of business aviation in Russia depends largely on whether the import conditions applicable to aircraft intended for commercial service are favorable enough and, accordingly, on how much business aviation carriers operating such aircraft are capable to expand and grow their fleets in line with passenger market demand. At the same time, registration of aircraft in the State Register of Civil Aircraft of the Russian Federation is encouraged in the country to allow airlines to legally operate flights within Russia.

The burden of customs duties and taxes impeding efficient operations of airlines in Russia has been repeatedly discussed at various events and in the media. One of the examples is a mandatory import value added tax (VAT). It is important that in the past Russian airlines engaged in legal commercial operations had a right to deduct or set off the import VAT paid in accordance with existing tax accounting practices. Clearly, with this system the airlines were in fact forced to set aside significant funds, which put extra pressure on their business.

Import conditions became more favorable with the promulgation of Federal Law No. 324-FZ dated September 29, 2019 "On Amendments to Part 1, Article 24.2, and Part 2 of the Tax Code of the Russian Federation" which included without limitation the addition of sub-paragraphs 20, 21, and 22 to Article 150 of the Tax Code of the Russian Federation from January 1, 2020 (the "Federal Law").

Pursuant to the Federal Law, imported commercial aircraft will not be subject to taxation (will be exempt from taxation) if one of the following documents is filed with a relevant tax authority: a copy of a certificate of the aircraft registration in the State Register of Civil Aircraft of the Russian Federation or an obligation of a tax payer, being a customs declarant, to submit a copy of such certificate within 90 calendar days upon registration of a customs declaration. This requirement

is stipulated in Article 150, Sub-Paragraph 20 of the Tax Code of the Russian Federation.

In addition, imported commercial aircraft will not be subject to taxation (will be exempt from taxation) if a relevant tax authority is provided with a copy of the aircraft registration in the civil aircraft register of a foreign state which by agreement with the Russian Federation transferred to it all or part of its functions and duties as State of Registry in respect of that aircraft pursuant to Article 83 bis of the Convention on International Civil Aviation (Chicago, 1944). This requirement is stipulated in Article 150, Sub-Paragraph 21 of the Tax Code of the Russian Federation and will be in effect until January 1, 2023. Currently, the Russian Federation has agreements with several governments, though some of them are not widely used or implemented at all. The provisions of Article 150, Sub-Paragraph 21 of the Tax Code of the Russian Federation will be in effect until January 1, 2023.

It should be noted that the tax amount that is assessed against a commercial aircraft declared for taxation purposes should be paid by a tax payer if such tax payer having an obligation to register the aircraft in the State Register of Civil Aircraft of the Russian Federation failed to provide a copy of such registration certificate or if the aircraft was removed from the said Register. No tax will be assessed where a commercial aircraft is removed from the Register as a result of its retirement or withdrawal from service due to impossible operation of such aircraft as intended (as a transport vehicle) or where a commercial aircraft is exported from the Russian Federation for the purpose of its transfer to a foreign legal entity or individual.

The import VAT will also be collected if the tax exemption was granted in accordance with Article 150, Sub-Paragraph 21 of the Tax Code of the Russian Federation but the aircraft was later removed from the aircraft

register of any state with which the Russian Federation has a relevant intergovernmental agreement. Again, the exemption will apply if the aircraft is retired due to operational unsuitability or is registered in the State Register of Civil Aircraft of the Russian Federation and a relevant registration certificate is filed with a tax authority.

The VAT is charged at the rate of 20 %.

In accordance with the law and existing practice, imported spare parts and equipment intended for maintenance and repair of commercial passenger aircraft will be exempt from customs duties based on Section 7.1.15 of Resolution of the Customs Union Commission No. 130 dated November 27, 2009 "On the Uniform Customs Tariff Regulation of the Eurasian Economic Union" and from import VAT in connection with goods clearance for home use based on Article 150, Sub-Paragraph 22 of the Tax Code of the Russian Federation.

A zero customs duty rate will be applied to aircraft with a maximum seating capacity of 50 passengers and an operational empty weight of 2–15 and 15–20 tons. Only a customs clearance fee of 30,000 Rubles

(approximately 370 Euro) will be charged. Imported aircraft with a maximum seating capacity of 50 passengers and an operational empty weight of 20–90 tons will be subject to the effective customs duty of 12.5% of the customs value of such aircraft.

Thus, we can say that significant financial investment and barriers associated with the development of business aviation in terms of aircraft import costs are kept to a minimum at the moment. In reality, this has been demonstrated by a number of airlines recently obtaining an air operator certificate and growing their fleets. However, it is essential to remember that these provisions are only applicable to aircraft that were type certificated in Russia by the Interstate Aviation Committee. Such measures will bring benefits to those organizations which are engaged in legal aircraft operations in the commercial sector, demonstrate compliance with all applicable laws currently in effect, perform aircraft repair within and outside the territory of the Eurasian Economic Union following proper customs clearance procedures as required by applicable laws and involve crews mainly composed of citizens of the Russian Federation.

Ekaterina Malyarova, Cand. Sc. Law, Head of Legal Department, North-West Air Company LLC

Liberalization of tax policy and tax administration in civil aviation is deemed a natural response of the lawmaker to the long-standing need for stimulating the development of one of the most important industries.

VAT exemption of imported commercial aircraft ensures consistent transparency and progressive development of civil aviation in the Russian Federation.

Based on accumulated experience and unbiased assessment of an existing industry trend, it is fair to say that the number of imported aircraft registered in the State Register of Civil Aircraft has grown significantly in recent times.

From a global perspective, the most important thing about the lawmaker's approach to taxation of customs procedures involving aircraft is that the resulting clear benefits are not limited to the exemption of imported commercial aircraft from VAT, as follows from direct interpretation of respective provisions of the Tax Code of the Russian Federation.

It is no secret that a major portion of maintenance and repair operations covering previously imported aircraft is performed outside Russia. Further, to be able to depart for maintenance the aircraft should be placed under an outward processing customs procedure.

The cost of repair work which, among other things, includes a conditional cost of warranty work for customs purposes, will be subject to a customs duty and VAT at the rates applicable to the aircraft at the time of import.

Therefore, in terms of the tax benefit concerned, repair work will be exempt from VAT, which is an even more notable and needed incentive for current operation of the aircraft creating a more comfortable operational climate for an operator/declarant, on the one hand, and, on the other, playing a preventive role in addition to stimulating such operator/declarant to ensure full compliance with applicable tax regulations while providing all necessary business tools.

At present, North-West Air Company's fleet includes 9 aircraft all of which, with one exception, have been imported to the Russian Federation and registered in the State Register of Civil Aircraft of the Russian Federation after this tax benefit was introduced.

This clearly indicates that North-West Air Company, as well as many other operators, appreciates the government's efforts towards stimulation of the aviation industry development.

“If You Want Peace, Prepare for War”, Or How to Draft a Contract That Will Protect a Carrier and a Client



Elmira Kondratieva,
Managing Partner, Forward Legal, attorney

Business aviation gains momentum in Russia, however, it is still a closed sector bound by strict confidentiality requirements.

Even though business aviation industry focuses on the provision of exclusive services, it is subject to conventional regulatory principles, the key one stating that “contracts are made in preparation for war, not peace”. For this reason, a contract should include all the provisions that can help a company win a lawsuit in which it may become involved either voluntarily or involuntarily. Clearly, the counterparties should not rely on good relationships existing between them at the time the deal is made.

Analysis of the commercial case database shows that there are very few litigation cases involving business aviation organizations. This can be explained by several reasons such as resort to commercial courts which do not publish their judgements; failure to enter into a contract or improper contract formation; failure to include information on courts of competent jurisdiction in the contract; conduct of business operations in disregard of the applicable Russian laws as a result of which the parties are unable to refer their dispute to a court.

As our decades of experience prove, strict compliance with all requirements set forth by the Russian laws, including those related to civil aviation operations, leads to a significant reduction of business risks and helps build long-term partnerships. In certain cases the parties could have avoided legal action if they drafted their contracts carefully.

Whether you are a broker, a carrier or a client, we recommend that you pay attention to the detailed description of all contract terms and conditions that are important to you. Some of them are listed below.

Aircraft cabin configuration: VIP or economy class. Neither Russian laws nor international regulations define the term “VIP” which is often used in business aviation. Assignment of an aircraft cabin to a VIP category is based on subjective perceptions by parties to a contract. So, in the event of any dispute related to suitability of the aircraft cabin considering the configuration requested, the court will base its decision on whether the contract terms and conditions have been fully met by a defendant, but not on the evaluation of the aircraft itself.

Potential parties to a contract for air services include an air operator, a client (a passenger or organization chartering a flight for its own benefit) and an intermediary (a broker, agent or tour operator).

The first thing that clients, both direct clients and intermediaries, are advised to do is to verify if a particular airline holds an air operator certificate and if the aircraft is included in such certificate. Airlines which cannot offer commercial fleets should not be contracted and their flights should not be chartered. A register of airlines operating under an AOC is publicly available on the website of the Federal Air Transport Agency.

All contracting parties irrespective of their numbers, service prices or contract type should concentrate on the following aspects, in particular.

Aircraft: apart from the type of aircraft, a contract should specify aircraft registration marks, all material technical parameters and options available to passengers, etc.

We recommend that the parties include a detailed description of the aircraft and conduct its visual check whenever possible. A configuration provision may be worded differently:

- Specify a registration mark of the aircraft planned for operation.
- Describe the exact interior characteristics and criteria according to which the interior will be classified as VIP or economy class (e.g. specific cabin configuration with luxurious seats, luxurious interior finish, maximum seating capacity, technical capability to serve hot inflight meals, availability of lavatories and shower facilities, cargo hold space, capability to transport oversized baggage (skis and other sports equipment, baby strollers, etc.) and other parameters).
- Include pictures of the cabin that meets the client's requirements as a schedule.

Procedure used for coordinating a change of aircraft if a carrier is unable to provide the aircraft specified in the contract: if a contract does not describe the procedure to be followed in case of aircraft change,

e.g. for technical reasons, a client and a broker are exposed to a risk of lower quality services. In such cases we recommend to focus on the following:

- The procedure used if an aircraft needs to be changed: a carrier chooses any aircraft with similar configuration available in its fleet or a change is discussed with a broker. In this case, a contract may specify a registration mark and characteristics of the aircraft that should be provided as a replacement.

- Whether a broker/client may cancel the service if neither of the replacement aircraft proposed meets the requirements. If all change options are described in a contract, an air operator will be protected in case of flight cancellation by a client or an intermediary which will constitute a breach of contract.

- Service price adjustment in case configuration of the replacement aircraft proposed by a carrier has been downgraded compared to the original configuration specified in the contract.

- Notification method used if the aircraft agreed by the parties cannot be provided: email or other communication means, if specified in the contract.

- Carrier's liability in case it is unable to provide a replacement aircraft from its fleet and has to charter another carrier's aircraft.

All of the above provisions should be included in a contract, otherwise the parties may find themselves in an unfavorable position during its performance. To illustrate this, let's refer to the following case taken from the court practice:

A broker acting for the benefit of its client entered into the contract of carriage of passengers and baggage with a carrier. According to the flight assignment agreed by the parties in the schedule to the contract, the air service was to be provided on a specific aircraft type outfitted with a VIP cabin interior. In the performance of the contract the carrier could not provide the aircraft with the agreed registration mark and replaced it with another aircraft of the same type.

After the flight completion, the broker filed a claim against the carrier to seek partial refund of the service price because the actual aircraft had an economy class cabin instead of the requested VIP interior.

The claim was dismissed by the court, as later were the cassation and the appeal submitted by the claimant, as the court found that the air service was properly delivered by the defendant in full compliance with the contract and the flight assignment which did not contain any description of the aircraft characteristics and based on acceptance of the service by the client under the contract.

Liability of a carrier and broker in the event of a flight delay through their fault: a flight delay may be caused by a carrier's failure to timely prepare an aircraft for departure or by a client's failure to show up on

time. In such situations losses are usually sustained by both contracting parties. Therefore, the consequences of schedule disruptions should be defined in advance.

For example, a contract may include a provision stating that in case of a departure delay a client may cancel the service or demand reduction of the price in proportion to the time of delay, if such delay was caused by inappropriate actions of an air operator and was not attributed to safety or security reasons, weather conditions, etc. In our practice, we have dealt with many similar cases none of which was referred to court as both parties made concessions intending to continue their business relations. In almost all cases the parties recognized the litigation risks knowing that they did not have a proper contract in place or the contract had certain flaws from the legal perspective.

Contract execution in compliance with Russian laws: if a contract was drafted based on examples from foreign airlines, we recommend that the parties verify that its terms and conditions are in line with Russian laws. This is particularly important when it comes to confirmation that the service was provided. Please note that neither an invoice nor a VAT invoice proves that the service was actually delivered and that a client or a broker has no objections to its quality. Such documents cannot be used to claim payment for the services from a broker or client.

A service acceptance certificate specifying that a client has no objections to the scope and quality of services is the only proper confirmation of the service delivery. The procedure and timelines for its submission should be detailed in a contract.

Jurisdiction: we have often provided consultancy support to clients who approached us with the intention to "sue the other party" under the air charter services contract. Unfortunately, very often we had to disappoint our clients by explaining them that all disputes under their contracts should be resolved by foreign state or arbitration courts (e.g. LCIA in London). Legal proceedings in any foreign court will require more time and financial resources compared to the Russian court. Moreover, sometimes there is no point to resort to a foreign court if the amount in dispute does not exceed a standard charter service price – you will spend more on attorneys' fees. In this case our main recommendation would be to decide in advance which court will resolve a potential dispute and evaluate the costs and time implications.

Therefore, it is of utmost importance to carefully word all material contract terms and procedures. A contract is not a mere formality, it is a tool for efficient and effective operations in any sphere. It is worthwhile to cover all possible situations early and try to eliminate the risks. Otherwise, there is high chance that one may have to face unpleasant circumstances resulting in loss of clients and long-term litigation which does not always have a desired outcome.

A contract properly drafted by legal professionals in coordination with air service experts will allow to go through every detail and settle a dispute amicably by means of negotiations, should it arise.

It is of utmost importance to carefully word all material contract terms and procedures. A contract is not a mere formality, it is a tool for efficient and effective operations in any sphere. It is worthwhile to cover all possible situations early and try to eliminate the risks

Illegal Charter Flights Pose Serious Risks for Airlines and Passengers

Illegal charter flights, i. e. commercial passenger air services operated on private jets without a commercial air operator certificate (AOC), is an issue faced by business aviation and its traveling public throughout the world every day. The topic of illegal charters raises much debate at the world's leading industry conferences.

The event organized by the Russian United Business Aviation Association (RUBAA) was no exception: in October 2020, the problem of illegal charters was addressed at a dedicated session of the annual Business Aviation Conference held under the auspices of RUBAA. The topic was discussed by experts from different perspectives, including legal aspects, insurance, and proper business practices of a commercial air operator.

The session was attended by Yaroslav Odintsev, President, RUBAA; Mikhail Parnev, General Director, Sirius Aero Ltd.; Alena Solovyeva, Legal Advisor, Kennedys; Andrey Sheyn, Deputy General Director, MARSH; Alexandr Morozov, Head of Charter Flights Department, Biletix.

The main objective of the session was once again to raise awareness of the problem of illegal charters as well as safety hazards that it poses to airlines, passengers and the industry in general and demonstrate well-reasoned arguments to the audience. In contrast to many other events where speakers simply state that illegal charters are a harmful phenomenon that we need to combat, at RUBAA's Conference the focus was made on the practical side of the topic with a view to highlight the troubles that illegal charter operations create.

In the first place, it should be emphasized once again that commercial air services may only be operated under an AOC. Only a commercial air operator is capable of ensuring safety of flight and passengers.

To qualify for and maintain an AOC, the airline must put a lot of work into meeting the essential requirements imposed on AOC holders. Such requirements which are mostly related to maintaining and improving safety and financial standing are not applicable to general aviation operators. Maintenance of AOC and compliance with all the requirements in terms of personnel numbers, working conditions, and qualification as

well as fleet airworthiness requirements are obviously associated with significant mandatory expenses. As a result, commercial air operators lose to private businesses in the illegal "competition" (the quotation marks are used on purpose). But passengers and customers may have to pay a high price for this cost reduction.

A commercial air operator assumes much more responsibility towards passengers and all parties involved in the transportation process.

One of the challenges that business aviation has to deal with is excessive regulation and unreasonably high requirements to commercial air operators that are currently applied uniformly to business aviation operators flying one or two airplanes of different types with a maximum seating capacity of 10-12 passengers and trunk carriers operating fleets of dozens of airplanes, each accommodating up to 200 passengers.

Again, it is important to distinguish clearly between commercial air carriers providing passenger services as part of their business operations they need to maintain and private operators that use aircraft exclusively for their own benefit.

Commercial air services may only be operated under an AOC. Only a commercial air operator is capable of ensuring safety of flight and passengers

The problem is not limited to economics only.

From a legal perspective, operation of commercial services on private jets is deemed an illegal commercial practice and may entail serious consequences. Illegal air services definitely fall under this category.

An important aspect is airline insurance. Insurance companies use different approaches to assess risks and liabilities that they assume when dealing with the private and commercial sector. Before any insurance policy is signed, an insurance company must be provided with the information on the airline and planned operation of its aircraft. The cost of aircraft insurance differs for private and commercial operators.

If, upon occurrence of an insurance event, it is established that the actual operation of the aircraft differs from that originally declared, an insurance company may use it as a legitimate reason to deny an insurance claim. In this case, the aircraft owner or operator will not only have the obligation to pay compensatory damages, but will be exposed to additional serious liability risks. Passengers and other third parties will be left without the protection of the insurance coverage. If transportation services are provided by a commercial air operator, such commercial air operator is required to carry passenger liability insurance. In general, any airline may procure life and health insurance for any person, including persons onboard a private airplane, for a period of 24 hours. But private jet operators are unlikely to even think about it. They just do not provide such insurance by default. When it comes to a commercial air operator, failure to provide a proper insurance coverage may lead to revocation of an AOC.



The session of the annual Business Aviation Conference, October 2020, Moscow

Any airline, agent or broker working with high-profile corporate customers will refuse to deal with a company operating a fleet of exclusively private aircraft.

Cooperation with a commercial airline will guarantee an appropriate level of safety and availability of a valid insurance policy covering all necessary risks. In addition, this will mean financial and reputation security and execution of a complete document package by all parties, including agreements and financial statements. It should be noted that an agent or a broker is responsible to the customer for the provision of specific services, including flight services, as well as the legitimacy of such services. For this reason, general aviation is a no go for careful agents and brokers. Both agents and brokers are reasonably interested in the growth of airlines' fleets. Appropriate online projects that are currently implemented, the NAJET online booking project in particular, assume that the system will work with commercial aircraft only.

Despite significant restrictions, 2020 demonstrated that the fleet offered by airlines in Russia has its growth potential and will be fully utilized. For example, Sirius Aero successfully performed its shuttle program which was under close examination, however, as an AOC holder the airline was able to transport passengers without any problems.

In conclusion it was stressed that RUBAA is committed to legitimate business practices and strongly supports the idea that commercial air services should be provided by commercial air operators only. This opinion was shared by all participants of the event.

Cooperation with a commercial airline will guarantee an appropriate level of safety and availability of a valid insurance policy covering all necessary risks. In addition, this will mean financial and reputation security and execution of a complete document package by all parties, including agreements and financial statements



Andrey Sheyn, Deputy General Director, MARSH;
Alexandr Morozov, Head of Charter Flights Department, Biletix; Alena Solovyeva, Legal Advisor, Kennedys;
Yaroslav Odintsev, President, RUBAA; Mikhail Parnev, General Director, Sirius Aero Ltd.

Identifying Critical Elements of an Aviation Enterprise by Analyzing Outcomes of Safety Occurrence Investigation



Dmitry Melnik

Deputy General Director, Flight Safety – Head of Flight Safety Department Sirius Aero Ltd.

Pursuant to the Regulations on Civil Aircraft Accident and Incident Investigation in the Russian Federation (PRAPI-98) [1], investigation of aircraft accidents or incidents should be based on a multi factor principle which includes identification of any deviations from the normal operation of the civil aviation system and assessment of their impact on flight performance.

Hazards identified through investigation of safety occurrences are analyzed in terms of a reactive approach to safety performance

management. At the same time, as the SHELL Model (*Figure 1*) suggests, investigation of safety occurrences also involves analysis of hazards related to personnel's failure to follow the established policies, rules and procedures, which can be used as a part of a proactive approach to safety.

