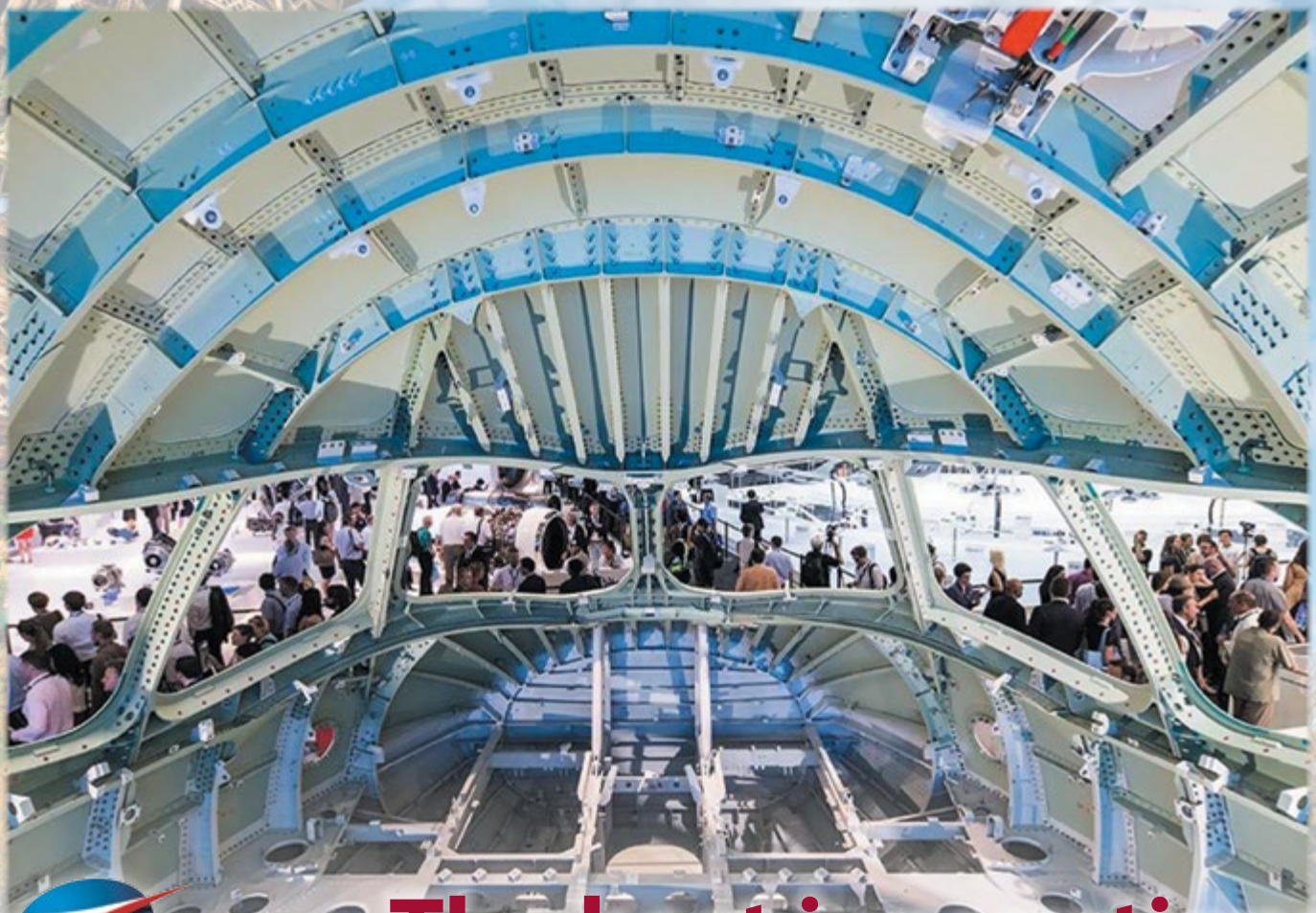
INTERNATIONAL AEROSPACE & TECHNOLOGY GUIDE

Special analytical export project of the United Industrial Edition

№ 08 (39), June 2019



The best innovations for the global market

53e INTERNATIONAL PARIS AIR SHOW LE BOURGET | 53e SALON INTERNATIONAL DE L'AÉRONAUTIQUE ET DE L'ESPACE PARIS • LE BOURGET

SPECIAL PARTNERSHIP

Russian Aviation Military Guide

'International Aerospace & Technology Guide'
№ 08 (39), June 2019

Special analytical export project
of the United Industrial Edition

'International Aerospace & Technology Guide'
is the special edition of the magazine
'Russian Aviation & Military Guide'