Therefore, all outcomes of safety occurrence investigation can be broken down into safety performance indicators (Sf component) and quality indicators (Lv, Hr, En components):

$$C_A = \{(Q_i \in Sf) \cup (S_i \in Hr, Lv, En)\}, \quad (1)$$

where C_A means Aviation System, Q_i means Quality Indicators, S_i means Safety Performance Indicators, Sf means Software (policies, procedures, manuals, regulations, instructions, and computer software), Lv means Liveware, Hr means Hardware, En means Environment.

Quality-related hazards depend on the level of observance of procedures, while safety-related hazards are viewed as events that occur due to non-observance of the established procedures. An example of such differentiation is provided by International Civil Aviation Organization (ICAO) in Doc 9859 – Safety Management Manual (4th edition, 2018), Section 4.3.2.2 [2].

Figure 2 shows that poor bird scaring activities at an airport (leading indicator) cause aircraft bird strikes in-flight (lagging indicator). ICAO notes that there is a clear correlation between the two types of indicators. However, no specific methodology to establish reverse correlation between the two has been proposed so far.

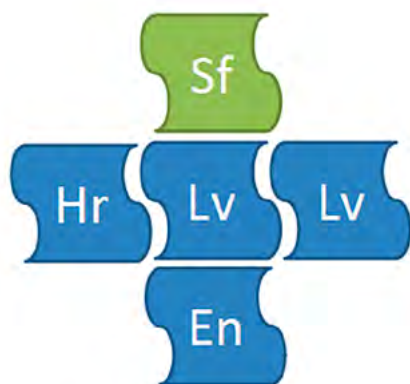


Fig. 1 Model of Impact of the Different Aviation System Components on the Human and Their Interaction

Poor bird scaring activities at an airport (leading indicator) cause aircraft bird strikes in-flight (lagging indicator)

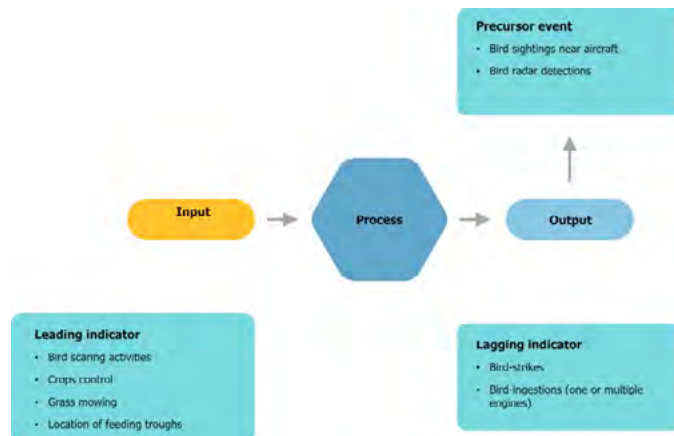


Fig. 2 ICAO Example of the Two Types of the Aviation System Indicators

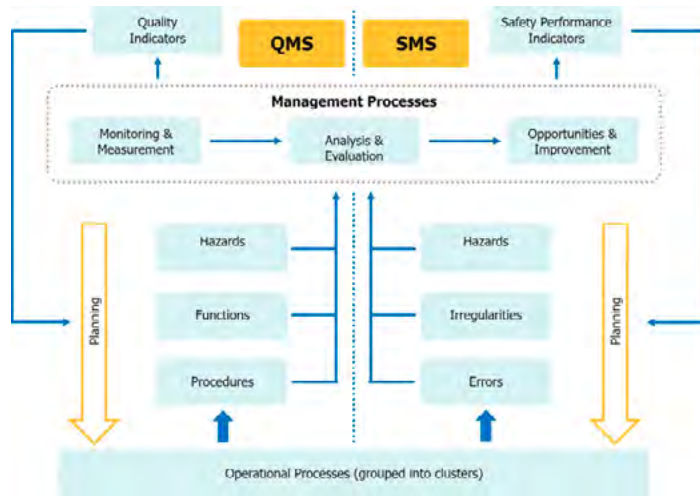


Fig. 3 Process Clusters of a Typical Aviation Enterprise Within an Integrated Quality and Safety Management System

QUALITY AND SAFETY PERFORMANCE INDICATORS OF AN AVIATION ENTERPRISE

In a modern aviation enterprise, the defined processes and procedures can be evaluated in terms of their observance, with the outcomes presented as quality indicators. Then, the risk events identified in the course of incident investigation can be perceived as safety performance indicators.

Figure 3 depicts process clusters of a typical aviation enterprise within an integrated quality and safety management system. As shown on the diagram, quality and safety performance indicators are handled through such management processes as monitoring, measurement, analysis and evaluation, determination and selection of opportunities for improvement [3].

Operational processes are grouped into clusters and comprise quality-related and safety-related hazards.

Monitoring of quality and safety performance indicators of an enterprise on a regular (ongoing) basis (2) and identification of interdependencies between these indicators using a typical correlation analysis method (3) offer a unique opportunity to determine critical elements (critical

Monitoring of quality and safety performance indicators of an enterprise on a regular (ongoing) basis (2) and identification of interdependencies between these indicators using a typical correlation analysis method (3) offer a unique opportunity to determine critical elements (critical procedures, processes), which, if proactively acted upon, may contribute to substantial improvement of the aviation system itself and efficiency of flight safety activities

procedures, processes), which, if proactively acted upon, may contribute to substantial improvement of the aviation system itself and efficiency of flight safety activities.

$$f: P_{mm} \rightarrow p_i = p_i(t) = f_i(t), \quad (2)$$

where means measurement and monitoring process, means operational processes.

An important feature of the new procedure is that the indicators are rated based on the following two types: type 1 – “non-observance of procedures” (quality indicators), type 2 – “deviations from established procedures” (safety performance indicators), so that the indicators are measured in the range from 0 to 1 (3).

$$f: P_{re} = f_i(t) = \begin{cases} 1 \\ 0 \end{cases}, \quad (3)$$

where means analysis and evaluation processes.

“Determination of Opportunities for Improvement” management process can be represented as follows (4):

$$f: P_{pi} = (u_1, u_2, u_3 \dots u_n) \left[\frac{1}{n} \sum_{i=1}^n p_i \rightarrow 1, \frac{1}{n} \sum_{i=1}^n l_i \rightarrow 0 \right), \quad (4)$$

where $\sum_{i=1}^n l_i$ means processes related to determination of improvement opportunities, means integrated changes of the system status, means process opportunities.

Accordingly, the formula of integration of the quality and safety management systems of an enterprise can be expressed as (5):

$$C_A = \{Q_i \cup S_i | P_{mm}, P_{re}, P_{pi}\}. \quad (5)$$

Hence, in a safety occurrence investigation both quality-related and safety-related hazards should be analyzed.

METHODOLOGY USED AT A TYPICAL AVIATION ENTERPRISE TO IDENTIFY CRITICAL ELEMENTS OF THE AVIATION SYSTEM

The methodology for identifying critical elements of the aviation system has been developed based on the multicriteria evaluation approach to complex systems proposed by professor E. A. Kuklev [4] (Saint Petersburg State University of Civil Aviation).

A matrix of indicators of an aviation enterprise is split into two independent lines as the quality (Q) and safety performance (S) indicators vary independently in the two systems. The Q and S indicators are then rated based on the following two types: type 1 – “non-observance of procedures”, type 2 – “deviations from established procedures” (Figure 4).

Thus, data on both quality-related and safety-related hazards are obtained.

These hazards are continually monitored over a period of at least 12 months, as shown in (2), with the use of the following types of inspection:

- Audits (internal, external);
- Safety occurrence investigation materials in compliance with PRAPI-98;
- Materials of internal investigations of unclassified safety occurrences;
- Mandatory and voluntary employee reports;
- Flight information analysis;
- Line check and simulator skill check reports;
- Aircraft safety inspection reports;
- Inspection reports issued by Rosaviatsia and Rostransnadzor.

Evaluation of Quality Indicators (of a process, procedure), Q	Evaluation of Safety Performance Indicators, S	Hazard Rating (ϕ)
Not achieved – 0–20% achievement	Number of deviations/month – 8 or more	0.8–1
Partially achieved – 20–50% achievement (0.2–0.5)	Number of deviations/month – 5–8	0.5–0.8
Mostly achieved – 50–70% achievement (0.5–0.7)	Number of deviations/month – 3–5	0.3–0.5
Fully achieved – 70–100% achievement (0.7–1)	Number of deviations/month – up to 3	0–0.3

Fig. 4 Rating of Quality and Safety Performance Indicators of an Aviation Enterprise

To identify critical elements of the aviation system, reverse correlation between quality-related and safety-related hazards $\varphi_1(\varphi_Q)$, $\varphi_2(\varphi_S)$ should be established by means of a typical correlation analysis used as part of a factor analysis of two derivative sets (6).

$$K_{Q,S} = \frac{\sum_{i=1}^n ((\varphi_{Q_i} - \overline{\varphi_Q})(\varphi_{S_i} - \overline{\varphi_S}))}{\sqrt{\sum_{i=1}^n (\varphi_{Q_i} - \overline{\varphi_Q})^2 \sum_{i=1}^n (\varphi_{S_i} - \overline{\varphi_S})^2}} \quad (6)$$

where K_{OS} means multicriteria performance indicator defined in fuzzy sets.

A critical value of the multicriteria performance indicator K_{OS}^* is determined on the basis of the risk assessment matrix developed specifically for the purposes of the methodology (Figure 5).

As can be seen from the above, the multicriteria performance indicator $K_{OS}^* \geq 0.8$ indicates that there are certain critical elements in the aviation system.

Implementation of targeted changes in the aviation system (4) to prevent the occurrence of critical elements allows to avoid undesired events, such as air crash, accident, serious incident, emergency, in the future operations of an enterprise.

CORRELATION BETWEEN QUALITY AND SAFETY PERFORMANCE INDICATORS ILLUSTRATED THROUGH ANALYSIS OF THE SAFETY OCCURRENCE INVESTIGATION AT SIRIUS AERO LTD.

The safety occurrence investigation conducted by Sirius Aero Ltd. ("Airline") has demonstrated a correlation between the quality and safety performance indicators.

In 2020, the Airline reported a safety occurrence related to misinterpretation of the ATC instructions by the flight crew and conducted its own internal investigation.

On January 17, 2020, 10.15 (UTC) Hawker-750 aircraft (VQ-BBR) operating flight No. VQBBR from Athens to Cephalonia occupied closed TWY D10 while taxiing to runway holding position. After that the crew reported the situation to the ATC, shut down the engines and requested a tow truck. 20 minutes later, the tow truck removed the aircraft from TWY D10 (Figure 6).

Among the causes that contributed to occupation of the closed taxiway at Athens airport by Hawker-750 aircraft (VQ-BBR) were:

1. Erroneous interpretation of the ATC taxi instructions by the flight crew.
2. Use of non-standard phraseology by the ATC when issuing taxi instructions, namely incorrect designation of the taxiway ("9D" instead of "D9" as indicated in published aeronautical information).

Non-observance of aeronautical information requirements by the flight crew was the associated cause.

Assessment of a Fuzzy Risk (\hat{R}) of Hazards			Damage Category				
			A	B	C	D	E
Hazard Level		Multiplier	1	0.8	0.6	0.4	0.2
	1st	1	1	0.8	0.6	0.4	0.2
	2nd	0.8	0.8	0.64	0.48	0.32	0.16
	3rd	0.6	0.6	0.48	0.36	0.24	0.12
	4th	0.4	0.4	0.32	0.24	0.16	0.08
	5th	0.2	0.2	0.16	0.16	0.08	0.04

Fig. 5 Multicriteria Performance Indicator Matrix

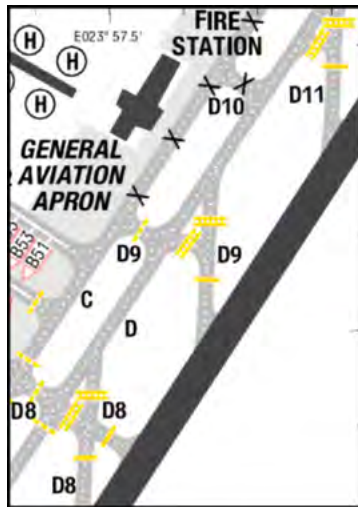


Fig. 6 Athens Airport Taxi Routes

Implementation of targeted changes in the aviation system (4) to prevent the occurrence of critical elements allows to avoid undesired events, such as air crash, accident, serious incident, emergency, in the future operations of an enterprise

The analysis of the occurrence has revealed that the taxiway indicated by the ATC was designated as D9 (not 9D) in the airport aeronautical chart. Having reviewed the possible taxi routes during the preflight procedure, the flight crew expected that the ATC would use a clear taxiway designation "D9". That is why, on hearing the non-standard designation the crew misinterpreted it as "MAIN DELTA" instead of "NINE DELTA" (meaning "take D" instead of "9D") due to similar pronunciation of the two words.

At the time of the ATC instructions, TWY D9 was at an acute angle to the right of the aircraft parked at GENERAL AVIATION APRON, while TWY

D10, the next taxiway along the aircraft movement trajectory, was more convenient for taking TWY D. For this reason, the captain continued taxiing towards TWY D10 to enter TWY D without any doubts as to whether the ATC instructions were interpreted correctly.

As we can see, there is a clear correlation between the quality indicator Q2.1.4 (pilot proficiency in communication (information exchange)) and safety performance indicator S2.5.2 (failure to follow the prescribed taxi routes at the airport) (Figure 7).

Using the formulas (2,3,6), the multicriteria performance indicator (7) was calculated indicating that there is a critical element in the aviation system and being equal to the factor loading between Q2.1.4 and S2.5.2.

$$K_{Q,S}(\beta_{17}^*) = 0.84, \quad (7)$$

where β_{17}^* means poor pilot proficiency in communication (information exchange).

Further on, the necessary corrective actions were developed by the Airline in accordance with (4), making it possible to assert that such occurrences will be prevented in the Airline's future operations.

After implementation of the corrective actions (4) the multicriteria performance indicator reached an acceptable level (8).

$$K_{Q,S}(\beta_{17}) = 0.24. \quad (8)$$

Therefore, critical elements of the aviation system can be identified by analyzing outcomes of safety occurrence investigations with the use of the proposed methodology developed on the basis of multicriteria evaluation of complex systems in fuzzy sets, which allows to implement changes in the aviation system through a risk-based approach.

Potential Benefits From the Use of the Methodology for Identifying Critical Elements of Aviation Systems by Civil Aviation Authorities of the Russian Federation

The use of hazard data obtained by the Federal Air Transport Agency in the course of investigation of safety occurrences and data available at the Federal Authority for Transport Oversight as a result of state supervision activities in the field of civil aviation (Figure 9) provides coherent, linked and useful information on critical elements in aviation systems of service providers (civil aviation entities), which in turn may enhance efficiency of the management decision-making process of both civil aviation authorities and civil aviation entities with a focus on improving aircraft safety performance.

Foto: Sirius Aero Ltd.

S2.4.1	0	-0.18	-0.11	0.41	0.11	0	-0.05	0.5
S2.4.2	-0.21	0	0.02	0.43	-0.17	0	-0.08	0.5
S2.4.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
S2.4.4	0	0.3	-0.11	0	-0.33	0	-0.35	0.5
S2.5.1	0.12	-0.32	0.44	0.12	0.29	0	0.22	0.5
S2.5.2	-0.17	0.23	0.48	0.84	-0.39	0	-0.1	0.5
S2.5.3	0.44	0.1	0.43	0.44	0.36	0	-0.1	0.5
S2.5.4	0.45	0.19	0.29	0.45	0.37	0	0.14	0.5
	Q2.1.1	Q2.1.2	Q2.1.3	Q2.1.4	Q2.1.5	Q2.1.6	Q2.1.7	Q2.1.8
β	14	15	16	17	18	19	20	21

Fig. 7 Fragment of Quality and Safety Performance Correlation Matrix

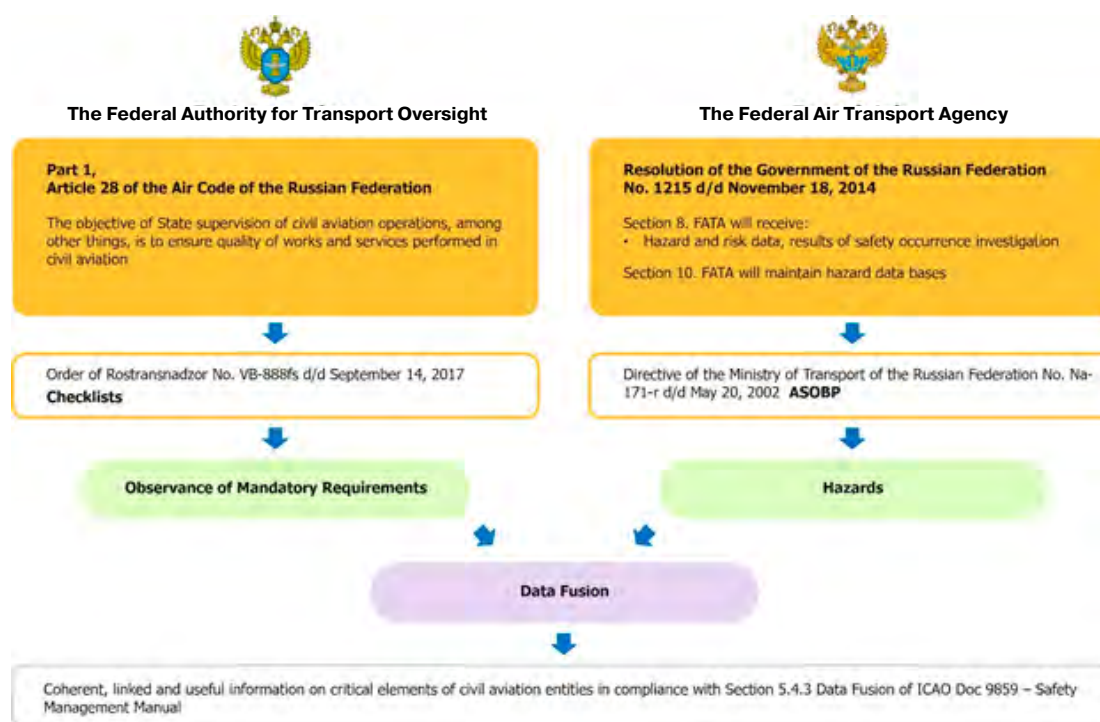


Fig. 9 Potential Benefits from the Use of the Methodology by Civil Aviation Authorities of the Russian Federation

References:

1. Regulations on Civil Aircraft Accident and Incident Investigation in the Russian Federation, approved by Resolution of the Government of the Russian Federation No. 609 dated June 18, 1998.
2. ICAO Safety Management Manual (Doc 9859), 4th edition, 2018.
3. GOSTRISO9001-2015 Quality Management Systems – Requirements.
4. Kuklev E. et al. Flight Safety & Aviation Risk. Singapore: Springer, 2019.
5. Air Code of the Russian Federation (No. 60-FZ dated March 19, 1997).
6. Resolution of the Government of the Russian Federation No. 1215 dated November 18, 2014 “On the Procedure for Development and Implementation of Flight Safety Management Systems, as well as Collection and Analysis of Data on Hazards and Risks Endangering Safety of Civil Aircraft, Storage of this Data and Exchange Thereof.”
7. Directive of the Ministry of Transport of the Russian Federation No. Na-171-r dated May 20, 2002 “On Approval and Implementation of the Guidelines on Information Support of the Automated Civil Aviation Safety System of the Russian Federation (ASOBP).”
8. Order of Rostransnadzor No. VB-888fs dated September 14, 2017 “On Approval of Checklist Forms Used for the Purposes of the Federal State Transport Supervision of Civil Aviation, Use of the Airspace of the Russian Federation, Provision of Air Navigation Services to Users of the Airspace of the Russian Federation.”



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Sustainable Aviation Fuel: Production, Education, Perspectives

The topic of SAF – Sustainable Aviation Fuel – has been discussed this year at the VI practical workshop “Flight Safety. Fuel Safety”, held on the 6th of April in combined format with attendees in the hall, online direct broadcast and telebridges with experts.

A solid board of experts took part in this session: they were Jonathan Wood, VP Europe-ASPAC, Neste; Leo Knaapen, Chief, Industry Affairs, Bombardier; Juergen Wiese, Head of BMW Flight Service and Timothy R. Obitts, President and CEO, National Air Transportation Association. The session was conducted by **Anna Serezhkina, Executive director of the Russian United Business Aviation Association.**



Anna Serezhkina,

Executive director of the Russian United Business Aviation Association

During the opening session, **Mr. Sergey Gudkov, Representative of the Russian Federation of the Governing Council of the International Civil Aviation Organization**, mentioned, that subject of SAF is now widely discussed, including at ICAO. SAF represents part of The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) and is one of the elements of this system and welcomed discussion of this topic at the workshop as one of the most important industry platforms.