Registered in the Federal Service for
Supervision of Communications, Information
Technology and Mass Media (Roscomnadzor)
09.12.2015 PI № FS77-63977

The magazine 'Russian Aviation & Military Guide', published by the United industrial edition, is a winner of National prize 'Golden Idea 2016' FSMTC of Russia

General director
Editor-in-chief
Valeriy STOLNIKOV

Chief editor's deputy
Elena SOKOLOVA

Commercial director
Oleg DEINEKO

Managers
Tatiana VALEEVA
Natalia MOZHAEVA
Andrey PARAMONOV
Alexander STOLNIKOV

Designed by
Svetlana SELIVERSTOVA

There are materials from the information agencies and from the press services of the federal authorities of the Russian Federation used in the project.

Edition is 3 thousand copies

Editorial office:
Malaya Gruzinskaya St., 39
Moscow, 123557
Tel.: +7-495-505-76-92, 778-14-47, 729-39-77

Media postal address:
Moscow, Russia, 123104, mailbox 29

doc@promweekly.ru
promweekly@promweekly.ru
www.promweekly.ru

Cover Photo:
Paris Air Show Le Bourget 2017

The materials marked with R
published on a commercial basis

CONTENTS

EDITORIAL

The best offers for the global market

It has become already obvious and undeniable that security is becoming increasingly important among the various values of civilization. Today, for any state, the ability to reliably and securely protect the territory, residents and values is a priority.

Political situation in the world (conflicts, sanctions, threats of war and other) makes nations once again reconsider their defense possibilities. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and nonending crisis – all of this leads to an unstable and dangerous situation.

One can predict raise of defense means market in times like this. But together with developing of defense technologies in order to safety, rivalry among sellers of weapons and defense systems increases in order to achieve such goals as increasing profits and market share. Paris Air Show 2019 Le Bourge presents the best world (Russian also) aerospace innovations for global market, which are the undisputed world leaders on price and quality in their segments.

This exhibition shows that it is not serious about how many weapons and planes you have, but quality and possibilities of every single one of them is fact what leads to victory on the battlefield and on the global market. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hi-tech products, solid aftersales service and proven reliability, Russia is honest and friendly partner for all countries, ready for mutual work.

Taking part in Paris Air Show 2019 Le Bourge Russia continues the policy of open partnership with other countries. Russia has a wide product line in civil aerospace that meets all the needs and ready propose the best technology and the best price offers.

Valeriy Stolnikov

NEW RUSSIAN HELICOPTER

The VR-Technologies design bureau of the Russian Helicopters holding company (part of Rostec State Corporation) presented a model of a light multipurpose helicopter VRT500 at Fuorisalone exhibition, which was taking place during Milan Design Week from April 8 to 14.

The model was demonstrated at the exposition of the ItalDesign company, which was one of the developers of the VRT500 design. This engineering company was mainly known as an automotive designer. Since it had been found in 1968, ItalDesign has been involved in the development of a wide range of concept cars and the production of automobiles, among them international giants such as Alfa Romeo, BMW, Ferrari, Lamborghini, Maserati.

'VRT500 became a competitive product in the market of light single-engine helicopters and allowed the holding to enter the segment in which it was not yet represented. 'Helicopters of Russia' was considering Europe as a potential market, and therefore we planed to apply for helicopter certification to the European Aviation Safety Agency (EASA) this year, and to begin testing the first prototype in 2020', said Alexander Okhonko the CEO of VR-Technologies.

To this date, specialists of Russian Helicopters have begun developing the working design documentation of VRT500. The release of the first production VRT500 helicopter is scheduled for the end of 2021. The VRT500 is a lightweight single-engine helicopter with a coaxial propeller layout and a take-off weight of 1600 kg. The machine has the most spacious passenger class cabin in its class with a total passenger capacity of up to five people and is equipped with a modern complex of interactive avionics. The helicopter can reach speeds of up to 250 km/h, have a flying range of up to 860 km, and take up to 730 kg of payload on board.

Breakthrough Products Presentation

Rosoboronexport (part of the Rostec State Corporation) is providing support to the largest international exhibitions of armaments and military equipment, which are to be held in Russia in 2019. The company is sponsoring the International Maritime Defence Show 'IMDS-2019', the International Aviation and Space Salon 'MAKS-2019', as well as the International Military-Technical Forum 'ARMY-2019'.

'The Maritime Defence Show, ARMY and MAKS are always memorable and meaningful events, which are attended by practically all our foreign partners and potential customers from the majority of the world regions. Here one can see all the trends of the Russian defence industry, assess the highest level of the development of technologies and design ideas. Rosoboronexport is an inherent participant and a traditional supporter of these exhibitions, which consistently enter the TOP-5 of the largest world shows in their respective segments. They constantly give us the maximum monetization out of all the exhibition events in the world,' said Rosoboronexport's Director General Alexander Mikheev.

The International Military-Technical Forum 'ARMY-2019', which will be held on June 25-30, presents the key newly-designed export products and bestsellers of the Russian defence industry for all the services and branches of the armed forces, as well as for special operations and anti-terrorist units.

This year the visitors of the ARMY will have an opportunity to see in the 'Patriot' park a number of newly-designed products, which are of a potentially breakthrough character for the world market, i.e. the Kalashnikov assault rifles of the newest 200th series, new generation special vehicle 'Tigr-2', the 'Viking' and 'Tor-E2' air defence missile systems, combat vehicle of a squad equipped with the 'Gibka-S' MANPADs, means to counter unmanned aerial systems, as well as new solutions in the area of electronic countermeasures.

For sure, the guests' attention will be drawn by the world famous brands, e.g. air defence missile system S-400 'Triumph', air defence missile and cannon complex 'Pantsir-S1', anti-tank missile systems of the 'Kornet' family, the 'Terminator' fire support combat vehicle and many other new products in the area of fire arms and close combat assets.

A number of newly-designed products are also prepared for the representatives of the naval forces of foreign states, who will visit the International Maritime Defence Show in Saint-Petersburg on July 10-14. The manufacturers will display the full-scale specimen of the 'Rubezh-ME' coastal missile system, multi-purpose integrated radar system 'Zaslon', air defence missile system 'Redut', different ships of Russian production, including the 'Karakurt-E' small missile ship of project 22800E.

For the delegations representing air force and for all the guests of the International Aviation and Space Salon 'MAKS-2019' in the Moscow region's town of Zhukovsky on August 27 – September 1, the following pieces of equipment will be presented: the newest Su-57 fighters of the fifth generation, light military transport aircraft Il-112V, multipurpose supermanoeuverable fighters Su-35 and Su-30SM, training aircraft (combat trainers) Yak-130, combat helicopters Mi-28NE and Ka-52, military transport helicopters Mi-171SH and Mi-17V5, and other aviation systems.

'For Rosoboronexport, the International Maritime Defence Show, MAKS and ARMY are an important marketing tool. We invite to them the maximum number of foreign delegations, which have a perfect opportunity to satisfy the needs of their defence and law-enforcement agencies in the sophisticated Russian materiel, to receive as much detailed consultations as possible, related to the distinctive technical features of the weapons, as well as to the modalities and particularities of their combat use,' added Alexander Mikheev.

RUSSIA-BELARUS COOPERATION

Rosoboronexport, Rostec's member, had been named the organizer of Russia's joint exposition at the International Military Equipment Exhibition MILEX 2019 which had taken place in Minsk, Belarus, on May 15-18.

'Russia and Belarus are strategic partners in military and technical cooperation. Since 2001, the volume of cooperation between Rosoboronexport and Belarus has exceeded $1 bln. The scope is unbelievable covering almost every line from the supply of end products and components to joint researches and defense projects,' said Rosoboronexport's Director General Alexander Mikheev.

The company's exposition occupied 500 m2 at MILEX 2019. It accommodated products of Russia's eight largest defense enterprises, including Almaz-Antey, Uralvagonzavod, and Tecmash.

Rosoboronexport's booth housed 220 pieces of military equipment – Yak-130 combat trainer, T-90S tank, BMPT tank support vehicle, Buk-M2E and TOR-M2KM SAM system to name just a few.

'Being one of the most representative and attended event, the exhibition in Belarus piqued our special interest. We saw a great opportunity to promote Russian equipment to Europe, Middle and Central Asia, and Transcaucasia,' added Alexander Mikheev.

Rosoboronexport also expected foreign delegates to show a keen interest in Russia's equipment, designed for army, aviation and AD units, as well as special gear and systems. Top of the list of products attracting our partners included the Mi-171Sh military transport helicopter, T-90MS tank, BTR-82A personnel carrier, Khrizantema-S SP anti-tank system, Kornet-EM anti-tank missile system, Typhoon-K and Tigr-M vehicles, Smerch multiple-launched rocket system, Iskander-E tactical missile system, and various types of Kalashnikov assault rifles.

The special arms exporter planed a rather extensive business program at the exhibitions, expecting to meet representatives of the Armed Forces and other security agencies of the Republic of Belarus and other states coming to the event. Besides, Rosoboronexport's delegation took part in the 8th International Conference on Military and Technical Issues, Defense and Security, and Dual-use Technology Employment.