Mr. Gudkov also brought attention of the participants of the workshop, that implementation of SAF is included to CORSIA not only as a method for operators to decrease their compensation obligations under this system, but is also an important instrument for achievement of ICAO goals of decreasing emissions. In long-term perspective, SAF will play an important role in CO₂ reduction for international civil aviation.

Mr. Gudkov added, that despite a huge work done and progress achieved in part of providing evidence of technical possibilities of production of equivalent SAF, in part of commercial scale and availability the offer is yet at very early stage. Time and investments are necessary

for development and implementation of SAF, as well as years of research, time for certification and construction of new productional facilities. Besides, new criteria developed by ICAO for implementation of SAF for CORSIA can also limit offer of SAF and require from the industry further efforts on research of new raw materials sources and processes of their processing. Thus, Mr. Gudkov noted in conclusion, only a long-term ecological policy in regard of SAF, as well as necessary economical stimulation can support capital investments of both public and private sectors.

It is also necessary to mention, that in Russia the topic of SAF has been poorly covered at industry meetings and related media, so a special session dedicated to SAF the named workshop has important weight and importance.

During the first session of the practical workshop “Flight Safety. Fuel Safety” topic of SAF was touched through the aspect of personnel training. This specialized session structure allowed to look deeper into the topic, in perspective of SAF manufacturer in name of Neste, aircraft manufacturer represented by Bombardier, and also an industry organization – NATA – who takes care of promoting SAF through its instruments.

Mr. Jonathan Wood, VP Europe-ASPAC, Neste, who opened the practical part of the session, provided essential information, answering the question of what SAF is, how it is produced, and, in fact, we talk about when we say SAF.

Mr. Wood noted, in the beginning, that he is very conscious that whilst the aviation industry is obviously being hit very hard by the COVID pandemic, he remains confident, and he thinks all are confident that sustainability will become an increasingly important topic. Sustainable aviation fuel, which we abbreviate as SAF, will become a key tool in enabling aviation to become more sustainable, in other words, to



Mr. Jonathan Wood,
VP Europe-ASPAC, Neste

provide lower carbon emissions by recycling waste carbon materials already in the ecosystem, rather than extracting more fossil carbon from the ground.

Some few words were said about Neste; a company based in Finland, which has become a leader in the production and supply of renewable fuels. Firstly, on the road for renewable diesel, but also now Neste is producing renewable jet fuel or sustainable aviation fuel. Neste is the largest producer today and has big plans to increase production massively over the next two or three years with very significant investments.

Neste is also already today reducing the carbon emissions of their customers by some 10 million tonnes a year. Neste has, as a company, been ranked in the top three or four in the global index for the sustainability of global corporations for many years. This is something that Neste is very proud of and is fundamental to the company's whole purpose, which is, in the end, to reduce emissions and to make the planet a healthier place for future generations. That's Neste's driving purpose, and so the products Neste is making available to the aviation sector are all part of that purpose.

It was noted, that climate change is increasingly recognized as a major issue for society. Many countries have already made significant commitments towards reducing carbon emissions over time. What is also very important to recognize is the sooner actions are taken, the more achievable a target will become, or to put it a different way, the longer it is ignored, the harder it will become to achieve the climate change goals.

So, what is SAF or what is sustainable aviation fuel? The first thing to emphasize is that it is a fuel which is approved by the global standards authorities, ASTM, for use by all aircraft when blended with fossil jet fuel up to 50 %. It can be used in any aircraft in any infrastructure, in any airport. That's really important if we want to encourage the usage of sustainable aviation fuel, that it is effectively something that we can put in our existing supply systems.

Sustainable aviation fuel is made from renewable recycled waste products. It's different from regular conventional jet fuel, which is made from fossil oil, which comes out of the ground. Sustainable aviation fuel is made from waste products, in particular, waste from bioproducts. It is really a 100 % recycled product, and as a result, does not bring additional carbon into our ecosystem, and as a result, is assessed as generating typically around 80 % carbon reduction end-to-end from production through to when it gets to the aircraft compared with fossil or jet fuel. It's a reduction in the net carbon emissions in the aviation sector.

This is not like carbon offsetting, when somebody else is asked to plant trees in another part of the world, this is about the aircraft we're flying using the fuel which generates a net carbon reduction versus the fossil jet fuel alternative. Also, it's worth noting, it does actually burn more cleanly than fossil jet fuel. It actually has fewer particulate emissions and is therefore also generating other benefits as well as carbon reduction. In fact, studies are going on right now, where 100 % sustainable aviation fuel is being used and where it's being measured, what the benefit is, not just in terms of carbon reduction, but also the other benefits compared with fossil jet fuel. That's what SAF or sustainable aviation fuel is.

Neste collects lots of different biowastes and other materials. The company has specific dedicated refining equipment to produce it into pure sustainable aviation fuel. Neste then blends it up to a maximum of 50 % with fossil jet fuel prior to then moving it or transporting it by pipeline, by a ship vessel, by train, or by truck to the airport and from the airport storage into the aircraft. It's a conventional normal supply system that is used for fossil jet fuel currently.

One other thing to bear in mind is that Neste has testing and certification all the way through the supply chain. Quality can always be confirmed, just like with regular jet fuel, and Neste also provides documentation to the end customers to confirm that they have indeed

bought renewable sustainable aviation fuel and that it has actually been delivered to the airport.

Neste actually has a very rigorous end-to-end process to manage and assure itself about the sustainability of the product it is supplying, right from the very beginning, when Neste collects the different raw materials or feedstocks from where they've come from, what their origin is, and they audit that on a regular basis, and ensure that all suppliers are contractually bound to certain requirements about the environmentally-friendly sourcing of the product.

Then, obviously, Neste both manufactures and delivers and certifies with independent verification agencies at the end with a document, a proof of sustainability, which says, "You have been delivered a product which is made from the following raw materials and it has delivered an 80 % reduction in carbon emissions versus the fossil jet fuel alternative." That's the documentation that will be made available to users of sustainable aviation fuel. That covers what it is.

The next point is how easy is it to get hold of it? The good news is that SAF is now really becoming more available. Initially, it's been made available in particular to commercial airlines, but now also increasingly to business aviation users in Europe and in the United States. In particular, for example, in the UK, Neste is now supplying Signature, and Mr. Wood is very hopeful that Neste can also make SAF or sustainable aviation fuel available to Russian aircraft when visiting Europe, and indeed, in the not-too-distant future, if we can find the right partner, hopefully, we can make it also available in Russia, in St. Petersburg and Moscow.

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Right now, if one wants sustainable aviation fuel, if one wants to make a contribution to our climate change challenge by buying lower net carbon fuel, you can speak to your regular jet fuel supplier in the locations that you fly to in Europe and North America and they can tell you if they have it available. Even if they don't have it available, the very fact that you are asking for it will help generate the demand so that it can be supplied by Neste or whichever partner Neste is working with.

Neste is very hopeful and confident that the network of supply locations will grow dramatically over the next two or three years. The reason Mr. Wood says that is because the policy framework is rapidly changing also in the world, especially in Europe and North America, where incentives are now available to make the cost of the product more manageable for customers.

What Neste envisages is that the support for sustainable aviation fuel will grow in the next year or two around other European countries and in the US. They even see now the introduction of so-called mandate, where a certain percentage of all fuel consumed will have to be sustainable aviation fuel. This has been seen that in Norway, Sweden. It is expected to happen in the very near future in Finland. Indeed, also in France, they have announced that they wish to require 1 % of all aviation fuel to be sustainable aviation fuel from next year.

In reality, this is already starting to happen. Neste is talking with distributors to make sure that it can be made available to you as customers in other locations around Europe, hopefully, in the future, also in Russia.

Right now, Neste believes that there are sufficient renewable raw materials to supply up to about 10 % of global jet fuel demand using waste products like oils and fats. Then over time, the industry anticipates production to start using municipal solid waste, other agricultural and forestry waste products as well as even algae. Then ultimately, the industry is looking forward to the production of sustainable aviation fuel, using carbon captured from the atmosphere or from industrial emissions and convert that into using renewable power.

"This is a journey we've started, and we as an industry truly believe that we can meet the challenge that aviation has, to grow the availability of SAF in order to be able to reduce the emissions as the aviation sector recovers. As Neste, we are currently supplying about 100,000 tons of sustainable aviation fuel. We are investing, as we speak, about a billion and a half, \$1.5 billion in the next production facility, and we therefore anticipate our production growing very significantly in 2023 and beyond. We are just one of the suppliers. There are others who are investing in production facilities as well, so the good news is, I think, here that there is a real momentum now and lots of investment in the supply. As I said, as Neste, we are comfortable working with whichever distributor we need to work with in order to make the product available at the airport locations where it is needed."

In summary, I want to say, the really good news is we have a solution for today and also for tomorrow to reduce the carbon emissions from the aviation sector and from business aviation in particular. It's now becoming available, and so really, we look forward to working with you as customers who when you want the product to make it available wherever you need it", Jonathan Wood concluded.

Mr. Leo Knaapen, Chief, Industry Affairs, Bombardier, continued the session, presenting SAF from the OEM perspective. He said, that there are a lot of the questions received from Bombardier customers and from operators; generally, they refer to what is the impact of sustainable fuel or SAF on an engine or on an aircraft.

There are seven pathways, so there are seven approved methods to convert waste into SAF or into jet fuel to be precise. There are some quality requirements. The thing for the pilots in the audience Mr. Knaapen wanted to emphasize was that "Once it (SAF) meets the characteristics of traditional petroleum-based jet fuel in ASTM D7566," that is the international standard. "Once it meets those standards, then it can be re-identified as meeting ASTM D1655, which is **jet A in America and jet A-1 for the rest of us in the world, including Canada and Russia.**"

In a nutshell, the impact is zero. It's accepted by all airframers and power plant manufacturers. There's no negative influence on the aircraft performance at all – neither in-flight nor on the ground. From a financial perspective and maintenance perspective, the engine warranty and the



Mr. Leo Knaapen,
Chief, Industry Affairs, Bombardier

APU warranties are not impacted and neither is the fuel system, in terms of sensors, valves, tanks, and fuel lines, et cetera.

There is a high level of concern about this, and this makes good sense, of course –, but jet fuel is jet fuel, whether it comes from outside or from beneath the ocean from out of the ground or whether it comes from recycled materials, once it's approved to be a jet fuel, it is jet fuel, and standard 1655 is to be remembered.

These fuel specifications included in all Aircraft Flight Manuals (AFM) and clearly specified that fuel must meet D 1655 specifications. Of course, as manufacturers, Bombardier had to prove this, and took the workshop participants through the process that they took. Bombardier was involved in this, but so were all the other business jet manufacturers; they all went through this together as a team. OEMs put aside, of course, their competitive differences and realized that they had a big mission here to assure the pilot community and the FBO community that there is no risk in using this fuel.

There were identified the four steps, and one was to, A, get together manufacturers to understand their knowledge. B, and very important, and this is recurring, to educate the operator community to demonstrate this. Then, of course, the biggest step is to improve availability. The knowledge foundation was made through an organization called GAMA or the General Aviation Manufacturer Association.

There is an environment committee at that organization, and it gathered all the business aircraft airframers as well Rolls-Royce, General Electric, other engine manufacturers, and they met on a regular basis over the course for almost a year. They want to first understand what they are all doing as manufacturers to make sure that their aircraft are absolutely fine with using SAF.

Most of the manufacturers were already working with ASTM to prove this, but it was felt they needed to regroup anyhow and have a better look at this in other ways. There was developed an industry spreadsheet.

One of key items all the OEMs discovered when they first met was somewhat of a surprise, almost an oversight:

"We were not explaining this properly. We asked ourselves around the table whether with use SAF when flying our demonstrator aircraft? Plus, collectively, we were not really using it internally the way we could to demonstrate to operators at large. Do we advise operators that the aircraft model is compatible? The answer is no. Aside from putting it in

the AFM, we never proactively reached out to the operator base and made operators understand. We realized we had to do that, we had to start moving forward”, shared Mr. Knaapen.

“We also did our due diligence with the fuel systems providers, with the engine manufacturers, of course, also the APU manufacturers, and made sure that we work with the regulators. As you know, when an aircraft flight manual is updated, or an aircraft maintenance manual, it requires the approval of the National Civil Aviation Authority i.e. the regulator. Certainly, in the case of the publication in Russia, that has been validated, and if you check your aircraft flight manual, you will see”, he added.

For that to occur, that means that the manufacturers have worked closely with the regulators to prove that there is no danger, no safety hazards, no performance issues with using SAF.

This collaboration led to joining with the operator and FBO sectors community at EBACE 2018 where there was a declaration signed basically committing business aviation industry collectively to sustainable aviation fuel. This took place three years ago. Some very significant progress is made since then.

The day before that signing Bombardier, Embraer and Gulfstream had a day-long demonstration of flying with sustainable fuel. This was made at London Farnborough. In Bombardier’s case, it became and still is the only facility in Canada where there is a stockpile of sustainable aviation fuel. They offer that to customers when they take their aircraft on delivery, their new Challengers and their new Globals. Bombardier provides sustainable aviation fuel as part of that, at no cost.

Bombardier takes part in SAF coalition, where education is the key. This will continue, of course, as there continues to be a real need to continue educating pilots and fuel experts and FBOs. Bombardier has done a series of demonstrations in Europe and in America to prove that there is absolutely no problem with this fuel at all.

Educational component has been named several times during the session, and **Mr. Timothy R. Obitts, President and CEO, National Air Transportation Association**, which takes active role in this process, provided this information.



Mr. Timothy R. Obitts,
President and CEO, National Air Transportation Association

The efforts of promoting SAF internationally from a business aviation standpoint has been done through the SAF coalition, Business

Aviation Coalition, where demonstration events were done, and most importantly, this group worked in Montreal with ICAO, through the International Business Aviation Council, as a voice for business aviation that represents the industry before the UN body there with the Civil Aviation Authority.

The task was to educate the member states as to the efforts of business aviation, as to what is done regarding education of operators, ground handlers of the maintenance facilities, and, obviously, the OEMs. Education has been the key component since this journey had started in September of 2017. It has been education at all facets and at all levels.

The best way to demonstrate or to educate is through demonstration. Likewise at Bombardier events, and also flights with SAF to EBACE, NATA did a series of demonstration events. It was at the events of the OEMs, providing their planes, and the fuel suppliers like Neste and World Energy providing the fuel, and then getting the media on the aircraft and flying with the media on the aircraft.

NATA, National Air Transportation Association, is an 82-year-old trade association. It represents ground handlers, commercial operators, or air charter companies as well as maintenance facilities, and OEMs and fuel suppliers. Both Neste and World Energy, the two producers of SAF, are members. NATA does not do the certification side for the OEMs.

The journey started for SAF for business aviation. The genesis of it was, believe it or not, Leo Knaapen of Bombardier calling NBAA, GAMA, and NATA together to go to ICAO in Montreal in September of 2017. At that time, CORSIA had just come out. The question was, how is business aviation going to adapt to CORSIA, which was working to mandate a reduction of carbon emission?

There were four pillars of CORSIA. SAF was part of it and it was not a strong side. Why? Because at that time, there was only about 12 million liters of SAF produced worldwide, and was the problem. So, it was too hard to comply with CORSIA mandates.

At the time, sustainable aviation fuel was called sustainable alternative jet fuel, SAJF. The word alternative threw everybody for a loop. Why? Because it had the word alternative in it. So, people are saying, “This isn’t jet fuel, it’s an alternative.” No, it is, in fact, D1655. It is jet fuel. It is a chemical equivalent. It has the same carbon chain as fossil-based jet fuel. So there was a need to get rid of the word “alternative”. NATA worked on getting rid of the word alternative. NATA worked with commercial aviation on that and ICAO and NATA change SAJF to SAF, which is what we know now, sustainable aviation fuel.

NATA started with an education initiative. It was important to start with aircraft manufacturers. Because the FBOs or the ground handlers did not want to take liability of something happened with the aircraft. Though by fact the fuel was Jet A, but more expensive. And it is more expensive, because production process is more expensive.

The manufacturers got together and did an incredible job. That was to get them to get them to say and put in their manuals that the engines and the frames are safe to fly on SAF.

Then it was necessary to provide a guide. That’s how the *Fueling the Future* guide appeared in 2018. We’re now in our second iteration of this guide, and it talks through and explains in detail what is SAF, i.e. is Jet A or Jet A-1, and the different pathways for production, the fact that it is safe for the planes or the aircraft, and also talks about if one wants to get it, he has to talk to fuel supplier because they can, hopefully, get it.

But the guide wasn’t enough. People said, “Well, it’s nice that you put something on paper, but...”

They said the best evidence is eyewitness evidence. That’s what NATA did. We got together, and Gulfstream, Bombardier, and Embraer provided planes. There was organized an event in Van Nuys, California, the busiest business aviation airport in the US and there was performed a demonstration event.

About 70 people were expected show up for the event on a rainy day in January and California, where it was never supposed to rain, and there were 170 people, media clamoring on this thing. That really the eyes for the industry, it opened the eyes for the media as well to see that business aviation cares. That was a reaffirmation of a commitment that was made 10 years prior. Goal was to make sure that it was very clear to the world that business aviation worldwide cared and the industry was going to move forward to meet the goals of greenhouse gas emission.

The first demonstration event in Van Nuys was an incredible success. There were planes flying on SAF to Van Nuys that broke speed records. What's interesting about SAF is having to do with the energy intensity of SAF. There is greater energy intensity in SAF, which is phenomenal. It is a fact that Bombardier set a speed record flying to EBACE on SAF. That's pretty phenomenal.

Then one more key event was at the World Economic Forum in Davos. This was the January, prior to COVID start in March of 2020, and then a new concept, which is called Book & Claim, was demonstrated. SAF was made available. The Neste product was made available in Switzerland, at Jet Aviation at Zurich Airport, though it was so hard to get SAF into Switzerland, because of their import laws.

Neste went to great length to demonstrate through science that SAF is Jet A. Why? The top chemists for customs at Switzerland could not believe that a fuel based on plant oils and fat oils could somehow be Jet A. Their own, the Swiss' own chemists tested it, and it was the same carbon chain.

It was important to get SAF to WEF in Switzerland. If not, with business aircraft flying to Switzerland then, WEF could turn into a business aviation Flygskam event – the Swedish name of movement “flight shaming”.

But there was a press conference about business aviation's commitment to climate change reduction, and also about the importance of SAF. This leads to the business aviation coalitions working with governments. In particular, coalition working through IBAC with ICAO.

NATA has also been working with the EU on this, and about business aviation's usage of SAF and the importance of making it available throughout Europe. Why is this important? ReFuelEU program was supposed to have come out, and it is important to make sure that industry is able to meet the obligations and the potential mandates that are going to be there.

Why is this important? Because there is a need for a clear message that business aviation is committed to climate change, while at the same time committed to doing the things that business aviation does, which is create good jobs and help the economy. It's interesting when working with governments, because for some reason they think this segment produces a lot of carbon emission, when in fact, **business aviation's carbon emission is only .04 of 1 % of global man-made emission.**

Business aviation's carbon emission is only .04 of 1 % of global man-made emission

Eating beef produces more emission, and what's great is that there is a possibility to take the waste of beef and turn it into SAF.

In countries where populations are not condensed, you need to be able to go out, and business aviation need to be able to reach out and help not only for job production, but for medical. This is extremely important during the COVID time, and if the industry is able to do this in

a way with carbon reduction, it makes that even more important and a stronger message.

The .04 of 1 % for some reason is clouding up the skies. Industry has to counteract this and continue to do this through demonstration and educating, and adoption of sustainable aviation fuel. Whenever we are able to talk about sustainable aviation fuel with the environmental groups, it changes their tone completely.

There are safe planes that fly in critical conditions that are proven, and we can do environmental reduction through SAF, it's that simple. What is the role of aviation associations? Their role is to help educate, to work with the government and regulatory officials to help and to connect with stakeholders like Neste and Bombardier.

“That is the role of the associations with SAF, and to be a voice, through IBAC industry is a voice there with ICAO. We work collectively together, so we're here to help and work with each other, we meet regularly together RUBAA, NATA, NBAA, EBAA, IBAC, just the alphabet groups we call them because we all have a lot of initials. We meet together, we talk through concerns, we're here to support and help each other.

I believe that we have a trifold that's in Russian, talking about SAF. Why is that? We believe the SAF business coalition believes that we should have the education material in all the important languages. Obviously, Russian is a very important country and an important language, so we make sure that we have that there as well”, Mr. Obitts noted.

Book & Claim was briefly mentioned. What is it, how does it work, and why does it matter? Book & Claim is where operator purchases fuel. Let's say, hypothetically, we've used the word “Signature” before. You purchase fuel from Signature, Signature doesn't have SAF on hand to put in your plane, so what happens is, you book it by purchasing it at another location that they have, and you pay for it to go into somebody else's plane. Then, you claim the environmental qualities, the environmental reduction, you get the certificate. That's how it works, you are able to claim the environmental attribution which is important for CORSIA, for ReFuelEU, and other mandates that are coming down the pipeline, as to the need for the operator to meet requirements. It is same like making money transfers through banks.

“We are working very hard in the EU, in the US, in Canada, on making sure that we incentivize the production and the use of SAF because it is more expensive to produce. We need to make sure that we take away the disincentives for the use, which is only money. Everything else is an incentive to use SAF”, concluded Mr. Obitts.

Juergen Wiese, Head of BMW Flight Service, highlights the important aspects for those who actually pay for the SAF, the Business Aviation operators and their clients.

It is important to recognize that in many parts of the world Business Aviation and its users are under high scrutiny by society and lawmakers. Business and Private Aviation is considered as an “unjustified” use of resources for a small part of society. Often this does not bring to light the primary, secondary and tertiary societal effects of the companies and individuals who use Business Aviation as a tool for improving connectivity and efficiency in a strive to create economic effects and jobs for a larger group within a society.

That said, it is clear that in order to ensure future acceptance of use of business aircraft, we must reduce our environmental footprint. An operator has a certain influence on CO₂ emissions through what aircraft they operate (size vs. mission requirements, newer technology), how they operate the aircraft (e.g. procedures, routings, altitudes and speeds) and the fuel they use (SAF). Before even thinking of buying offset certificates the focus must be on the actual reduction of emissions.

The major factor is of course Sustainable Aviation Fuel (SAF). Here we connect to many of the aspects already mentioned by the previous speakers. It is important for all OEM's to continuously educate their buyers (whether new or used aircraft) about the abilities of their products



Juergen Wiese,
Head of BMW Flight Service

to safely use SAF. This must come through operator communications, conferences and reach out to pilots, maintenance personnel and managers in order to bring them all to a similar and appropriate level of knowledge. Too many operators still do not know that their aircraft can use SAF with NO negative effect on safety, performance or warranty.

As was mentioned before, the fuel which includes SAF has the same properties as it is certified Jet Fuel. Too many rumors are not justified at all from a technical standpoint. But this not only affects operators. Many airports and fuel tank farm operators have not yet understood or familiarized themselves with the technical aspects. Jet Fuel is Jet Fuel certified to the same standard, regardless of whether being made of crude oil or using other feedstocks. So, to counter one example of ideas floating around, there is no need to provide a second fuel tank on the ground for SAF. A few airports, small and large have already accepted SAF deliveries as part of their regular Jet Fuel supply and can testify that it is safe in all aspects.

The financial aspect of buying SAF as an operator is not to be neglected. Jet Fuel that includes a certain portion of SAF is more expensive than Jet Fuel straight from crude oil. But this price difference is part of the life cycle of the new product. As we heard earlier, huge

investments are being made and the availability of the product is still limited. Now, over the next years with increased demand that price differential should become smaller. But if operators do not start small now, they will probably never start. So, as an example, if an operator consumes 500.000 liters of Jet Fuel per year, then they can start with asking for a small percentage, say 25.000 liters, or 5 % being SAF. This way the overall price will not increase drastically. Over the years with decreasing SAF price that operator may want to increase that portion to higher percentages. So, it is up to the operator to start negotiating with the fuel providers and also to commit to taking the actual volumes of SAF.

Business Aviation's strength is to connect with destinations which often airlines do not serve. It will therefore be unreasonable to expect that SAF will be supplied everywhere soon. It also contradicts environmental reasoning to supply current production SAF in small amounts to every small airfield. But the major Business Aviation destinations should become aware of the operators' increasing demand and more and more be ready to actually deliver SAF at their airports.

Book and Claim was already mentioned earlier and answers the question of "How can we use SAF if we do not fly to the major airports and Business Aviation hot spots?" As an operator you may buy SAF by paying a "SAF add-on" for your fuel. The actual SAF will probably not be delivered to your aircraft as the aircraft may not stop at a place where SAF is available. But, because you were the one who paid for it, you will receive the CO₂ credits. Ideally these can be applied for your emission trading obligations or just for the corporate reports if required.

To ensure that Book & Claim is offered by trusted sources and not used many times for the same amount of SAF in the overall aviation system, it is important to get engaged with fuel providers and FBOs.

To conclude now, as Business Aviation operators we can do two things: First convince our clients that it is a very good investment to pay a certain premium for using SAF on their trips as it ensures our "license to operate" for the future. Then second, make our voice heard and ask for SAF from our fuel providers, FBOs, handling agencies. With this approach we all increase the demand and future distribution of SAF.

In the end, it is important to note, that SAF session of the VI practical workshop "Flight Safety. Fuel Safety" was very well attended by online viewers (online version was necessary due to event attendance limitations at that moment; so this year the event had about 50 people in the hall, against over 200 in previous periods; though online viewers counted almost 400 unique users with a vast geography), including major fueling companies in Russia. Interest was confirmed with numerous questions and for sure SAF will appear as topic in upcoming events.

CBTA and EBT – new trends or a new reality?



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Most aviation professionals involved in pilot training are already familiar with these English-language abbreviations – CBTA (Competency-based Training and Assessment) and EBT (Evidence-based Training).

So, what is the CBTA and EBT, new trends or a new reality? Let's try to figure it out.

Analysis of statistics relating to aviation accidents and serious incidents over the past 30 years shows that in 70–80 % of them the main cause was the notorious human factor. It is a human who turns out to be the weak link of the modern air transport system where a safety barrier against potential risks breaks through.

At the same time, aviation technology is being advanced, one aircraft generation replacing another. Design and reliability of aircraft and ground systems are steadily and significantly improving. However, even though the aircraft and all technical systems are operating without failures, aviation accidents still occur.

Some statistics

According to the data for 2016–2020 published by the International Air Transport Association (IATA) in its Safety Report 2020 (<https://www.iata.org/en/publications/safety-report/>), the safety level achieved by the post-Soviet region (CIS) on jet aircraft, namely, in the number of aviation accidents per million sectors flown, is somewhere near Africa (AFI) (Fig. 1).

IATA's accident analysis identifies common threats and flight crew errors and points out prevailing contributing factors associated with

so-called “non-technical” skills, such as leadership, situational awareness, communication, decision-making, workload management and others.

This shows that existing flight crew training system almost entirely focuses on technical aspects of the flight and does not pay necessary attention to the strategy and methodology used for development of pilots' thinking skills, cognitive attitudes and behavioral culture, which appear to be just as important for the safe outcome of the flight.

There is an industry-wide consensus on the need for a strategic review of the entire paradigm of the airline pilots training in order to reduce the frequency of aviation accidents related to the human factor.

CBTA and EBT Background

In fairness, it should be noted that those regions in which in recent years flight safety records are substantially better than in our region, have been working on improvement of the flight personnel training system for a long time.

Back in 1990, the US Federal Aviation Administration proposed an *Advanced Qualification Program (AQP)* as an alternative for conducting initial and recurrent training of pilots. In 2006, a similar *Alternative Training and Qualification Program (ATQP)* was introduced by the European Joint Aviation Authorities. These programs comprised the basic elements of the future industry innovations, which we now know today as CBTA and EBT.

ICAO Provisions on CBTA and EBT

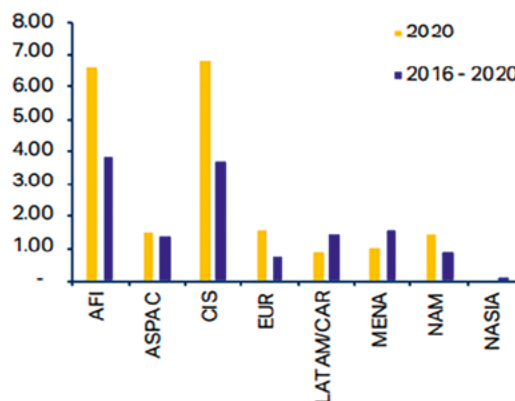
In 2007, IATA launched its Training and Qualification Initiative (ITQI) announcing a comprehensive systemic approach to pilot training. This initiative formed a basis of ICAO's provisions on CBTA and EBT.

“Procedures for Air Navigation Services – Training” (ICAO Doc 9868 PANS-TRG) proposed by ICAO for implementation by all Contracting States become applicable since 5th November of 2020. They provide guidance on the development and implementation of various CBTA programs designed to meet the requirements of ICAO Annex 1 in paragraph 1.2.5 “Validity of licences”.

ICAO Doc 9868 (PANS-TRG) also includes general provisions on Evidence-based Training (EBT).

Regional Accident Rate (2016-2020)

Accident per million sectors





The “Manual of Evidence-based Training” (ICAO Doc 9995) is intended to provide Civil Aviation Authorities, operators and approved training organizations with guidance on implementation of pilot recurrent training in accordance with section 9.3 “Flight Crew Member Training Programmes” and subsection 9.4.4 “Pilot proficiency checks” of Chapter 9, Part I, ICAO Annex 6.

IATA together with ICAO and IFALPA (*International Federation of Airline Pilots Associations*) has released the Evidence-Based Training Implementation Guide. IATA’s activity is a driver and an example of the successful cooperation in the ongoing improvement of pilot training for the benefit of the industry. IATA has published a series of guidance materials to support organizations implementing CBTA and EBT.

CBTA and EBT – What is the Difference?

CBTA and EBT are two different ICAO initiatives which are closely interrelated. They differ in their purpose, content, scope and status.

CBTA is competency-based training and assessment applicable not only to pilots but also to cabin crew members, ATC controllers, aircraft maintenance personnel, flight dispatchers and other personnel. EBT applies only to flight crew members (pilots).

The scope of CBTA is also considerably broader as it includes almost all types of training. With regard to pilots, for example, this is flight training on an airplane, simulator recurrent training, dangerous goods training, emergency and rescue training, etc. EBT is currently limited by ICAO’s framework of simulator recurrent training only.

On November 5, 2020, a new amendment to ICAO PANS-TRG (Doc 9868) came into effect stating that States which have not implemented CBTA to publish differences with ICAO PANS-TRG rules in their aeronautical information publications. EBT, for now, is an alternative method of pilot training recommended by ICAO.

Why EBT?

EBT is a training and assessment based on operational data that is characterized by developing and assessing the overall capability of a trainee across a range of core competencies rather than by measuring the performance in individual events or maneuvers.

What? The aim of an EBT program is to identify, develop and evaluate the core competencies required by pilots.

How? By managing the most relevant threats and errors, based on evidence collected in operations and training.

Why? To operate safely, effectively and efficiently in a commercial air transport environment.

Why EBT? To answer this question, we will use the new term resilience.

Resilience is the ability of a pilot to successfully address and resolve problems in any unfavorable flight conditions. After years of discussions about stress management, resilience is becoming a new term used for pilots in order to cope with the challenges of the industry that is changing faster than ever before. Resilience implies a readiness to manage not only those situations you are trained for, but also unexpected events, the so-called “black swans”.

By the way, the “black swan” has turned into a symbol used by Michael Varney (in the photo, on the right), one of the EBT concept founders, President of the EBT Foundation and CEO of EBT Solutions, to identify his organizations.



CBTA / EBT Pilot Competencies

ICAO defines competency as a combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.

The new term “attitude” comes from psychology and means a persistent internal mental state or disposition that influences an individual’s choice of personal action toward some object, person or event and that can be learned. Attitudes have affective components, cognitive aspects and behavioral consequences. To demonstrate the “right” attitude, a learner needs to “know how to be” in a given context.

As a result of the collaboration between ICAO, IATA and several work groups composed of well-known pilot training experts from various regions and organizations the list of eight core competencies that need to be achieved by the modern pilot was developed (Fig. 2).



The competency-based model can be adapted to suit the needs of an airline or a training organization. As an example, in our case, we added in blue the ninth competence – *Knowledge* which is recommended within the framework of the European Aviation Safety Agency (EASA).

Behavioral Indicators

Competency is a dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through observable behaviors (OB).

Effectiveness of the entire training process should be assessed. Whilst the criteria for “technical skills” were defined by performance standards such as speed, altitude and accuracy of flight parameters, there was no common assessment system for the so-called “non-technical” skills in CRM. EBT should close this gap through the use of ICAO behavioral indicators (Fig. 3) and competency assessment methods.

EBT Simulator Training Scenarios

In traditional training approaches, flight crew training and evaluation are based on scenarios that are highly unlikely to occur on modern aircraft. Current training programs are overloaded with an excessive number of exercises that do not reflect real risks. Over time, new aviation accidents occurred and new exercises were added to the old ones resulting in

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Competency	Description	Observable behaviours (OB)
Situational awareness and management of information	Perceives, comprehends and manages information and anticipates its effect on the operation	<p>OB 7.1 Monitors and assesses the state of the aeroplane and its systems</p> <p>OB 7.2 Monitors and assesses the aeroplane's energy state, and its anticipated flight path</p> <p>OB 7.3 Monitors and assesses the general environment as it may affect the operation</p> <p>OB 7.4 Validates the accuracy of information and checks for gross errors</p> <p>OB 7.5 Maintains awareness of the people involved in or affected by the operation and their capacity to perform as expected</p>



overflow of the training programs with cumbersome set of exercises. This created an inventory or “tick box” approach to training.

EBT implementation is intended not only to replace outdated critical scenarios with new ones, but to use *Line Oriented Flight Training (LOFT)* as a method and tool for the development and assessment of flight crew performance in terms of applying the required competencies.

In this article we do not intend to describe all the EBT tools designed to develop simulator training scenarios, however the list of such tools shows how advanced this innovative approach really is: *Threat and Error Management, Aircraft Generations Training Priorities, Assessment and Training Matrix, Equivalency of Malfunction, Malfunction Clustering, Equivalency of Approach Types, etc.*

Aircraft Generations

Based on a full-scale and comprehensive analysis, four different jet aircraft generations and two turboprop aircraft generations were defined (Fig. 4).

Generation 4 Jet	A318/A319/A320/A321, A330, A340-200/300, A340-500/600, B777, A380, B787, A350, Bombardier C Series, Embraer E170/E175/E190/E195
Generation 3 Jet	A310/A300-600, B737-300/400/500, B737-600/700/800 (NG), B737 MAX, B757, B767, B747-400, B747-8, B717, BAE 146, MD11, MD90, F70, F100, Bombardier CRJ Series, Embraer ERJ 135/145, IL96, TU204
Generation 3 Turboprop	ATR 42-600, ATR 72-600, Bombardier Dash 8-400, BAE ATP, Embraer 120, Saab 2000
Generation 2 Jet	A300, BAC111, B727, B737-100/200, B747-100/200/300, DC9, DC10, F28, L1011, IL86, IL76, TU154,
Generation 2 Turboprop	ATR 42, ATR 72, BAE J-41, Fokker F27/50, Bombardier Dash 7 and Dash 8-100/200/300 Series, Conquest 580-600 Series, Shorts 330 and 360, Saab 340, AN12, AN24/AN25
Generation 1 Jet	DC8, B707

Analysis of pilot training data shows that aircraft of different generations have their own priorities and specific risks that are not respected at the moment. The need for significant differences in training programs for aircraft of different generations has become obvious.

EBT Data Analysis

The availability of data covering both flight operations and training activity has improved substantially over the last 20 years. Such sources as occurrence investigation results, Flight Operations Quality Assurance (FOQA), Line Operations Safety Audit (LOSA) and flight safety reports give a detailed insight into the threats, errors and undesired aircraft states encountered in modern airline flight operations as well as their relationship to potential undesirable consequences. Availability of such data confirmed the need for the EBT program and contributed to the development of an evidence-based training curriculum concept.

To support service providers implementing EBT, IATA has published its guidance material *Data Report for Evidence-Based Training*.



EBT Training and Evaluation

Nowadays we see powerful training tools available, simulators becoming more advanced, virtual training systems being developed, however the regulatory framework remains the same focusing mainly on testing and evaluation rather than training itself. Sometimes, especially when the training and evaluation functions divided between instructor and examiner, the whole training process may be reduced by the instructor practicing those exercises of the scenario that are checked by the examiner.

EBT system removes imbalance between training and evaluation by swapping them. The structure of EBT simulator training assumes evaluation during the first session and training and assessment conducted at the second session.

EBT recognizes the necessity of competency evaluation but also emphasizes on the fact, that once it is completed and proper self-assessment is done during de-briefing, pilots demonstrate better performance as long as the training is not limited to evaluation conditions.

EBT Instructors

Assuming the critical importance of instructor competence in any training program, EBT requires special training of EBT instructors.

EBT instructors should have highly developed facilitation skills in order to support the development and assessment of pilot competencies across all required knowledge, skills and, what is more important, attitudes (KSA). Facilitation is an effective tool for allowing self-analysis and in depth thought, which is an easier way for pilots to learn, as there is less recourse to memory techniques (Fig. 5).

?	Directed Instructional technique	Facilitated Instructional technique
What do the words instructing/facilitating imply?	Telling, showing	Enabling the trainee to find the answer by himself/herself
What is the aim?	Transfer knowledge and develop skills	Gain insight/self-analysis to enable an attitude change
Who knows the subject?	Instructor	Both instructor and trainee
Who has the experience?	Instructor	Both instructor and trainee
What is the relationship?	Authoritarian	Equal
Who sets the agenda?	Instructor	Both instructor and trainee
Who talks the most?	Instructor	Trainee
What is the timescale?	Finite	Infinite
Where is the focus?	Instructor – task	Trainee – performance and behavior
What is the workload?	Moderate	High
What are instructors' thoughts?	Judgmental	Non-judgmental
How is progress evaluated?	Observation	Guided self-assessment

EBT also refocuses the instructor to root cause analysis of unsuccessful maneuvers, primarily to adjust the relevant competencies, rather than repeating a maneuver without a real understanding of why it is failed.

IATA has published *“Guidance Material for Instructor and Evaluator Training”*, which defines a set of instructor and examiner competencies.

Implementation of CBTA/EBT

CBTA/EBT implementation has become an urgent issue not only for major airlines and training organizations, but also for business aviation. It's become a new reality. Most business aviation airlines operate abroad-built aircraft and have simulator training at overseas training organizations with foreign instructors who for the most part adopted new methods of pilot training already.

In some cases, pilots from Russia do not quite understand what the instructor who uses CBTA/EBT methodology and terminology wants from them, have to adapt to new requirements intuitively and completely on their own. The instructor wants to see demonstration of the pilot's key competencies, knowledge, skills and attitudes (KSA) illustrated by relevant behavioral indicators. He / she focuses not only in the ability of the trainee to perform exercises from the scenario of the simulator session but in the ability to conduct a briefing or debriefing and an objective self-assessment, demonstrate leadership and communication skills both internally and with external resources, apply threat and error management, proper use of decision-making models and workload management.

CBTA/EBT implementation in our region is carried out simultaneously within the framework of two projects: *ICAO Regional Expert Safety*

Group – Pilot Training Project Team (ICAO RESG PTPT) and *Russian Pilot Training Group* (RU-PTG) established under the Flight and Methodological Board of the Federal Air Transport Agency.

In an expanded format the Russian Pilot Training Group is represented by many leading carriers (Aeroflot, Rossiya, Pobeda, S7 Airlines, AirBridgeCargo, Nordwind Airlines, Smartavia, Azur Air, etc.), manufacturers (Airbus, Boeing, Sukhoi) and training organizations (Ulyanovsk Civil Aviation Institute). Business aviation airlines, such as Meridian Air Company, Sirius Aero, Aviaservice and others, also take part in the RU-PTG activities.

We conduct major international online workshops with the world's leading industry experts in the field of pilot training, speakers from ICAO, IATA, EASA, manufacturers AIRBUS, BOEING, industry leaders, such as LUFTHANSA, AIR FRANCE, AEROFLOT, AIR ASTANA, as well as various training organizations – CAE, EBT Solutions and many others.

The Russian Pilot Training Group (RU-PTG) welcomes all airlines, industry educational institutions and training organizations of Russia to take part in its work. Time waits for no men... Key stages of the new CBTA/EBT approaches can and should be implemented now, do not wait for the green light from the authorities.

To make appropriate decisions, industry authorities need an initiative from “below”, a clear and well-reasoned request from air operators and training organizations that by nature of their services are forced to reach international standards sometimes ahead of legislative initiative from “above”. Contact details of the RU-PTG can be found at Rosaviatsia's website: <https://favt.gov.ru/dejatelnost-lms-podgotovka-letnogo-sostava/>.