Repairing Helicopter Engines

The Center for Integrated Logistics Support for the UEC in Vietnam repaired five helicopter engines. The new center, certified this year by the aeronautical authorities of the Socialist Republic of Vietnam, is equipped with all the necessary equipment, spare parts and assembly units for repairing engines developed by UEC-Klimov.

The intermediate level maintenance and repair of engines as TV3-117 and VK-2500, which are operated in Vietnam, is carried out by specialists from UEC-Klimov.

The Russian side supplies parts and assemblies, spare parts, trains personnel to maintain engines and main gearboxes.

The Vietnamese side provided supporting staff to accompany the maintenance works.

Vietnamese experts have already received certificates of UEC-Klimov on successful familiarization with the process of intermediate engines repair.

With their help, Russian employees successfully carried out a pilot repair of the first TV3-117VM series 02 engine for the Mi-17-1V helicopter, which is in service in Vietnamese civil aviation for passenger traffic.

The engine received damage due to intrusion of a foreign object.

The UEC-Klimov company and the Vietnamese company Helicopter Technical Service Company signed a distribution agreement for the maintenance of engines in October of last year.

Helicopter Technical Service Company, on the territory of which the integrated logistic support center is located, is engaged in servicing Russian-made helicopters. It serves as a distributor of TV3-117 and VK-2500 engines.

Promising MTC Projects

Rosoboronexport (part of the Rostec State Corporation) was showcasing the best selling and promising new products from the Russian defense industry at the IDEF 2019 International Defense Industry Fair, which was held from April 30 to May 3, 2019 in Istanbul.

'Military-technical cooperation (MTC) between Russia and Turkey shows a positive trend. We successfully deal with competitors' attempts to interfere with our relations,' said Rosoboronexport's Director General Alexander Mikheev. 'We have a number of joint projects for the development of advanced aircraft and helicopter systems, armored vehicle components, after-sales support of supplied weaponry. In addition, Turkey is interested in Russia's latest remote weapon stations, air defense assets of varying ranges, as well as ATGM systems.'

The exhibit profile of the exhibition was: Army, Navy, and Air Force military equipment, defense technology, space technology, onboard systems, helicopters, ships, electronics, security systems, transportation and logistics equipment and systems.

'Turkey is among the key partners of Rostec and Russia. The level of bilateral relations, including in industry, is growing rapidly. At the moment, we are discussing with Turkish partners the implementation of a number of critical projects in both military-technical cooperation and civil industry fields,' said Sergey Chemezov, Director General of the Rostec State Corporation. 'Of course, we are ready for various formats of technology cooperation, including in such high-tech areas as the aerospace, helicopter and power industries.'

Rosoboronexport was the organizer of a joint Russian display at IDEF 2019, which included over 450 pieces of weaponry and military equipment from more than ten domestic defense manufacturers. Almaz-Antey Air and Space Defense Corporation, Shvabe Holding Company and Tehmash Holding Company were among the exhibitors.

Rosoboronexport's Stand 232 (Pavilion 2) provided information on more than 300 pieces of military equipment that had the best prospects in Turkey and the Middle East region, including new products from the Company's export catalog: the newest Kalashnikov AK-200 series assault rifles, 30-mm 32V01 remote weapon station, Viking SAM system and the 76.2-mm AK-176MA automatic naval gun.

The mock-ups of the BT-3F armored personnel carrier, KAMAZ-53949Typhoon-K vehicle, Su-35 multi-role super-maneuverable fighter and the Project 12061E Murena-E-class air-cushion landing craft were on display at the Company's stand.

Numerous meetings and talks were expected to take place at the event with representatives of the Turkish armed forces and other security agencies of the country, as well as with partners from other countries in the region. Rosoboronexport planed to discuss the implementation of current contractual obligations and promising MTC projects.

'IDEF is among the world's top ten largest defense industry exhibitions and, along with Russia's ARMY, MAKS and International Maritime Defense Show (IMDS), is one of the most significant arms exhibitions in Europe. The event provided an excellent opportunity to study the trends in the world arms market, while foreign customers can see the best Russian weapons, known for their impeccable fighting qualities,' added Alexander Mikheev.

REPAIR CENTER IN VIETNAM

Integrated logistics support center for repairing helicopter engines created by UEC-Klimov (subsidiary of the United Engine Corporation, part of Rostec) has begun operations in the Vietnamese city of Vũng Tàu. Pilot repair project of the first engine in the new center has been successfully completed.