EBT Implementation at Meridian Air Company



Ivan Lavrentiev,

Head of Flight Department, Meridian Air Company; member of the Air Transport Professional Qualifications Board under the Russian National Presidential Board of Professional Qualifications

The standard of evidence-based pilot training was endorsed by ICAO over a year ago. The EBT program is aimed at improvement of a flight crew's reliability as an element of the transport system through competency development of its members.

A high competency level is necessary for a pilot to be able to detect deviations, take appropriate countermeasures and adapt to any unexpected changes and irregularities in the performance of his/her professional duties based on practical experience, expertise, knowledge and skills.

Development of core flight crew competencies is at the heart of the EBT concept.

The training process was traditionally centered around technical competencies, such as "Standard Operating Procedures (SOPs)", "Manual Aircraft Control" and "Automation".

Recently, additional non-technical competencies have been included: "Teamwork", "Workload Management", "Communication", "Decision Making" and "Situation Awareness".

Meridian Air Company was among the first Russian airlines to add these new competencies to existing pilot training programs. Moreover, the airline implements the changes relying solely on its own resources as currently no methodological support is offered by Russian civil aviation authorities.

In line with international best practices, four phases of EBT implementation were defined and launched almost concurrently:

- Standardization of instructor training;

- Development of a competency portfolio for each flight crew member;
- Personnel information support;
- Continuous update of personal training programs.

Crew training builds upon a standardized approach to instructor training. In the first place, an organization needs experts who are capable of delivering training and instruction in accordance with EBT principles. All flight instructors of the airline have gained basic knowledge of the EBT concept by reviewing in detail its main differences from the traditional model of pilot training and instruction.

In parallel with the training of instructors, we initiated gathering and analysis of information required for the development of pilot competency portfolios with a corresponding assessment system.

Since the beginning of EBT implementation at Meridian Air Company, special efforts have been made to distribute information on the program principles and methodology among our employees in order to encourage their development under the EBT program.

Continuous monitoring and timely improvement of the pilot training system were viewed as key success factors of EBT implementation, from both technical and methodological perspectives taking into account the airline specifics.

Evidence is gathered by onboard data recorders. In accordance with the EBT concept, flight data analysis is used not only to detect possible deviations, but also to highlight operational trends of a specific flight crew member.

For example, if a pilot performs late flare during several flights, which can result in exceeded operational limits, the pilot training program will be updated with specific procedures eliminating the root causes of such deviations.

A combined flight and cabin crew theoretical training aimed at competency development has proven highly efficient. Such training focuses on simulation of various scenarios intended to improve targeted crew competencies.



From late 2019 onwards, Meridian Air Company holds regular training workshops in Human Factors and Crew Communication for its flight and cabin crews. The workshops are conducted by S7 Training instructor A. V. Zakharov. The unique workshop program has been developed for Meridian's aviation personnel and meets specific needs of the business aviation industry. It covers various practical tasks that help develop professional competencies important for decision making under pressure.

Personal training programs include simulator sessions that have been developed for each pilot during the initial phase of EBT implementation and are still gradually refined. In fact, each pilot of the airline has a personal training schedule. Dynamic simulator training scenarios are based on the extensive use of evidence analysis.

At Meridian Air Company, we have accumulated significant experience in EBT adaptation and can say that its implementation has boosted the effectiveness of training. As a result, the flight crew qualifications and, therefore, our safety performance have improved substantially.

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Determining Critical Combinations of Elements Within the Uncertainty Range of Aviation System Statuses: a Case Study of Sirius Aero Ltd.



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Abstract. This paper focuses on the application of a Fuzzy Sets Theory for investigating the uncertainty range of the aviation system statuses at an aviation enterprise. The article presents modern methods used to analyze fuzzy measurability of uncertainty in the outcomes of occurrences, which allows to identify a risk level of the aviation system before any conditions leading to undesired occurrences arise. These conditions are defined as an equation for a scenario (air crash) that helps implement preventive actions through a risk-based approach.

Introduction: International Civil Aviation Organization (ICAO) points out the importance of continued evolution of a proactive strategy to improve safety performance of aviation enterprises depending on emerging safety hazards [1]. The foundation of this proactive safety strategy is based on systematic identification and elimination of risks associated with deviations from standard operating processes, in particular at aviation enterprises of various levels, including business aviation operators.

Rationale of the study: Efficient performance of “business class” aviation enterprises is dependent on a variety of interrelated factors

affecting the user attractiveness and profitability of an enterprise. For passengers, one the overarching factors is flight safety which is assessed in terms of the “risk” \hat{R}_i of unfavorable outcomes, such as “late aircraft departure”, “late aircraft arrival at destination”, “undesirable occurrence”, etc. ICAO recommends to use a systematic approach to managing safety [2] which in turn calls for implementation of a risk-based approach [3]. Today, several methodologies are used to assess safety performance by calculating a total score describing the \hat{R}_i value on the basis of a set of indicators showing the degree of demonstration of this indicator in terms of “success probability”. These methodologies clearly indicate the uncertainty of such assessments, which means that the existing solutions need to be improved. *According to the new ICAO approach, a reverse correlation between indicators of the two modules, the quality (Q) module and safety performance (S) module, should be established, i.e. new solution patterns should be found. Therefore, this is a new task where a solution is achieved by means of the risk-based approach [3]. A proposed solution pattern allows to identify critical combinations of individual indicators in the context of their impact on safety performance. In addition, ICAO mandates implementation*

of the so-called integrated quality systems for this purpose [3]. The second requirement is clear enough and required solutions can be found. As regards the first task, ICAO does not offer any known solutions: such solutions need to be developed from scratch with respect to uncertainty factors related to the statuses of functional elements of the SMS.

The purpose of the article is to promote and inculcate new approaches proposed by ICAO in the form of integrated risk management (IRM, or the assessment and integration of functional system interdependence) [2] to process arrays of results obtained during standard performance monitoring of an aviation enterprise under the uncertainty of **structures of the two most important modules specified above, i.e. the Q and S modules.**

This article reviews some of the results obtained by Saint Petersburg State University of Civil Aviation in the course of study of the problems under consideration. The University implements training programs in flight safety, transport security, and health and safety management, develops various methods and algorithms used to assess safety levels considering the degree of uncertainty of inputs and practical application of Knight's concept [4], and has established a school of thought dedicated to human resource management with an aim to ensure flight safety (led by V. V. Balyasnikov, D.Sc. in Engineering, Professor). The Management Department is focused on the common patterns of collapse of aviation enterprises (under the supervision of V. P. Maslakov, D.Sc. in Engineering, Professor). Professor E. A. Kuklev is working on the development of well-known Berkeley School (USA) methods based on analysis of the degree of uncertainty (invalidity) of measurement parameters in fuzzy sets. A thesis dedicated to methods of assessment of indicators influence in an integrated Quality and Safety Management System of an aviation enterprise has been prepared at the University and is ready for defense.

The results of testing the practical and theoretical relevance of presented concepts have been verified and implemented by Sirius Aero Ltd. where D. M. Melnik, a co-author of the article, is employed.

1. Problem definition. The Guidelines on the Audit of Service Providers' Safety Management Systems for Regional Offices of Rosaviatsia [5] propose a methodology for evaluation of an arbitrary efficiency factor K_{Φ} absorbing the risk value \hat{R}_i . In the Guidelines, average efficiency values \bar{K}_{Φ} are calculated allowing to obtain a positive evaluation of the SMS efficiency on condition that $\bar{K}_{\Phi} \leq K_{\Phi}$.

The baseline methodology includes performance monitoring against a set of standard indicators representing quality modules $Q = \{K_i\}$, $i = 1, \bar{m}_1$ and safety performance modules $S = \{S_j\}$, $j = 1, \bar{m}_2$ of service providers. Q and S sets linearly merge into a single set with a power of $m_{OS} = m_1 + m_2$, allowing to find an average established (arithmetic mean) value \bar{K}_{Φ} for service providers which may also indicate a status of the risk of loss of system properties.

However, the number of $m_1 + m_2$ elements (a sum of m_{OS}) is high. At Sirius Aero Ltd. $m_1 = 166$, $m_2 = 72$, a sum of $m_{OS} = 238$. Here we only have a single (as required by regulations) dimension of process indicators describing the performance of an aviation enterprise. This set of indicators does not reflect consistent statistics, the audit figures are under the uncertainty of status of the aviation enterprise. Some statuses may occur rarely and that is why risk indicators of the \hat{R}_i type cannot be introduced unless the conditions of measurability of occurrences with the uncertainty of randomness are met.

The problem is that ICAO recommends to identify critical combinations of Q and S element statuses leading to increased risks of the highest possible hazard. Although such recommendations are necessary, they are hard to follow.

In this article, the problem has been solved correctly. According to Gaussian method, risks are non-measurable under the uncertainty of randomness as the required consistent statistics is unavailable. Typical single or repeated monitoring procedures do not allow to overcome difficulties associated with identification of reliable links and combinations of elements. For this reason, it is necessary to follow IRM recommendations [2] regarding the use of the measurable uncertainty model, such as [6,7].

To that end, Sirius Aero Ltd. has designed and implemented a methodology to develop streamlined procedures for processing standard performance monitoring results of an aviation enterprise with an aim to improve flight safety through integration of QMS and SMS.

2. Solution pattern.

2.1. Integration of Quality and Safety Management Systems of an aviation enterprise.

Implementation of changes related to flight safety assurance at aviation enterprises assumes introduction of risk-based thinking targeted at identification of critical elements of the aviation system that may lead to undesired occurrences. This approach is based on integration of Quality and Safety Management Systems. Quality Management System (QMS) should be the core management system for an aviation enterprise. In this case, Safety Management System (SMS) may be further improved in terms of enhancement of safety performance of an aviation enterprise.

The foundation of QMS and SMS integration is formed by the two types of indicators of an aviation enterprise, as illustrated by ICAO [2].

Figure 1 shows leading and lagging indicators. Here, the low percentage of pilots who have received training in stabilized approach procedures leads to deviations and safety occurrences related to aircraft runway landings.

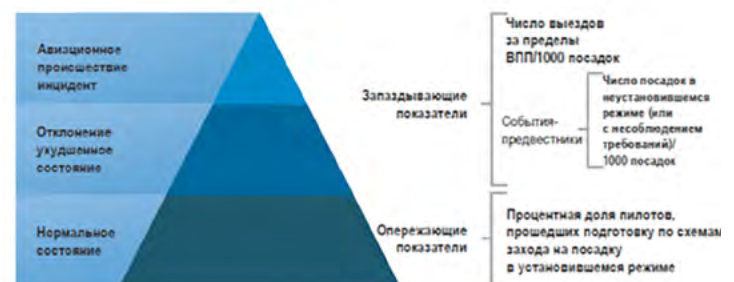


Fig. 1 Two Types of Indicators

ICAO emphasizes that different types of indicators are interdependent. However, no specific methodologies to establish such interdependencies have been proposed by ICAO so far.

It is expected that in an integrated Quality and Safety Management System, indicators of an aviation enterprise will be split into quality and safety performance indicators according to the principle presented in Figure 1. This means that quality indicators reflect the level of observance of procedures, while safety performance indicators are expressed as deviations (errors, irregularities) from the established procedures.

In present day context, a risk-based approach to safety includes a decision making process aimed at early prevention of adverse events and unexpected circumstances. The quality of such decisions depends on correct identification of consequences of events under the conditions of uncertainty.

Nowadays, uncertainty is defined as a state, even partial, of deficiency of information related to a future event, consequence or likelihood [8]. Correlations between quality and safety performance indicators of an

aviation enterprise can be indicative of critical elements of the aviation system under the uncertainty. By critical elements we mean elements of the aviation system that, when occurring in sequence, may lead to an undesired event, such as air crash, accident, serious incident, emergency.

2.2. Uncertainty in the operations of civil aviation organizations

The problem of relationship between a QMS and an SMS has arisen due to lack of clear understanding of the applicability of each of these systems. It may seem that a QMS has a broader focus, whereas an SMS merely fulfills one of its functions. However, the civil aviation industry has formed another opinion of the SMS and not without reason.

A unique feature of the QMS consists in guarantees that must be provided by the system. The QMS defines an image of the aviation system which can be maintained by assuming specific responsibility secured by relevant standards. Still, some spheres of life and performance of the aviation system cannot be standardized. It is mostly applicable to human activities. A standard implies uniformity. A human may be required to demonstrate a specific result, but not the uniform performance. Due to this circumstance, systems focusing on the use of personal characteristics of humans are placed in special conditions. SMS is one of these systems.

In late 20th century, accident statistics proved that a human (or human performance) posed a major hazard for civil aviation. After many attempts to resolve the problem associated with the negative manifestation of the human factor, a strong opinion was formed that a human should have a room for error. This viewpoint was in direct contradiction to the attitudes proposed in the QMS. However, with the adoption of the safety management concept it not only survived, but gained even more support by introducing safety risk management principles. In accordance with such principles, a human should be allowed to independently choose how to use its room for error. As a result, some of the underlying provisions of the QMS appeared to be incompatible with modern concepts of the human performance.

The source of this contradiction lies in the understanding of bivalent manifestation of uncertainty. On the one hand, uncertainty is a safety hazard, but on the other it drives human development. In this connection, it is necessary to determine an acceptable level of uncertainty of the properties and statuses of external environment (including aircraft) for each person. A solution to this task should be based on the self-management principle declared by the SMS. At the same time, safety requirements attain the status of an attitude that a person demands from himself or herself. Therefore, a person is able to unlock his or her internal potential and also take an active part in the development of collaborative potential.

Frank H. Knight classifies uncertainty into three types [4]: certainty, measurable uncertainty and non-measurable uncertainty. The first type of uncertainty does not carry an immediate threat to safety. Any other manifestation of such uncertainty should be eliminated, which is achieved through the QMS. Measurable uncertainty characterized by Frank H. Knight as “risky uncertainty” is intended to be used solely for the system development. The results of such uncertainty are a threat to safety and a risk as a measure of hazard or likelihood of an adverse event causing extensive damage. Accordingly, the task is to mitigate risks associated with identified safety threats, which may be realized through integrated QMS and SMS in accordance with the risk-based approach of ICAO IRM concept [2]. At the same time, the term *fuzzy uncertainty* of the system statuses is introduced based on the well-known risk assessment matrix proposed by ICAO and Boeing. This dictates a task of safety risk mitigation that can be solved with integrated SMS and QMS.

The main source of non-measurable uncertainty is latent individual manifestations of human incompatibility with operational environment. These manifestations may appear as a result of unsuccessful use of risk management methods, among other things. As the “measurable

uncertainty” and “non-measurable uncertainty” have similar triggers, the distinction between the two is fuzzy. Being indistinguishable, *factors indicating the presence of “non-measurable uncertainty”* are becoming the main hazard that can only be eliminated by means of tools ensuring that “non-measurable uncertainty” is transformed into “measurable uncertainty” (Figure 2).

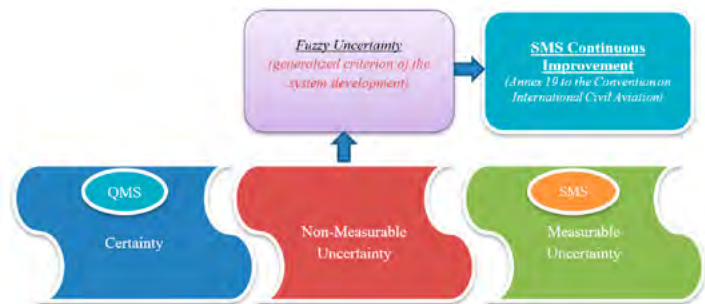


Fig. 2. Uncertainty in the Integrated Quality and Safety Management System

Such effect on uncertainty cannot be achieved through the QMS and is an exclusive domain of the SMS. Therefore, the task of safety risk mitigation can be solved with integrated SMS and QMS. The QMS cannot have the same effect on uncertainty as even the most reliable systems may become hazardous under low probability of accidents if catastrophic combinations of elements (i.e. system errors) are possible. This problem may be resolved using the concepts and algorithms of the SMS.

As an alternative to the SMS, the Quality Management System does not have the required level of influence on the human performance. As a result, significance of the QMS in the flight safety assurance is reduced substantially. Moreover, in some cases the attempts to impose its own vision through the use of common standards are harmful. A good example is educational standards. It is obvious that professional education impacts all aspects of life and performance of the aviation system and, thus, should fall within the QMS jurisdiction. The problem is that when it comes to human performance the QMS cannot offer any guaranteed tools to maintain educational standards. A final result is not defined by knowledge and skills. Any activity result substantially depends on the type and level of uncertainty under which the activity is performed. It is understood that the required level of uncertainty cannot be ensured by the QMS.

A motive is just as important for the quality of human performance. Being a key driver of the desired result in some cases, a motive cannot be controlled or presented as a requirement. A motive of activity represents an area where any human can express himself or herself as a personality that has a choice and may independently decide how to deal with it. For a human, a motive is the main tool helping to show independence from the system and regulating his or her behavior, which in turn is used to ensure continuous development. That is why every activity related to the use of human resource should be carried out with methods and tools that are consistent with this specific type of activity. Normally, interference of the QMS with the human activity does not eliminate the hazard, but becomes its main source. It creates an illusion that the measurable uncertainty is eliminated but in fact is transformed into the non-measurable uncertainty.

Such problems may be resolved by resorting to *fuzzy uncertainty* allowing to use the term “risk” correctly for the analysis of situations in some rare events having a near zero probability [6], as shown in Figure 2.

Similar to other systems, the aviation system comprises several subsystems characterized by specific indicators. As these indicators

are incompatible with each other, a conflict of interest arises among the subsystems. To resolve the conflict, a compromise is used where subsystems give up the achievement of best indicators if this does not lead to any critical consequences. This results in the formation of acceptable indicator value ranges describing the subsystem performances. Any values beyond such ranges are deemed critical. As there is no composite indicator reflecting the overall system development, such approach restrains the development of each individual subsystem.

Based on the SMS and QMS example, a conclusion can be made that the very task of finding mutual compromises means that subsystems of the aviation system have an unreasonably high level of independence. Thereby, loss of integrity of the aviation system seems to be declared permissible, which is due to non-existence of any generalized criterion of the system development. For this reason, analysis of the SMS and QMS unity and contrast in the absence of common framework requirements is unpromising. It is safe to say that neither quality indicators nor safety performance indicators alone are useful for building the integrity of the system.

If we speak of the QMS and SMS integration, the decisive factor is the formation of their overall integrity. In simple terms it means that specific features of the QMS and SMS do not create any constraints for their individual development or development of the whole aviation system. Otherwise, a risk of lack of integrity arises being the source of uncertainty. This allows to use uncertainty as a tool to assess integrity of the system and an indicator showing its development potential that, when realized, leads to continuous improvement of the SMS [1] (Figure 2).

It is known that the state of integrity of the system is characterized by emergence. For constituent subsystems, it means that they start to demonstrate redundancy as a result of their mutual participation in the joint development. The lack of emergence precludes development of the system and is therefore critical in terms of its status assessment. In the absence of emergence, subsystems show a high level of adverse mutual influence accompanied with an additional risk that is not always observable. Thus, the lack of emergence should be viewed as entry of the system into the critical risk area. Consequently, the identified instances of the SMS and QMS adverse mutual influence may be considered as the occurrence of a critical condition. In order to establish this condition, a monitoring process should be implemented ensuring continuous comparison of the SMS and QMS performance for the purposes of determining a generalized criterion of the system development.

2.3 Process interactions of quality and safety performance elements within the uncertainty range

Based on the existence of the three types of uncertainties, one of which is non-measurable uncertainty as proposed by V. V. Balyasnikov

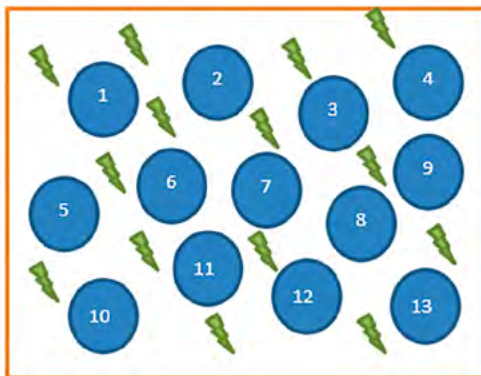


Fig. 3. Elements Within the System Uncertainty Range

[6], all system elements can be conveniently classified into two groups forming the uncertainty range (Figure 3).

Figure 3 shows elements of the system that represent quality indicators (blue spheres) belonging to the first type of uncertainty ("certainty") and safety performance indicators (green needles) belonging to the second type of uncertainty ("measurable uncertainty").

In the operations of an aviation enterprise interactions of quality and safety performance indicators may highlight that certain elements of the system are weak. Figure 4 demonstrates vulnerability of specific elements. These elements associated with quality indicators are vulnerable. If such elements are linked in chain, the entire system will be compromised.

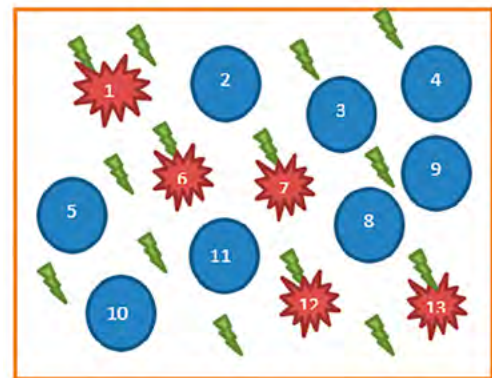


Fig. 4. Critical System Elements Within the Uncertainty Range

Therefore, a chain of critical system elements represents a third type of uncertainty, "non-measurable uncertainty", that may lead to an undesired safety occurrence, such as air crash, accident, serious incident, emergency (Figure 5).

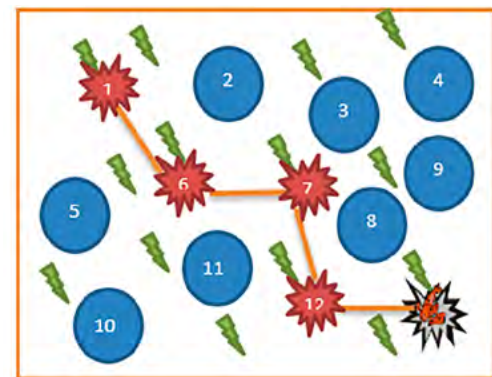


Fig. 5. A Condition Triggering an Undesired Occurrence Within the Uncertainty Range

In this regard, a tool is needed that will help transform the non-measurable uncertainty into the measurable uncertainty using a generalized criterion of the system development that can be derived from the links between the QMS and SMS indicators. In this case, consistent links between elements of the system are characterized by a certain risk level. Conditions that trigger an undesired occurrence with different links existing between the system elements are presented in Figure 6 below. Each condition corresponds to a specific risk level \hat{R}_i . This classification

of risk levels is based on ICAO Doc [2] and is used by civil aviation organizations of the Russian Federation.

Расположение элементов в области неопределенности	Уровень риска	Формула события
	Не приемлемый	$\hat{R} \rightarrow L_R \Rightarrow U_R = (1 \wedge 6 \wedge 7 \wedge 12 \wedge 13) = 1$
	Допустимый	$\hat{R} \rightarrow L_R \Rightarrow U_R = (2 \wedge 6 \wedge 8 \wedge 11 \wedge 13) = 0$
	Приемлемый	$\hat{R} \rightarrow L_R \Rightarrow U_R = (2 \wedge 3 \wedge 8 \wedge 11 \wedge 12) = 0$

Fig. 6. Risk Levels Within the Uncertainty Range

Figs. 5 and 6 show five critical elements (Nos. 1, 6, 7, 12, 13) that, when linked in a chain L_R , may lead to an air crash. The task is to identify these critical elements before occurrence of the condition triggering an air crash U_R .

3. Identification of critical elements at Sirius Aero Ltd.

3.1 Processes used at Sirius Aero Ltd.

As part of the integrated Quality and Safety Management System implemented at Sirius Aero Ltd. operational processes were subdivided into 5 classes (corresponding to different areas of activity) in which 166 quality indicators and 72 safety performance indicators were identified (Figure 7).

Classes	Number of Indicators	
	Quality Indicators (Q)	Safety Performance Indicators (S)
Class 1 "General Organization"	13	1
Class 2 "Flight Operations Management"	60	22
Class 3 "Continuing Airworthiness"	32	16
Class 4 "Ground Handling"	39	20
Class 5 "External Communications"	22	13
Total:	166	72

Fig. 7 Quality and Safety Performance Indicators of Sirius Aero Ltd.

The above indicators were monitored on a monthly basis during one calendar year with the use of the following tools:

3.2. Monitoring of indicators.

Monitoring was conducted based on the following data: safety occurrence investigation materials in compliance with PRAPI-98 [9], materials of internal investigations of unclassified safety occurrences, internal and external audit reports.

Additional materials: Mandatory and voluntary employee reports, flight data analysis, line check and simulator skill check reports, aircraft safety inspection reports, inspection reports issued by the Federal Air Transport Agency and Federal Authority for Transport Oversight.

As a result, a dataset was formed and processed using the new procedure aimed at identifying intercorrelations and determining the depth of reverse correlation.

3.3. Indicator processing steps:

Step one of the new procedure: A row matrix is split into two independent lines as the quality (Q) and safety performance (S) indicators

vary independently in the two systems being interlinked in essence and thus should not be averaged over the total.

Step two. The Q and S indicators are then rated based on the following two types: type 1 – "non-observance of procedures", type 2 – "deviations from established procedures" (Figure 8).

Evaluation of Quality Indicators (of a process, procedure), Q	Evaluation of Safety Performance Indicators, S	Hazard Rating (ϕ)
Not achieved – 0–20% achievement	Number of deviations/month – 8 or more	0.8–1
Partially achieved – 20-50% achievement (0.2-0.5)	Number of deviations/month – 5-8	0.5–0.8
Mostly achieved – 50-70% achievement (0.5-0.7)	Number of deviations/month – 3-5	0.3–0.5
Fully achieved – 70-100% achievement (0.7–1)	Number of deviations/month – up to 3	0–0.3

Fig. 8. Rating of Quality and Safety Performance Indicators

Thus, data on both quality-related and safety-related hazards were obtained.

To identify critical elements of the aviation system, reverse correlation between φ_Q, φ_S should be established by means of a typical correlation analysis used as part of a factor analysis of two derivative sets.

At Sirius Aero Ltd., correlation between quality-related and safety-related hazards was determined with the use of publicly available methods for calculating factor loadings between the elements in Excel. **As a result, generalized criteria of the system development, or multicriteria performance indicators defined in fuzzy sets, were established (presented in Figure 9).**

Values of the multicriteria performance indicator exceeding the set value ($K_{QS}^* \geq 0,8$) shows that the system is not developing in a certain area (in the unreached remainder {0.2} of the full range). A range of values of the multicriteria performance indicator forms a risk level within the system, including an unacceptable risk level under adverse conditions of the system development (Figure 6).

The appendix (Figure 10) includes a fragment of a calculation matrix for critical elements of the system containing red cells with the critical

S_j							
S_j	K_{Q,S^*}						
S_j							
S_j							
S_j		K_{Q,S^*}					
S_j				K_{Q,S^*}			
S_j							
S_j						K_{Q,S^*}	
S_j							K_{Q,S^*}
	Q_i	Q_i	Q_i	Q_i	Q_i	Q_i	Q_i

Fig. 9 Multicriteria Performance Indicator Defined in Fuzzy Sets

elements identified on the basis of the established value of the multicriteria performance indicator defined in fuzzy sets ($K_{OS}^* \geq 0,8$).

Accordingly, in a set of elements we can find critical elements within the uncertainty range that, when linked in a chain, may cause an undesired occurrence.

Based on the critical elements identified, Sirius Aero Ltd. developed necessary corrective actions to eliminate undesired occurrences so that the system risk level shown in Figure 6 is in the acceptable range:

$$\hat{R}_s \rightarrow L_R \rightarrow U_R = 0.$$

The risk level will be verified during the next scheduled internal quality audit of the Airline.

Conclusion

1. Potential conditions that may trigger undesired safety occurrences in the aviation systems (*air crash, accident, serious incident, emergency*) and were previously unknown due to *non-measurable uncertainty of statuses in rare events* may be identified *proactively* before any such occurrence based on the status assessment of elements in fuzzy sets of the aviation system according to ICAO IRM approach by applying the concept of fuzzy measurability of uncertainty of element statuses in fuzzy sets with the use of the *Accident Causation Model* (the Reason Model, or the Swiss-Cheese Model) [2].

2. The task of achieving standard values of the dominant SMS and QMS performance indicators (reliability (quality) and safety performance) and identifying critical combinations of elements within the integrated

system through the monitoring process can be solved by any type of aviation enterprises by means of transition to the modern interpretation of functional properties of the system statuses in terms of “go or no go”: “safety threat”, “risk of undesired occurrence associated with identified threat”, “fuzzy measure of a likelihood of an adverse event causing extensive damage”. Risk may be defined in a similar way as an indicator of “properties of a certain future event”: “risk is a “fuzzy measure” of an anticipated “*scope of danger*” associated with the identified threat”. This approach allows to determine the cost of solving the task of mitigation of risks associated with identified safety threats, which can be achieved through integrated QMS and SMS based on the well-known risk assessment matrix proposed by ICAO [2].

3. A useful effect achieved for the business aviation industry through implementation of the described methods at Sirius Aero Ltd. includes potential improvement of the quality of safe operation monitoring and passenger services and development of a more concise and natural decision-making system for Sirius Aero Ltd. based on the methodology for assessing minimum risks of accidents during future operations instead of some traditional systems that involve calculations of total scores necessary to determine the probability of air crashes and damage contrary to the condition that no analytical probability (in rare events which are non-measurable according to Gaussian method) exists. Conditions that may trigger undesired safety occurrences (*air crash, accident, serious incident, emergency*) may be identified proactively before any such occurrence based on the status assessment of elements in fuzzy sets of the aviation system.

References:

1. Annex 19 to the Convention on International Civil Aviation – Safety Management, 2013.
2. ICAO Safety Management Manual (Doc 9859), 4th edition, 2018.
3. GOST R ISO 9001-2015 Quality Management Systems – Requirements.
4. Frank H. Knight. Risk, Uncertainty and Profit. – M.: Delo, 2003.
5. Guidelines on the Audit of Service Providers' Safety Management Systems for Regional Offices of Rosaviatsia: <https://favt.gov.ru/dejatelnost-bezopasnost-poletov-subp-normativ-metodolog-obespech/>.
6. M. Yu. Smurov, V. V. Balyasnikov. Uncertainty, Risk, Emergence. Contemporary Defense and Security Issues: Planar Reports from the All-Russian Training Conference of the Russian Academy of Missile and Artillery Sciences. Published by the Federal State Institution “Russian Academy of Missile and Artillery Sciences”, 2019.
7. Kuklev E. et al. Flight Safety & Aviation Risk. Singapore: Springer, 2019.
8. GOST R ISO 31000-2019 Risk Management – Principles and Guidelines.
9. Regulations on Civil Aircraft Accident and Incident Investigation in the Russian Federation, approved by Resolution of the Government of the Russian Federation No. 609 dated June 18, 1998.
10. GOST 58771-2019 Risk Management.
11. E. A. Kuklev, E. V. Konikova, D. M. Melnik. “Risks of Functional Element Failures in the Integrated Safety Management System for an Aviation Enterprise”, the Scientific, Economic and Practical Journal “Transport of the Russian Federation”, No. 3(88), 2020, – pp. 36–40.
12. D. M. Melnik. “Identifying Critical Elements of an Aviation Enterprise by Analyzing Outcomes of Safety Occurrence Investigation”, The Transport Strategy XXI journal, No. 47, 2021, – pp. 28–31.

APPENDIX: Fragment of Quality and Safety Performance Correlation Matrix of Sirius Aero Ltd.

S2.2.2	-0,09	0,51	-0,20	0,70	0,33	0,70	0,70	0,70	0,70	0,47	-0,24
S2.2.3	0,45	0,72	-0,22	0,70	0,27	0,70	0,70	0,70	0,70	0,61	-0,48
S2.2.4	-0,10	0,17	-0,55	0,70	0,12	0,70	0,70	0,70	0,70	-0,23	-0,07
S2.3.1	0,05	0,17	0,07	0,70	0,35	0,70	0,70	0,70	0,70	0,30	0,10
S2.3.2	-0,12	0,04	0,37	0,70	0,13	0,70	0,70	0,70	0,70	0,40	0,06
S2.3.3	-0,17	0,41	-0,05	0,70	0,26	0,70	0,70	0,70	0,70	0,43	-0,19
S2.3.4	0,08	-0,07	0,01	0,70	-0,29	0,70	0,70	0,70	0,70	0,10	-0,15
S2.3.5	-0,09	0,21	0,08	0,70	-0,13	0,70	0,70	0,70	0,70	0,92	-0,30
S2.3.6	0,14	0,35	-0,25	0,70	-0,08	0,70	0,70	0,70	0,70	0,81	-0,39
S2.4.1	0,52	0,41	-0,27	0,70	0,26	0,70	0,70	0,70	0,70	0,43	-0,19
S2.4.2	-0,09	0,21	0,08	0,70	-0,13	0,70	0,70	0,70	0,70	0,92	-0,30
S2.4.3	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70
S2.4.4	0,52	0,41	-0,27	0,70	0,26	0,70	0,70	0,70	0,70	0,43	-0,19
S2.5.1	0,36	0,60	-0,52	0,70	0,53	0,70	0,70	0,70	0,70	-0,34	-0,17
S2.5.2	-0,20	0,48	-0,13	0,70	0,09	0,70	0,70	0,70	0,70	0,56	-0,39
S2.5.3	0,19	0,88	-0,78	0,70	0,28	0,70	0,70	0,70	0,70	0,25	-0,62
S2.5.4	-0,34	0,79	-0,45	0,70	0,15	0,70	0,70	0,70	0,70	0,26	-0,64
	Q2.3.5	Q2.3.6	Q2.4.1	Q2.4.2	Q2.4.3	Q2.4.4	Q2.4.5	Q2.4.6	Q2.5.1	Q2.5.2	Q2.5.3
β	34	35	36	37	38	39	40	41	42	43	44

Valeriy Balyasnikov

Candidate of Science in Physics and Mathematics, Doctor of Science in Engineering, Professor. Mr Balyasnikov received a higher education degree at the Leningrad Polytechnic Institute. He has been working at the Saint Petersburg State University of Civil Aviation (SPbGUGA) for more than 45 years. Head of Health and Safety Management Department. Elected a full member (academician) of the Academy of Transport and the International Academy of Transport. Author of over 150 scientific papers. He is the founder of the school of thought in Human Resource Management for Flight Safety, a member of the Dissertations Council for the Defense of Doctoral and Candidate Theses in Transport Specialties of the Saint Petersburg State University of Civil Aviation.

Mr Balyasnikov takes part in the implementation of scientific and research studies in general transport, a considerable part of which includes studies in engineering psychology, ergonomics, flight safety and health and safety management focusing on the human-operator activity in the complex man-machine system "Man-Machine-Industrial Environment".

Evgeniy Kuklev

Professor, Doctor of Science in Engineering.

Honored Worker of the Higher School of Russia. Mr Kuklev was awarded the "Excellent Air Transport Specialist" badge, an Honorary Diploma of the Federal Aviation Service of the Russian Federation for many years of fruitful work in the field of civil aviation. Winner of the Commemorative Medal of the People's Republic of Vietnam (2018) for Services in Training of Scientific Aviation Personnel (Candidates of Science in Engineering) and for the implementation of scientific and engineering projects in civil aviation of the Republic of Vietnam and of the Russian Federation; Member of the Editorial Board of the Journal "Transport of the Russian Federation".

Place of work: Saint Petersburg State University of Civil Aviation, Head of Mechanics Department. Director of the Center for Expertise and Scientific Support of Projects (CESS) at the Saint Petersburg State University of Civil Aviation.

Member of three Dissertations Councils for the Defense of Doctoral and Candidate Theses in Transport Specialties – at the Saint Petersburg State University of Civil Aviation, All-Russian Scientific and Research Institute of Radio Equipment (VNIIRA) and State Research Institute of Civil Aviation (GosNII GA) (Moscow).

Education: higher, graduated from the Kazan Aviation Institute (1958) with a Mechanical Engineering degree in Aircraft Construction.

Scientific and educational work: expert in simulation of controlled processes in air transport systems. He has more than 300 scientific papers and inventions in aviation, including 18 monographs, 10 textbooks; 8 works have been published abroad.

Recent foreign publication in English: author of the book (co-authored) published by Springer (Singapore) in 2019: Aviation System Risks and Safety. Authors: Kuklev E.A., Shapkin V.S., Filippov V.L., Shatrakov Y.G.

Internship at the U.S. ATC Center (San Diego, LA) with an awarded ATC inspector certificate.

Report and publication on Global Security in Shanghai (Competition Project: China, Fudan University, 2005), at ICAO (South Africa, Johannesburg, 2012).

Dmitry Melnik

Deputy General Director, Flight Safety – Head of Flight Safety Department, Limited Liability Company "Sirius Aero Aviation Company" (Sirius Aero Ltd.)

In 1995, Mr Melnik graduated from the Armavir Higher Military Aviation School with an Air Navigation Engineering degree in Tactical Air Navigation.

From 1995 to 2011, he served as the Aircraft Navigator, the Flight Sector Navigator in military units of the Kamchatka Region (Yelizovo Airfield, 1995-2004) and the Moscow Region (Ostafyevo Airfield, 2004-2011) on An-26, An-12, An-74 aircraft. 1 Class Military Navigator.

In 2006, he finished the extra mural course at the Saint Petersburg State University of Civil Aviation with a degree in Organization of Traffic Services and Management of Transport (Air Transport).

From 2011 to 2019, he held various positions from the Chief State Inspector to the Head of Department of the State Aviation Oversight and Supervision Over Transport Security in the Central Federal District of the Federal Authority for Transport Oversight.

He was recognized as the best State Inspector of the Russian Federation in aviation transport in 2016.

In 2019, Mr Melnik finished a part-time doctoral programme at the Saint Petersburg State University of Civil Aviation in Air Navigation and Aerospace Engineering.

From 2019 till present, he has been working at Sirius Aero Ltd. in the following positions: Risk Analysis and Assessment Expert of Flight Safety Department, Deputy General Director for Flight Safety – Head of Flight Safety Department.

12 scientific publications dedicated to the quality and flight safety in the following journals: Transport of the Russian Federation, Risk Management, Quality and Life, Bulletin of the Saint Petersburg State University of Civil Aviation.

Educating Aviation Professionals Through State-of-the-Art Training Programs



Boris Eliseev,

Rector of the Moscow State Technical University of Civil Aviation (MSTU CA), speaking on aviation personnel training

Today's business aviation is a high-tech industry with specific requirements to training and continuous development of workforce.

Over 50 thousand engineers and other subject-matter professionals are currently engaged in the aviation industry. Many graduates of MSTU CA (former known as the Moscow Institute of Civil Aviation Engineers) are pursuing their careers in business aviation sector. It is only natural, as today the industry is represented by nearly all types of organizations – airport facilities, airlines, maintenance centers, dispatch services. Aviation security, safety, fueling and IT experts are also in high demand. Civil aviation in general (and business aviation in particular) is an industry that requires talent with domain-specific knowledge and skills developed to a high standard. We are proud to be able to provide such talent.

These days, apart from students wishing to complete their first university degree, MSTU CA also welcomes those interested in additional vocational training. Such additional training programs are delivered in close cooperation with business aviation operators.

Let me give one of the recent examples.

**Today's business aviation
is a high-tech industry
with specific requirements to training
and continuous development of workforce**

In March 2021, certificates were awarded to the first participants of the Qualification Program "Maintenance Initial Training – BD-700-1A10 and BD-700-1A10 with Rolls Royce BR700-710A2-20 Engines, B 1.1 + B2".

The training was arranged by MSTU CA Approved Training Organization (ATO) and held at the facilities of Tulpar Technic, the first Bombardier authorized service facility in Russia and CIS. The course was attended by 11 students. Theoretical and practical training was delivered at Tulpar Technic facilities located in Kazan International Airport. Various Bombardier aircraft were used as training facilities for the course.

Professional development of civil aviation personnel has generally been and still remains the focus of increased attention. MSTU CA Development and Assessment Institute (DAI), a certified ATO, offers training and development services for various specialists of civil aviation organizations, including aviation personnel, under 150 additional vocational training programs.

A significant part of these training programs is relevant for business aviation operators.

**A significant part of MSTU CA
training programs is relevant
for business aviation operators**

In addition, DAI conducts competency assessment of personnel responsible for ensuring transport security. It is notable that DAI's half-a-century history started with the delivery of training courses within MSTU CA. Such rapid growth and ramp up of business in the aviation industry build upon continuous development and the ability to pick up most recent trends and demands to design new programs of additional vocational training for aviation personnel and other aviation industry workforce.