The center is equipped with all necessary equipment, spare parts and assemblies to provide repairs for engines designed by UEC-Klimov. By the end of April four more engines in use in Vietnam went through repairs in the center.

Specialists from UEC-Klimov performed medium repairs of TVZ-117 and VK-2500 engines operated in Vietnam. The Russian side provided the details and spare parts, and trains the personnel for engine and gearbox maintenance. The Vietnamese side provided support personnel to accompany the working process. The Vietnamese specialists had already received certificates from UEC-Klimov on successful familiarization with the medium repair process of the first engine: TV3-117VM series 02 used by the Mi-17-1V. A foreign object damaged this particular engine during operation by the Vietnamese civil aviation.

'Till the end of April, we were going to repair four more engines operated in Vietnam. We planed to actively expand the geography of our cooperation and start providing repair and support services of helicopter engines in India, China, Indonesia, Malaysia, Cambodia, Thailand, Vietnam, Myanmar, Laos, Australia, Bangladesh and Sri Lanka. Our partners in the region are highly satisfied with the approach and quality of services provided by Rostec, which included after-sale support for the whole life cycle of our products', said the Director for International Cooperation and Regional Policy of Rostec, Viktor Kladov.

The Aviation Administration of the Socialist Republic of Vietnam certified the new center. Certifying the support personnel was a mandatory procedure for ensuring the operation and repair process made by the center. Vietnamese specialists familiarized themselves with all the steps concerning medium repairs of the TV3-117 engines and their different models during a technological procedure of the certification.

In October 2018 UEC-Klimov and the Vietnamese company Helicopter Technical Service Company signed a distribution contract concerning service maintenance of engines.

Helicopter Technical Service Company, on the territory of which the new center is located, provided service maintenance for Russian-made helicopters. It also operated as the distributor of TB3-117 and VK-2500 engines.

New Radio Stations

Ruselectronics holding of Rostec State Corporation is launching a new line of civil radio equipment for the European market. The European Union's Intellectual Property Office (EUIPO) issued registration certificates for six DMR standard devices: automotive, base, wearable and portable radio stations, as well as two antennas for a portable radio station.

A portable radio station provides high-quality communications at a distance of up to 10 km, and a base station – within a radius of up to 30 km.

The devices are resistant to external factors, such as vibration, shock, extreme temperatures, ingress of moisture.

In addition, they have increased noise interference immunity and protection against unauthorized listening.

Such radio stations can be used in railway transport, in the agricultural sector, by emergency and medical services, logistics companies, tourists and hunters.

The developers note that the devices are compatible with all existing domestic and foreign civil systems of DMR standard professional mobile radio. The obtained certificates give the right to the equipment developer the 'Constellation' Concern (a part in 'Ruselectronics') to sell equipment in the European Union.

Certification also guarantees the enterprise that there will be no analogues from other manufacturers prior to the actual beginning of sales of radio stations in the European market.

Demonstration at the Victory Parade

Rosoboronexport JSC (a part of Rostec State Corporation) is actively promoting modern Russian weapons and military equipment to the world arms market, which were presented on 9th of May at a military parade in Moscow which was dedicated to the Victory Day in the Great Patriotic War of 1941-1945.

Export-oriented analogues of the Russian military equipment chosen for the demonstration at the Victory Parade were also presented in the Rosoboronexport catalog.

In particular, these were the Buk-M2E and Tor-M2E anti-aircraft missile systems, the Pantsir-S1 anti-aircraft missile and gun complex, the Iskander-E tactical missile system, the Msta-S self-propelled howitzer, and Smerch multiple launch rocket systems, armored wheeled vehicles Tigr-M, Typhoon-K and BTR-82A, T-72 type tanks, BMPT tank support combat vehicle, Il-76MD-90A (E) military transport aircraft , a multipurpose front-line fighter MiG-29M, a super-maneuverable multi-purpose Su-30SME, a fighter-bomber Su-32 and a multi-purpose fighter Su-35 top maneuverable fighter, Mi-28NE and Ka-52 combat helicopters, Mi-26T2 heavy transport helicopter.

The Armata tank, the Boomerang armored personnel carrier and the Kurganets-25 infantry combat vehicle, which have a large export potential, also passed across Red Square on Victory Day. Participation of this machinery in the Victory Parade was a demonstration of the highest level of the latest technologies of military-industrial complex enterprises of Russia to foreign partners.

'Russia's military-technical cooperation with foreign countries maintains a positive trend.