A good example is our new training and development program "Aerodrome Bird Control" intended for civil aviation executives and experts involved in flight safety assurance processes, which has been recently developed, reviewed at the meeting of the MSTU CA Avionics Maintenance Department, agreed with the Airport Operations Division of Rosaviatsia and approved by MSTU CA Rector.

The program meets the requirements of the Air Code of the Russian Federation, Manual on Aerodrome Bird Control in Civil Aviation (ROOPGA-89) and ICAO Recommendations.

The training course focuses on aerodrome bird control management, bird scaring methods, bird control activities included in aerodrome operator's SMS, as well as international best practices in aerodrome bird control.

Generally, flight safety is the subject of special emphasis – multiple safety training programs have already been developed, approved and delivered.

Our University is proud to support the annual workshop "Flight Safety. Fuel Safety" conducted under the auspices of RUBAA, where our specialists are invited as experts. This year, our students were able

to attend the workshop in an online format only, however all the materials presented are highly valuable and useful in the training process.

MSTU CA is quick to respond to evolving demands. Development of unmanned aerial systems (UAS) has been one of the key recent trends in the aviation industry. Nowadays, unmanned aerial vehicles (UAV) are widely used for military and commercial applications. In the commercial sector, UAVs are still mainly utilized for cargo operations, however dozens of passenger UAV prototypes are ready to fly.

The UAV concept implies that drones can be controlled autonomously based on artificial intelligence technology or remotely by a human from the ground. UAV pilots must receive special training given that even the simplest non-commercial unmanned systems have considerably high cost. Training of UAV pilots is a focus area for leading civil aviation universities and training organizations which are fully capable of providing students with all necessary knowledge and skills. An external pilot, or UAV operator, and conventional aircraft pilot are equally responsible for safe operation of the flight and must have thorough knowledge of the air law, flight operation and planning process, operational loads, human factor, meteorology, air navigation, operating procedures, principles of flight and radio communication phraseology and procedures.

We are among the universities that have promptly responded to the UAV pilot demand in the market.

As MSTU CA Rector, I said that our University was ready to launch training of UAV operators back in 2013 when the Russian aviation industry was only starting to experience all this “drone boom”. Later on, the UAS and Robotics Laboratory was opened in the main campus, becoming a scientific platform for students, postgraduates, teachers and even school pupils undergoing their pre-university training at MSTU CA as part of the municipal projects implemented by Moscow Government.

Lack of clear requirements to external pilot training in the Air Code and FAR-147 remains our main challenge today.

Possessing sufficient experience in UAV training, Russia's leading technical civil aviation university served as a center for education of future UAV operators. In 2020, Irkutsk Branch of MSTU CA was licensed to implement the main degree program 25.02.18 “Operation

of Unmanned Aerial Systems” designed for training of unmanned aerial vehicle operators. First students are expected to be enrolled in the program in 2022.

At the same time, training courses for instructors and operators of UAS with a 30 kg MTOW have been developed by MSTU CA Development and Assessment Institute.

Employees of MSTU CA main campus and Egorievsk campus, where students' flight training sessions were held, became the first graduate instructors. The 112-hour training course included all required theoretical and practical components covering air law, air navigation, meteorology, UAS design and operation.

Much attention is also paid to management personnel training. In June 2021, MSTU CA congratulated its first graduate students successfully completing a bachelor's degree program in Air Transport Business Management (Air Navigation Department).

Graduates of the new training program are prepared to take up Business Analyst, Process Analyst, Business Process Management, System Analyst and similar positions at air transport and consulting businesses tasked with enhancing management efficiency through improvement of business processes and corresponding organizational structures.

The need to implement this new bachelor's degree program is rooted in one of the modern management trends that emerged as a result of Russia's Digital Economy Program – the transition from functional to process-based management. In this regard, graduation of bachelor's degree holders capable of designing and implementing new business processes based on system cross-disciplinary competencies in management, system analytics and IT has become a priority. Currently, market demand for process management experts in Russia is mostly met through implementation of additional vocational training programs which are normally offered by IT divisions of various universities. As a result, business process management tasks are often performed by IT staff who do not have a required depth of systemic knowledge in management and economics.

A scientific basis for the new bachelor's degree program was formed in 2015–2016 when the Air Transport Economics and Management



Foto: MSTU CA

Department of MSTU CA conducted its research studies for the Project "Development of Methodological Approaches Aimed at Building Information Competencies of the University Management Program Graduates Ensuring Efficient Business Management in Uncertain Environment" which was supported with a grant by the Russian Foundation for Humanities.

The University has signed partnership agreements with the providers of business process management software BETEC and Software AG creating a foundation for development of the software-based infrastructure supporting simulation, analysis and improvement of business processes.

Most of the studies were conducted for the brand new academic courses, such as Theory of Process Management, Business Analysis, Project Process Consulting, etc., which had not yet been delivered at MSTU CA or other universities.

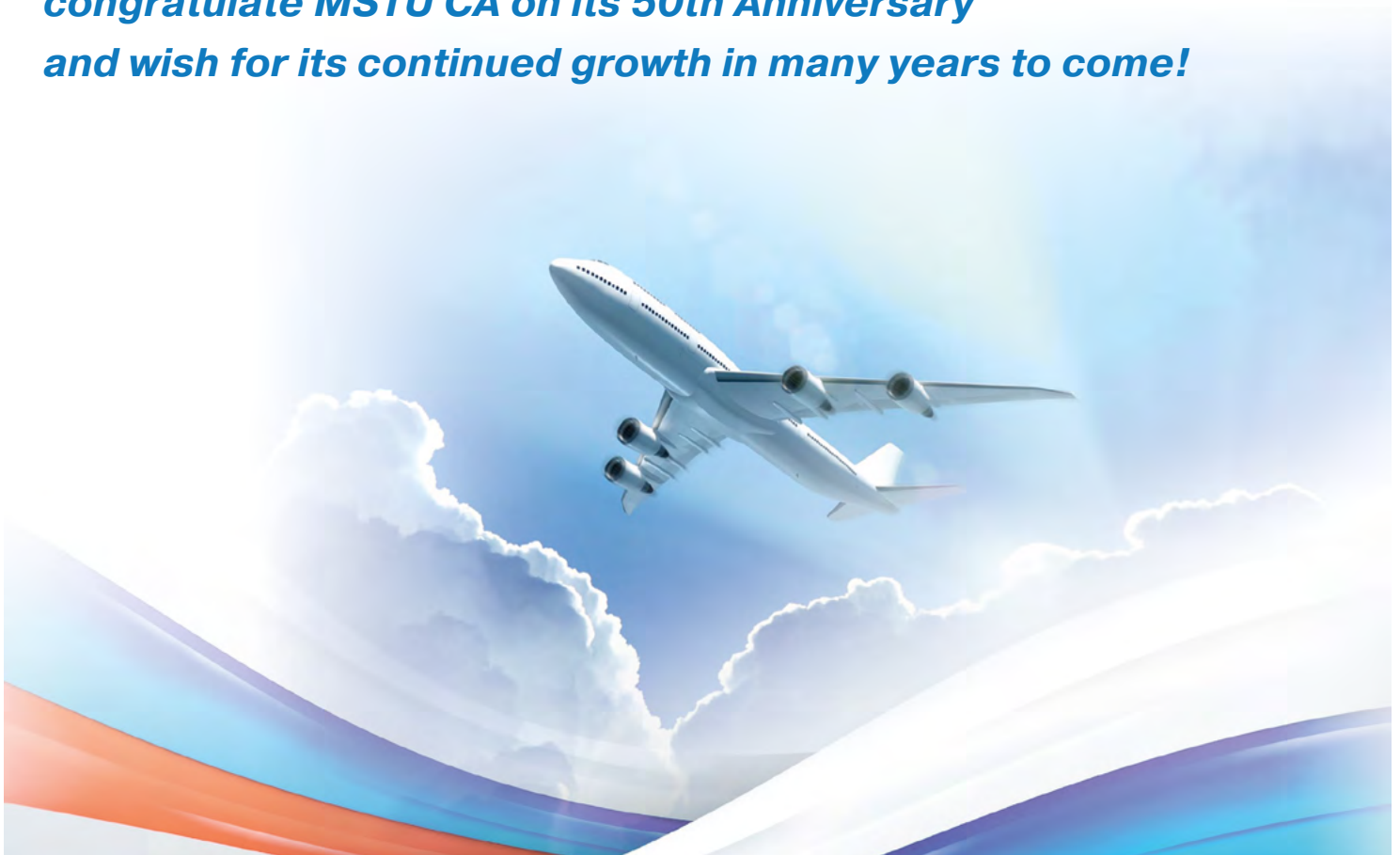
I strongly believe that management personnel will be in high demand among business aviation operators.

All business aviation players are welcome to complete training and professional development programs at MSTU CA. And the next year we will be happy to greet high school graduates, ready to educate professionals who will support our industry in the future.

Boris Eliseev:

"I strongly believe that management personnel will be in high demand among business aviation operators!"

***Editorial team of the Transport Strategy XXI
and the Russian United Business Aviation Association
congratulate MSTU CA on its 50th Anniversary
and wish for its continued growth in many years to come!***





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In the sky – like at home: safe and secure



Azat Khakim,
Tulpar Aero Group

In August, Tulpar Aero Group turns 30 since its foundation. Over this period, business aviation has been our core activity, flight safety assurance has been our main priority, and passenger loyalty has demonstrated that we are keeping on the right track.

Aviation is a specific industry. After initial ten challenging years in the industry as a businessman, I was capable to precisely forecast for five or seven years ahead how the sectors that we were working for would evolve. Within this framework, we have overcome several financial and industrial crises without big losses due to the Group's timely reorientation of operations, flexibility of policies and synergy.

All these years we have wisely prioritized our activities because we do understand that planes and helicopters are to be airborne, and not on the ground. Regarding flight operations, Tulpar Air was actively engaged in delivering charter passenger air services through 2008. Further on,

from 2008 to 2019, the company focused on corporate air services and corporate aircraft maintenance. Since 2020, it has come back into the segment of business aviation passenger services, largely owing to the coronavirus crisis.

But now, charter flights are only part of a wide product line we offer to our clients. The main focus is placed on our comprehensive maintenance programs for aircraft owners. For the last few months, four planes have entered operation under the Tulpar Air's flag. One Challenger 300 has been purchased. Two more planes which are currently under the design phase are planned to start operations late in the year.

Why do our clients choose us? Perhaps, it is because we are not striving for solid achievements and ratings at rapid-fire pace. The aviation industry is not a toys place. Again, quality and safety of flight operations is our main operational priority. This rule is very important for our customers who entrust us with their lives. We rigorously follow all requirements to preparation, support, and safe conduct of flight operations.

Management of an owner's fleet goes beyond the flight operations aspect. It mainly includes focus on management of flight crew training, aircraft maintenance, continued airworthiness, and cabin interior maintenance ... That is why we were expanding other segments in parallel with flight operations, such as aircraft maintenance, repair and overhaul, cabin interior maintenance, aircraft modifications. Currently, our clients, Bombardier planes' owners, enjoy highly favorable conditions. Tulpar Technic (the first Bombardier authorized service facility in Russia and CIS and the official Collins Aerospace dealer in Russia) is an independent MRO organization in Kazan delivering services for business jets. Considering Tulpar Technic's extensive competence, a lot of activities within the base maintenance checks are performed in Kazan, while MRO activities abroad are rare. An airplane availability for MRO activities in Kazan enables us to perform cabin interior works as well, resulting in the reduction of aircraft downtime and owner's costs for ferrying the aircraft abroad.

Definitely, the industry has competition

I'm all for healthy competition in all ways. It motivates to grow, and not to stand still. There are few business aviation airlines as such in Russia. We maintain communication with and meet our colleagues, including at RUBAA events. I guess, each airline has its peculiar nature and client portfolio, and that is why I don't see any kind of direct competition between us.



Even inside the Tulpar Group, business relations are organized in such a way that some competencies overlap. One might wonder why we would create competition for ourselves? But, if you look at our approach in more detail, you will see that all parties are winners – us, and our clients. Our clients get an extra option. For example, nowadays we have two business airlines: Tulpar Air based at international airports Kazan, Begishevo and Ufa, and Jet Express based at Vnukovo-3. These airlines have their own fleets with both differences and commonalities in aircraft types. Sure thing, it is more convenient and efficient to base an aircraft at the location you live in and fly from.

Tulpar Air Group has big plans for the future

Tulpar Air Group is nurturing extensive plans for the future. We are planning the construction of two new MRO hangars with an area of 8,800 and 5,700 sqm at the airports of Kazan and Ufa respectively. Up next, we are constructing a new building designed for providing modifications to aircraft cabin configuration and interiors. The facility will have an area of 3,000 sqm and will be located at the base of Tulpar Air Group.

Richard Bach's phrase stating that when we are achieving the impossible, we are getting the real thing resonates deeply with me. Over the years of our presence in the market, we have tried ourselves in numerous aviation segments. Experience and deep knowledge of the aviation market enable us to elaborate a new operational model. I am sure the model will be supported by our colleagues. Our current work on the model goes in parallel with projects in MRO, cabin interiors, and aircraft modifications.

I would like to emphasize the cooperation between Tulpar Air Group and RUBAA, which has been lasting for all these years and proved to be efficient and effective. It is a great pleasure to work side by side with high level professionals who understand that business aviation is not limited to Moscow or Saint Petersburg, but also includes regions having a great growth potential. And our joint events (forums and exhibitions) held in Kazan in 2012 and 2018 contributed much to the development of our region's business aviation. I am sure that the Regional Business Aviation Forum should be repeated in the coming years.

Over the years of our presence in the market, we have tried ourselves in numerous aviation segments. Experience and deep knowledge of the aviation market enable us to elaborate a new operational model. I am sure the model will be supported by our colleagues



Tulpar Air Group, one of the oldest and active players of the Russian business aviation market, is celebrating its 30th anniversary in August. Editorial team of the Transport Strategy XXI, the Russian United Business Aviation Association and industry colleagues congratulate Tulpar Air Group on its Anniversary and wish that it reach new heights!





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Bombardier is a global leader in aviation, creating innovative and game-changing planes. Our products and services provide world-class experiences that set new standards in passenger comfort, energy efficiency, reliability and safety.

Headquartered in Montreal, Canada, Bombardier is present in more than 12 countries including its production/engineering sites and its customer support network.

The Corporation supports a worldwide fleet of over 4,900 aircraft in service with a wide variety of multinational corporations, charter and fractional ownership providers, governments and private individuals.

400 Cote -Vertu Road West, Dorval, Quebec (Canada) H4S-1Y9 • Phone: +1 514 855 7474 • E-mail: no-reply@bombardier.com
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Your Charter is a personal air transport service including management of all phases of the flight, from check-in to landing.

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We can guarantee maximum comfort, reliability and safety.

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Web site: www.yourcharter.ru

**CJSC VIPPORT**

VIPPORT has been exclusively assigned as a Fixed Base Operator for business and regular flights at Vnukovo airport since 2004.

VIPPORT meets the highest international standards and has all the necessary certificates of conformance and is a full member of the following business associations: EBAA, NBAA, RUBAA, HAI.

On a daily basis the Company's professional team of highly qualified specialists carry out a huge amount of organizational and technical work related to the complex servicing of scheduled and unscheduled flights, not only at Vnukovo-3, but also at Vnukovo-1 (Passenger terminal A), Vnukovo-1 (Cargo terminal) and Vnukovo-2 (Government terminal).

VIPPORT has currently served government flights from 104 countries.

119027, Moscow, Vnukovo Airport 1 building 3 • Phone: +7 (495) 436-45-95 • E-mail: ops@vipport.ru • Web site: www.vipport.ru

**SIRIUS AERO, LTD**

Sirius Aero is the largest international business aviation company in Russia. We provide domestic and international charter flights to almost all countries of the world. The Sirius Aero fleet includes 18 modern private jets with a premium cabin configuration. There are 5 types of aircraft in our fleet.

Sirius Aero is the largest commercial operator in Eastern Europe. Sirius Aero offices are located in Moscow, Vienna, London and Limassol. The base airports are located in Russia and in Europe.

The activities of our company comply with Russian and international air legislation. Sirius Aero is committed to caring for its passengers, which is why we adhere to the strictest international safety standards.

Dorogobuzhskaya st. 14, building 1, Moscow, Russia • Kärntnerstrasse 17/13, 1010 Vienna, Austria
Phone: +7 (495) 989-61-91 – Moscow; +43 (660) 614-20-90 – Vienna • E-mail: info@sirius-aero.ru • Web site: www.sirius-aero.com

**JEPPESSEN / BOEING DIGITAL SOLUTIONS & ANALYTICS**

Jeppesen is the integral part of The Boeing Company and is currently named Boeing Digital Solutions & Analytics.

Boeing offers MRO services, conversions and modifications as well as an array of digital tools aimed at operational efficiency gains for airlines, private customers and business jets operators.

Boeing Business Jets (BBJ) provides VIP customers access to the same amenities in the air as they have on the ground including an office, bedroom, shower, dining facilities, entertainment areas and more. BBJ customers put a high premium on quality, convenience and mobility.

17, Gazetny pereulok, 125009, Moscow, Russia • Phone: +7 (495) 797-34-15 • E-mail: RussiaComms@boeing.com • Web site: www.boeing.ru

**JetPort SPb LLC**

JetPort SPb LLC provides its customers with a full range of services, including service both at Pulkovo Airport and beyond: ground handling services for any type of aircraft; hangar; passenger services at FBO "Pulkovo-3"; airfield technical support; apron transportation; refueling, transfer to/from the city; hotel reservations in the best Saint-Petersburg hotels; premium class onboard catering; crew visa support; private jet charter; and many other services.

196210, Pulkovskoe highway 37/5A • Phone: +7 (812) 240-02-88 • E-mail: ops@jetport.ru • Web site: www.jetport.ru

**ALFASTRAKHOVANIE PLC**

AlfaStrakhovanie Group is the largest Russian insurance private company* with the universal portfolio of services both for business and private clients.

Russia, 115162, Moscow, Shabolovka street, house 31, Building "B" • Phone: +7 (495) 788-09-99 • E-mail: alfastrah@alfastrah.ru
Web site: www.alfastrah.ru

**MERIDIAN AIR COMPANY**

Since 1992, Meridian Air Company has been specializing in the operation and management of aircraft in business aviation. The base airports are Vnukovo-3, Koltsovo and Bugulma. The airline's fleet consists of aircraft such as Gulfstream G450, Airbus A320 and Bombardier CL-600-2B16 Challenger 605. The aircraft are registered in the state registers of Switzerland, Ireland and Bermuda. The airline has the following certificates: an operator of a commercial GA; IBAC on compliance with the requirements of the International Standard of Business Aviation Operators - IS-BAO Stage III; EASA Part-CAMO Certificate for the right to maintain the airworthiness of aircraft of European registration; BCAA OTAR 39 SubPart F Authorization for the right to maintain airworthiness of aircraft of Bermuda registration.

Meridian Air Company is the first aviation Family Office in Russia.

15 Garibaldi street, Moscow, 117335, Russia • Phone: +7 (495) 500-32-21 • E-mail: comm@meridian-avia.com • Web site: www.meridian-avia.com

**ATM JET LTD**

ATM JET is a company founded in 2004 by the best professionals in the field of aircraft management.

The team of specialists has more than 16 years of experience working with European and Russian aviation organizations.

We organize private flights, including special, cargo and medical flights around the world.

197110, St.Petersburg, Petrovskaya kosa 1/1 office 3025 • Phone: +7 (812) 425-35-02 • E-mail: info@atmjet.ru • Web site: www.atmjet.ru

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Airbus Corporate Jets (ACJ) offers the most modern and comprehensive corporate jet family in the world, giving customers the greatest choice of unique, customisable and spacious cabins— offering them a unique flying experience. All Airbus corporate jets originate from the most modern aircraft family on the market. Derived from Airbus' successful market-leading jetliners, ACJ customers will invariably be close to Airbus' global support network. Our products: **ACJ TwoTwenty**. The ACJ TwoTwenty is the newcomer to the ACJ Family. The TwoTwenty creates a whole new market segment "The Xtra Large Bizjet" and offers customers more personal space and cabin volume for a whole new passenger experience. **ACJ319neo**. The ACJ319neo, based on the best-selling A320neo family product line, with new engines and Sharklets, delivers better range and enhanced passenger comfort. **ACJ320neo**. Available with the industry's latest generation engines, the ACJ320neo is wider and more comfortable than traditional business jets, offering significant enhancements in range and efficiency. **ACJ330neo**. The ACJ330neo, one of the latest VIP widebodies in the ACJ product line, offers an unbeatable combination of modern design and top end luxury to deliver more comfort, efficiency and true nonstop to the world range. **ACJ350 XWB**. The ACJ350 XWB offers innovative technology as well as a fuselage made from next-generation carbon composite materials. The XWB stands for Xtra Widebody, enabling the ACJ350 to deliver Xtra comfort, Xtra innovative technology, Xtra efficiency and to be Xtra easy to outfit.