'Russia's military-technical cooperation with foreign countries maintains a positive trend. According to the results of the first four months of 2019, Rosoboronexport delivered Russian arms and military equipment worth 4.9 billion US dollars, as well as signed new contracts for 5.2 billion US dollars', – said Alexander Mikheev, the general director of Rosoboronexport. 'This is the result of an immense marketing work of Russian participants of military-technical cooperation and of manufacturing enterprises, an important element of which is the public demonstration of military equipment at parades and exhibitions.'

According to the Ministry of Defense of the Russian Federation, more than 1,600 units of military equipment took part in Russia's military parades. Foreign guests, primarily which were representatives of the military-diplomatic corps of foreign countries and correspondents of leading world mass media were able to personally see samples that were not only the basis of the combat power of the Armed Forces of the Russian Federation, but also domestic bestsellers of the world arms market.

Full-scale samples of Russian armaments and military equipment delivered for export by Rosoboronexport were presented to foreign specialists as widely as possible within the specialized exhibitions which are to be held this summer of 2019 in Russia: the International Military-Technical Forum 'ARMY-2019' (from 25-30th of June, Kubinka town), the 'IMMS-2019' International Naval Salon (from 10 – 14 July, St. Petersburg) and the 'MAKS-2019' International Aviation and Space Salon (from August 27 – September 1, Zhukovsky town).

BRAINREADER NEURO INTERFACE

The 'Avtomatika' Concern of Rostec State Corporation will bring to the international market the BrainReader universal neural interface, which enables the 'exchange' of information between the human brain and any external device that has the required interaction interfaces (home appliances, computer, exoskeleton, artificial sense organs, wheelchair). The Concern has already begun obtaining permits for entering Asian markets.

The Concern has already begun obtaining permits for entering Asian markets.

Proposals from Asian companies, from Indonesia and Malaysia in particular, on distribution of BrainReader resulted from participation in the Medlab AsiaPacific & Asia Health 2019 exhibition, where the capabilities of the device generated great interest.

The development of the device as part of the Rostec is the Institute of Electronic Control Machines (INEUM) named after. I.S. Brook (a part of the concern 'Automation').

'Breakthrough neurotechnology solutions, such as BrainReader, are the technologies of the future that change lives and open up new opportunities for the development of science and technology.

Neuro headset can be used to control 'smart' systems and robotics, in medicine – for the rehabilitation of people with disabilities, in studies of the human brain, mental activity, sleep, and in many other areas.

It is important to note that the device has a good export potential.

The closest competitor in terms of characteristics, the American neuroheader, is priced about three times as much', said Oleg Evtushenko, the executive director of Rostec.

Neuro headset allows registration of the surface electroencephalogram in vivo, without limiting the user's motion activity.

The data is received using a non-invasive method via specially designed 'dry' electrodes that do not require the application of an electrically conductive gel.

Due to the high quality of the recorded signal processing, the device operates stably even in places of large crowds of people, in transport, surrounded by a large number of transmitters and other interference.

According to the study of Allied Market research, the brain-computer interface market is growing at an accelerating pace and in 2020 it will amount to an approximate of $ 1.46 billion.

Russian Helicopters in SITDEF-2019

Russian Helicopters holding company took part in the seventh International exhibition of defense technologies, security and prevention of natural disasters SITDEF-2019, which was taking place in the Peruvian capital Lima from 16th to 21st of May on the grounds of the Peruvian Army's main headquarters.

This year, the holding presented the main line of civilian Russian helicopter technology – the lightweight Ansat, the medium Mi-171A2 and the medium heavy Mi-38.

'We were closely cooperating with our Peruvian colleagues in creating a mobile service center for servicing multi-purpose Mi-171Sh helicopters in the area of the Arequipa city.

The holding under the contract with Rosoboronexport had completed the first stage of installation and commissioning.

Further work on installation and commissioning of the equipment in agreement with the Peruvian side will continue in October.

We plan to complete this work this year and assist our colleagues during the first repairs of helicopters', said Igor Chechikov, head of the holding's delegation at SITDEF, deputy general director for after-sales service.

The service center consisted of three repair lines: the overhaul line for the airframe of the Mi-171Sh helicopters,

the line for the repair of assemblies of mechanical systems and the line for the repair of aviation and radio-electronic equipment. More than 370 Soviet and Russian-made helicopters, both civilian and military, were being operated that day in 12 countries of North and South America, from Mexico, Venezuela and Colombia to Argentina and Chile.

More than 90 civilian and military Mi-8/17 helicopters of Soviet and Russian production were registered in Peru – more than anywhere on the continent.

Rostec Joined Vision Zero

Rostec joined the Vizion Zero international program of reducing industrial injuries to zero level. Until 2021, the State Corporation will conduct a set of preventive measures to achieve 'zero injuries' at its production sites.

Rostec received a certificate of entry into the program during the All-Russian Week of Labor Protection (VNOT), which was taking place in Sochi.

Within the framework of VNOT, from April 23rd to April 24th, Rostec State Corporation held a strategic session on a culture of sustainable security for senior officials of health safety and security of holding companies.

One of the key events of the occasion was the accession of the State Corporation to the Vision Zero international program.

The main idea of the Vision Zero concept is that all industrial accidents and occupational diseases have a reason, which means that they can be prevented.

The International Social Security Association (ISSA) offers seven golden rules for achieving 'zero injuries': leadership, risk management, setting clear goals, methodic work on improving occupational safety, ensuring the safety of industrial premises, improving the skills of workers and their motivation.

The certificate of joining the program was presented by the Ambassador of Vision Zero Hans-Horst Konkolewski.

'We believe that Rostec, by joining, sets a good example for other companies, including its subcontractors and small commercial organizations, because most industrial accidents can and should be prevented', he said in his speech.

According to the International Labor Organization (ILO) estimation, about 2.8 million people die every year around the world at their workplaces, and losses from fatal industrial injuries amount to 4 percent of the global GDP.

Two meetings and great prospects

In early June of this year, President of Russia Vladimir Putin held two important meetings with representatives of the global business community and major investment companies. At the St Petersburg in frame of the International Economic Forum Vladimir Putin has Meeting with RDIF International Advisory Board and international investment community leaders. Then, after one day he has been the second meeting: he met with foreign business leaders.

The meeting between President of Russia Vladimir Putin and members of the Russian Direct Investment Fund (RDIF) International Advisory Board and representatives of the international investment community was held in a working lunch format. This year the meeting was attended by representatives from investment funds from Germany, France, Japan, China, South Korea, India, Italy, the UAE and Saudi Arabia. A total of more than 40 international investors were invited to a conversation with the Russian leader, who, generally speaking, manage over $15 trillion.

In his speech, Vladimir Putin specifically noted:'There are a great number of people here whom we have known for quite a long time, people we meet with and regularly discuss plans with. Some of our colleagues have probably come here for the first time. I would like to express the hope that you will like it here – in Russia, in St Petersburg at the economic forum – and that these meetings will be useful and substantive and will create conditions for developing your business in Russia.

You know that we have set ourselves fairly large and ambitious development goals that are expressed in national programmes. Basically, these are our plans and they do not come from thin air but are backed by resources, and what I consider no less important, by our real economic policy. I would like to express the modest hope that you will agree with me that this policy produces results and creates the conditions for your active and efficient operations.

I am referring to the macroeconomic indicators that we have achieved recently – a budget surplus, the current account surplus of payment transactions and a considerable amount of international reserves.

As for inflation, let me recall that last year it was a very good figure for the Russian economy – 4.3 percent (the Minister of Economic Development agrees, so I am not mistaken). It increased a little at the beginning of this year, but now we are expecting a lower rate.

According to Rosstat, from May 28, 2019 to June 3, 2019 the inflation was only 0.01 percent, or 2.4 percent since the start of the year and 5.08 percent in annual terms. As I said, I think there is a downward trend, all the more so since low growth is predictable and we have considered this. We thought this would happen because of the VAT increase.

We thought a lot about what we should do regarding the search for sources to fund the state's liabilities in our national programmes that I spoke about. These are large-scale projects in infrastructure development, cutting-edge manufacturing, digitalisation, healthcare and education development, and other key areas that will ensure, and must ensure high growth rates and structural changes in the economy throughout the world.

So we took it upon ourselves to increase VAT by 2 percent. We were aware that it would affect, to a certain extent, economic growth and inflation, yet we proceeded from the assumption that as the projects started unfolding, as the state invested in infrastructure and other areas which are directly dependent on the state, including those areas that create conditions for your investments, that inflation would settle down, and growth rates would go up.

This is what is happening so far. We are seeing exactly what we expected; we have not found mistakes in our forecasts yet. The 2019 January through May federal budget surplus reached 683 billion rubles. As of April 1, 2019, the trade surplus, according to the Bank of Russia, was $45.5 billion, whereas international reserves reached almost $500 billion – 492.2 billion; I have the exact figures.

Economic growth last year was 2.3 percent, the highest since 2012. I can say without exaggeration that we have overcome the hardships and have embarked on a road of sustainable development and increased growth rates.