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**LIMITED LIABILITY COMPANY "JET CATERING"**

For 10 years of existence in the aviation market, we have served more than 50,000 business aviation flights and more than 1,000 events in the aviation and other industries.

Our team works 24/7 and is ready at any time to accept and fulfill a client's order, and thanks to the well-developed logistics, to ensure guaranteed delivery to the destination and by the specified time. The best suppliers of products and our own complete production cycle give us the ability to control and ensure the high quality of each order. And ISO and HACCP certifications give us serious competitive advantages in the business aviation market.

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**FLIGHT CONSULTING GROUP**

Flight Consulting Group has more than 20 years of experience in the business aviation area and provides comprehensive solutions for flight support, business jet ground handling, organising private charters, buying and selling aircraft, and aviation consulting.

We pay special attention to the quality of our services, making our customers' wishes and needs our top priority!

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**JET SUPPORT SERVICES, INC. (JSSI)**

Jet Support Services, Inc. (JSSI), is the leading independent provider of hourly cost maintenance programs to manage the often unpredictable costs of operating and maintaining virtually all makes and models of aircraft, engines and auxiliary power units (APUs). JSSI is responsible for maintaining in excess of 2,000 business jets, regional jets and helicopters across the globe and serves customers through an infrastructure of certified technical advisors.

JSSI's portfolio of companies leverage its technical knowledge, experience, buying power and data to provide support at every stage of the aircraft life cycle. Other JSSI companies: JSSI Parts & Leasing, JSSI Advisory Services, Conklin & de Decker, and SierraTrax.

Farnborough Airport Ively Road Hampshire GU14 6XA United Kingdom • Phone: +44 (20) 39347244 • E-mail: info@jetsupport.com
Web site: www.jetsupport.com

**AIR CHARTER SERVICE**

Air Charter Service Russia is a part of a large international group Air Charter Service (ACS), a leading aircraft charter specialist. ACS launched its business in Russia back in 1995 and has 2 full-scale offices now – Moscow and S.-Petersburg.

ACS pioneered the Russian business aviation market by introducing business technologies of executive aviation brokerage. Some of those are widely used by today's industry leaders.

ACS mission in Russia is not just about increasing its own business. The company is working on developing a mature market to provide comfortable environment for players with the highest standards of air charter services.

121552, Moscow, Yartsevskaya, 19 • Phone: +7 (495) 775-42-70 • E-mail: pax@aircharter.ru • Web site: www.aircharter.ru

**SATCOM DIRECT RUS (SATCOM DIRECT, SD)**

Satcom Direct (SD) and its companies provide global connectivity solutions for business and general aviation, military, government, and head of state aircraft. At Satcom Direct Rus, the spirit of innovation is both our heritage and our future. The company has a wide client base in the Russian and international markets. A professional and close-knit team can solve problems of any complexity.

The long-term partnerships with the world's leading satellite operators and space technology manufacturers provide the company's clients with unique opportunities and solutions.

119530, Moscow, Ochakovskoe highway 34, of.25 • Phone: +1 321 525 4645 • E-mail: moscow@satcomdirect.com
Web site: www.satcomdirect.com

**LLC "CHARTER GREEN LIGHT MOSCOW"**

Charter Green Light Moscow LLC has been an avid participant of the Russian charter flight market for more than 8 years, during which the company has organized over 800 international and domestic air charters.

Our company offers its customers a full range of charter flight options - from flights on helicopters and business aircraft, to the organization and supervision of cargo charter flights. For the many years of successful work on the market, the company has earned a reputation as a reliable partner, always fulfilling its obligations.

In the field of business aviation, we present a comprehensive list of VIP services, including: transfers, access to VIP lounges with increased comfort, priority service at passport control and passenger escort at all stages of the flight.

We are chosen for our ability to fulfill any task, be it to organize a VIP flight, a corporate charter or deliver any cargo, including especially valuable items, to anywhere on the globe.

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business aviation

MSKY**MSKY, LLC**

MSKY offers a complete range of services in business aviation: private and commercial operation of business jets and helicopters with European and Russian registration; business jet charters; aircraft hangarage at company facilities at Vnukovo-3; aviation consulting; aircraft sales and acquisitions.

MSKY is highly experienced in completion of customs operations for importation of business aircraft and spare parts in Russia and EAEU.

MSKY has exclusive rights for chartering business jets of various types, managed by the company.

The MSKY team consists of over 40 highly qualified professionals, spread across offices in downtown Moscow and Vnukovo-3.

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Web site: www.msky.ru

**LLC 'JET PARTNERS AERO'**

Jet Partners – experts in business aviation and leaders of corporate flights in Russia in terms of quality and volume of flights performed annually, the largest host of sharing flights in Europe, officially accredited broker of the Russian United Business Aviation Association. We have been operating since 2012, and the experience of our key employees exceeds 13 years.

We specialize in solving aviation problems of any complexity: private, corporate and sports charters; regular jet sharing programs; medical charters; shift transportation charters; etc.

We are trusted with state scale projects: aviation support of economic forums and congresses, delivery of the Holy Fire for the Easter service, private missions involving the EMERCOM fleet.

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**VIP GROUP AERO**

VIP Group Aero was founded in 2001 in Moscow, Russia. Nowadays VIP Group Aero is one of the biggest players among the market of private jets brokerage, sharing flights, airports' VIP-service booking for regular flight passengers.

VIP group aero accredited broker of the RUBAA.

The company employs more than 30 professionals that work 24/7. VIP Group services are designed for VIP passengers, personal assistants of VIP persons, travel companies and business travel agencies.

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Web site: www.charter.vipgroup.aero

**LLC "AVIASERVICE"**

Aircompany "Aviaservice" was established in 2014 and is registered as an operator for the performance of commercial passenger transportation, aerial application and general aviation, performs business air transportation around the world.

Aircompany is a member of the Russian United Business Aviation Association (RUBAA), Russian Air Transport Operators Association. Aviaservice was one of the first in Russia to successfully pass certification in the European Aviation Safety Agency (EASA) for the right to fly to EU countries. Aircompany has a positive experience of successfully passing the certification procedure according to the international standard IS-BAO.

The airline's fleet consists of 16 aircraft, including 7 aircraft and 9 helicopters. Base airports: Kazan, Vnukovo, Bugulma. During the period of its activity Aviaservice has earned a reputation as a reliable and high-comfortable carrier.

420017, Republic of Tatarstan, Kazan International Airport n.a. G. Tukay • Phone: +7 (843) 537-78-18 • E-mail: mail@aviaservice.aero
Web site: www.aviaservice.aero

**TEXTRON RUS LLC.**

Company Textron RUS is the representative office of Textron company in Russia and CIS.

Today the main activities of the representative office are the promotion of products and services of Bell, Textron Aviation and Textron Specialized Vehicles business units.

125466, Moscow, Nikolskaya street, building 10, office 542 • Phone: +7 (495) 782-21-89 • E-mail: ajabenko@textron.com • Web site: www.textron.com

**LLC AVIA BUSINESS GROUP**

Welcome to the company AVIA BUSINESS GROUP, which specializes in providing flights and ground handling of aircraft. Our company will also help to organize and carry out: charter flights (business aviation, commercial aviation), event air transportation (corporate transportation, corporate flights). We also offer our clients to use the service of ordering an aircraft (aircraft rental) from a wide fleet of domestic and foreign aircraft. AVIA BUSINESS GROUP is your reliable partner in the field of VIP and charter air transportation.

The staff of AVIA BUSINESS GROUP understands the importance of the smallest nuances when flying, therefore, based on the client's preferences, we will develop the optimal route and flight schedule. AVIA BUSINESS GROUP is: flight support; charter flights; commercial aviation; business aviation; corporate transportation (corporate flights).

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**LLC "GETJET"**

GetJet is a business aviation marketplace, which offers a wide variety of business jet flights. This can be both an entire aircraft or a seat-by-seat rental – Jet Sharing. The GetJet regular Shuttle program includes destinations: Nice, Genoa, London, Munich, Dubai and many others.

GetJet offers a wide range of technological solutions: online booking of aircraft, empty legs and sharing subscription, search of co-travellers, sales of free seats, merging flights.

All services are provided through application, available at AppStore.

123456, Moscow, Vereyskaya street, house 29, building 33 • Phone: +7 (495) 120-04-47 • E-mail: sales@getjet.com • Web site: www.getjet.com

**GLOBAL JET MONACO**

Global Jet is a world-leader in private aviation.

Founded two decades ago, the Global Jet family has helped countless generations take to the skies with an unrivalled commitment to excellence.

The company is still privately owned by its founders, actively working in the business.

If you are thinking about chartering or owning your private aircraft, consider joining the Global Jet family.

We are more than service providers; we are partners.

Villa L'union / 27 Boulevard Des Moulins 98000, Monaco • Phone: +377 97 77 0104 • E-mail: sales@globaljet.mc
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**SAN MARINO AIRCRAFT REGISTRY**

The Republic of San Marino is a landlocked sovereign State located in the northeastern part of the Italian peninsula.

The San Marino Aircraft Registry is open for private, corporate and commercial air transport operations.

San Marino Aircraft Registry – a global leader in Aircraft Registration

Services is well positioned to assist aircraft owners realise the fiscal and operational benefits of the T7-Register. Our administrative, management and technical staff has the experience and expertise to service and safeguard your aircraft operation from day one.

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**LILIENTHAL JET LIMITED LIABILITY COMPANY**

The main areas of activity are the organization of premium charter flights and aircraft management.

We carry out domestic and international charter flights worldwide.

All aircraft meet international flight safety standards and the highest comfort requirements.

You can also rent a personal chair in a private jet.

You pay for only one seat in the cabin, but do not lose comfort and get all the benefits of airport VIP service on board.

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Web site: www.liliental.ru

**CJSC "EASTUNION"**

The EastUnion company began its activity in 2005 and at the moment, in addition to services for the organization of charter flights around the world, provides consulting services for the acquisition of aircraft, as well as aircraft ground handling and flight support.

Since its inception, EastUnion has managed to win the trust of its passengers, customers, major aircraft manufacturers and has taken a worthy niche in the aviation market.

EastUnion is the authorized sales representative of Cessna and Beechcraft jet and turboprop aircraft in Russia and the CIS countries, as well as the official representative of Bell Helicopter in Azerbaijan, Uzbekistan and Tajikistan.

119530, Moscow, Ochakovskoe Shosse, 34 • Phone: +7 (495) 269-02-10 • E-mail: reception@eastunion.ru • Web site: www.eastunion.ru

**JSC "AVIACOMPANY "BYSKY"**

BySky is the first business aviation operator in Belarus.

The company fleet includes the best-in-class Swiss turboprop aircraft Pilatus PC-12NG and is based in FBO MINSK business aviation center. The geography of flights is adapted to each customer individually.

The BySky team works 24/7 and consists of highly qualified specialists: flight crew, flight safety specialists, technical staff and ground management.

220076, Minsk, Francyska Skaryny street, 21/1, office 249 • Phone: +375 17 270 27 88, +375 29 122 99 33 • E-mail: info@bysky.by
Web site: www.bysky.by

AVIATION MASTERS

AVIATION MASTERS is an industry leader among the top-rated Bespoke VIP Premium Services Specialists and Aviation Consultants, offering its services worldwide 24/7.

AVIATION MASTERS is the only approved Business Jet Charter specialist in Southern Europe, Middle East, and North Africa by all esteemed professional organizations!

We are among the very few with an inhouse Safety Department. Client Safety is the Utmost at AVIATION MASTERS!!

Our Services consists of: Bespoke VIP Premium Services which are divided to Aircraft Charter and Luxury Travel Concierge, dedicated to HNWIs, Companies Executives, VIPs, and Governments.

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3 Andrea Panagidi Str. Office: 201, 1085, Nicosia, Cyprus • Phone: +357 22 450 500 • E-mail: info@aviationmasters.aero
Web site: www.aviationmasters.aero

FASTAIR LLC

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Authorized Customs Broker in the Russian Federation. Express aircraft and component Customs clearance services at all Moscow airports.

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PRIMUS AERO GMBH

We are one of the most renowned, independent CAMOs (Continuing Airworthiness Management Organization) in Central Europe and offer cost-efficient technical management and inspection competencies for almost all aircraft types from manufacturers like Bombardier, Gulfstream, Dassault, Cessna, Embraer, Pilatus and Hawker Beechcraft and even more.

Our capabilities range from the pure technical management of aircraft to issuance of an Airworthiness Review Certificate up to asset inspections for banks and insurance companies.

We even have experts in the procurement of spare parts which is already supporting the big players in Europe's business aviation industry.

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**JOINT STOCK COMPANY "AIR MANAGEMENT GROUP"**

TRADEMARK: SANRET

JSC "Air Management Group" established on December 27, 2004, AOC No. 481. Since December 2019, under the management of new owners, the company has started a rapid development in the area of business aviation, operating its own Embraer Legacy 600 with RA registration. The flight geographic covers all Russia, Europe and Asia.

We offering for the private owners and companies special management programmes, providing full support and organization of flights, we are engaged in the HR and crew training programmes, providing as well own technical maintenance for our aircrafts. During 2020-2021, the fleet was managed with one Embraer Legacy 600 and two Challenger 850 with RA registration. In 2021, the company rebranded by registering the "SANRET" Trademark. The company continues to increase its own and management fleet and the development of new types of aircrafts, it is planned to enter under AOC several new aircraft in the 2021-2022.

117279, Moscow, Miklukho-Maklaya Street, house 36 A, office 404 A • Phone: +7 (499) 682-00-76 • E-mail: info@airmg.ru
Web site: www.sanret.aero

**JETPORT TECHNICS LIMITED LIABILITY COMPANY**

JetPort Technics is a maintenance provider based in Vnukovo-3 airport with AOG services available in all Moscow airports and throughout Russia/CIS countries.

The company is an Authorized Service Center for Bombardier and Gulfstream. JetPort Technics holds EASA approval certificate (EASA.145.0472), as well as the USA, Russian and Bermuda CAA approvals for line maintenance of Bombardier (CL300/350/604/605/650/850 and Global series), Gulfstream (G450/550/650), Embraer (Legacy 600/650) and Hawker (700/800/800XP/850XP).

The company offers CAMO services to support private aircraft owners and commercial operators. JetPort Technics provides unparalleled logistics solutions in regard to spare parts provision for business aviation in Russia, arranging customs clearance within the shortest possible period.

Zavodskoye Shosse 19, Building 71, Moscow, Russia, 119027 • Phone: +7 (495) 436-60-35 • E-mail: info@jetport.tech
Web site: www.jetport.tech

**PULKOVO AIRCRAFT SERVICES LLC**

Main activity of the company - organization of aircraft servicing for Russian and foreign air carriers at Pulkovo airport, such as:

Ground handling; Airline representative service; Fuel arrangements; Car transfers; Aircraft interior/external cleaning.

Along with main activities we can offer additional services: aerial photography; carrying out events at the airfields of St. Petersburg and the Leningrad region; excursion programs with aviation topics; gift certificates for flights and skydiving.

196210, St-Petersburg, Pulkovskoe highway, building 37/5 "A", office 220 • Phone: +7 (812) 380-60-41; +7 (812) 380-68-97
E-mail: ops@pas.spb.ru • Web site: www.pas.spb.ru; www.pastour.club

**“SKY ATLAS” JOINT STOCK COMPANY (“SKY ATLAS” JSC)**

Providing full range of services in business aviation, from flight and airnav support, ground handling and fueling services, to charter flights organization throughout Russia, Asia and Europe.

In addition, we provide concierge services: catering, crew visa arrangement, hotel accommodation, transfers for crews, VIP transfers for passengers.

Having our headquarter at Sheremetyevo international airport (SVO/UUEE) and good cooperation with our partners, we are the main provider of ground handling services for business aviation in the main Russian airports Sheremetyevo (Moscow) and Pulkovo (St. Petersburg). We are also ready to provide your bizjets long-term apron parking and places in modern warm hangars.

141411, Moscow, Mezhdunarodnoye h-y, 28b, building 1 • Subdivision: 141426, Khimki, Moscow Region, Sheremetyevskoe h-y, 2, building 20
Phone: +7 (495) 150-19-62; +7 (495) 150-19-61 • E-mail: ops@skyatlas.biz; office@skyatlas.biz • Web site: www.skyatlas.biz

**AURA AVIATION**

Aura Aviation is a leading aviation consultancy practice with a strong track record in executing transactions and delivering value for its clients across multiple jurisdictions.

Aura Aviation undertakes both aircraft sales and aircraft acquisition instructions, and acts for a wide range of clients around the globe – serving high net worth individuals, corporates, and government entities.

We work with Airport and Aircraft operators to conceptualize, finance and deliver specialist commercial projects.

By continuously anticipating and monitoring industry trends, we can quickly identify opportunities and realize tangible results in today's challenging marketplace.

7 Bell Yard, London, England WC2A 2JR • Phone: +44 203 290 3311 • E-mail: info@auraaviation.com • Web site: www.auraviation.com

**AIRCOMPANY NORTH-WEST LLC**

“North-West” Air Company provides a full range of aircraft management services.

The company's advantages are its own 24/7 dispatching service, representatives of airline in regional airports and a subsidiary company “North-West Technics”, which provides technical and unscheduled aircraft maintenance.

The company provides the management of the aircraft of the world's most famous manufacturers: Gulfstream, Bombardier, Dassault and Leonardo Helicopters.

The base airports are located in Moscow and St. Petersburg.

Security, comfort, confidentiality and high level of service are our main priorities in working with clients.

Konstitutsii Square 7, Build A, Office 71H, Saint Petersburg, Russia, 196191 • Phone: +7 (812) 612-81-84
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**AVIATION SERVICES MANAGEMENT**

ASM provides a comprehensive service for private and commercial aviation. The range of services includes flight planning, flight and landing permits, aircraft parking slots, refueling and ground handling.

The benefits of working with ASM are as follows: We have excellent connections with civil aviation offices and their approved agencies around the world. We offer complete price transparency and ease of purchase through a single point of contact. We provide services at any airport in the world. The ASM team speaks 14 languages. ASM Charter offers charter services on exclusive aircraft of the company – Learjet 60XR.

Our dispatch service is at your service 24/7 and we speak Russian.

Suite No. 217, Bldg 8, West Wing, Block B • Dubai Airport Free Zone • PO Box 293684, Dubai, UAE
Phone: +971 4 4097755/4097722 • E-mail: sales@asm.aero • Web site: www.asm.aero

**JET PORT REGION**

Jet Port Region has been operating since 2013 and provides services for non-scheduled flights and airlines as well.

We have representative offices at several airports such as "Koltsovo", "Kurumoch", "Strigino", "Platov", "Bolshoe Savino", "Gagarin".

The company provides a wide range of services in ground handling and flight support for business aviation.

Our representative offices operate on 24/7 basis.

620025, Sverdlovskij region, Ekaterinburg, Bakhchivandzhi sq., 1, office 64, room B4-92 • Phone: +7 (343) 272-66-99
E-mail: ops@jp-region.ru • Web site: www.jp-region.ru

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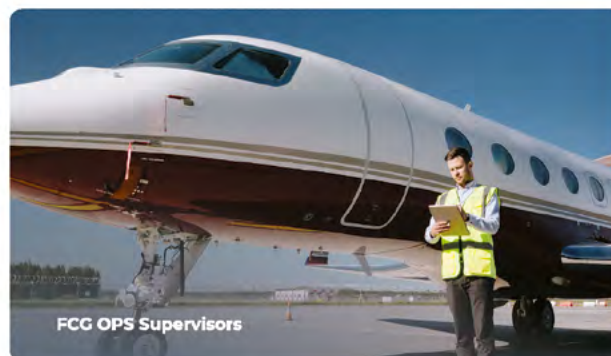
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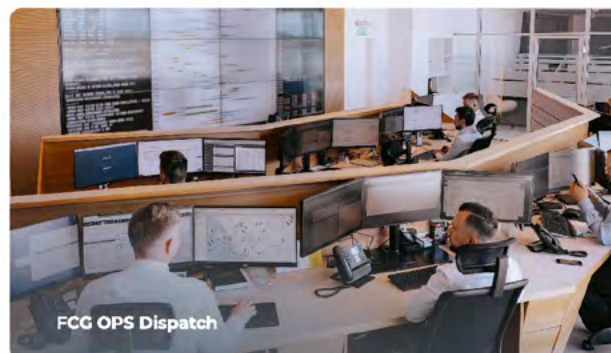
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