We did not simply set the goal of becoming one of the top five economies in the world – there was a fluctuation between fifth and sixth places, there was a time when we came in fifth, but this is not the only goal.

The goal is to ensure the technological and spatial development of the country through sustainable growth, and to progress to a higher standard of living for our citizens in key parameters.

This is why the national projects and programmes I spoke about are being launched. Total funding over six years should be around $400 bil-

'The 2019 January through May federal budget surplus reached 683 billion rubles. As of April 1, 2019, the trade surplus, according to the Bank of Russia, was $45.5 billion, whereas international reserves reached almost $500 billion – 492.2 billion; I have the exact figures. Economic growth last year was 2.3 percent, the highest since 2012. I can say without exaggeration that we have overcome the hardships and have embarked on a road of sustainable development and increased growth rates.'

Vladimir Putin

lion, which includes not only state funds but also private investment.

Colleagues, we would definitely welcome foreign capital in these massive plans, we offer good, reliable conditions and modern tools for cooperation. That conditions in Russia are changing has been reported by independent analysts. Specifically – I have already given these numbers today, they are well known – according to the World Bank's Doing Business rankings, Russia has climbed from 121 to 31 in just two or three years.

This is clear progress, but we understand that it is still not enough; we will keep working on it. For this to be evident we have adopted a programme to improve the business environment and to support business and attract investment.

We have a number of instruments, and one of them is the Russian Direct Investment Fund. It was set up back in 2011, and since that time, we have used it to invest over a trillion and a half rubles in ongoing projects in almost every Russian region.

I would like to draw you attention to the fact that investment yields are higher than world indices. This is about a 15 percent annual return on all projects with the RDIF participation. A number of companies and investment funds together with the RDIF have already invested in the development of medical centres, the reconstruction of major highways, and so on.

I should stress that these projects have been carefully evaluated, and the main beneficiaries are the state, society and the investors. I have already told you about the return on investment.

We are ready to further expand interaction in areas like education, healthcare, transport, infrastructure, creating a modern urban environment, increasing corporate efficiency and labour productivity. It requires both large investment and the considerable experience of launching large-scale development programmes that you possess.

Another promising area I mentioned is investing in the design and introduction of digital and other so called end-to-end technologies in promoting advanced and unique products. We see a lot of room for cooperation here, all the more so now that the high-tech markets are growing so rapidly, exponentially, as they say.

I would like to note one of the RDIF digital economy projects – establishing in cooperation with Moscow State University an AI Centre that will have competitive, comfortable conditions for scientists, engineers and programmers.

It is designed to become a crucial element in the implementation of the National Strategy for technology development in the field of artificial intelligence. I know that our Chinese friends are also showing interest in this.

This is what I wanted to say at the beginning.

There is something I would like to ask – please be understanding of the fact that, unfortunately, I do not have much time today, and my colleagues are waiting for me to take part in various events, so could we maybe change the format a little?

Usually I immediately responded to each of your comments and proposals. Maybe this time our colleagues here will say what they have to say, and then I will just try to summarise in one comment the matters that are of the biggest interest.'

After that Kirill Dmitriev, CEO of the Russian Direct Investment Fund (RDIF), said: 'On behalf of all those present I would like to thank you for your support of the Russian Direct Investment Fund and our partners present here. Very briefly, we wanted to say that interest in such meetings is growing from year to year. The investors present here manage capital of $15 trillion, which is $1.5 trillion more than last year. Many of our partners are interested in investing in Russian national projects, and, accordingly, we will discuss in which

> ***'We would definitely welcome foreign capital in these massive plans, we offer good, reliable conditions and modern tools for cooperation. That conditions in Russia are changing has been reported by independent analysts. Specifically – I have already given these numbers today, they are well known – according to the World Bank's Doing Business rankings, Russia has climbed from 121 to 31 in just two or three years.'***
>
> *Vladimir Putin*

> ***'We are ready to further expand interaction in areas like education, healthcare, transport, infrastructure, creating a modern urban environment, increasing corporate efficiency and labour productivity. It requires both large investment and the considerable experience of launching large-scale development programmes that you possess.'***
>
> *Vladimir Putin*

MAIN TOPIC

'Obviously, implementing national projects is a huge area for cooperation and partnership, for joint initiatives from Russian and foreign businesspeople. I very much hope that you understand us and are making plans to work together with us. Especially since many of you have been working successfully in Russia, located your manufacturing here, and have taken the goods to third countries' markets. We are watching all that very closely and trying to support you. We greatly appreciate this and are set to go on in this vein.'

Vladimir Putin

projects or exactly how they would like to participate.

The RDIF is successfully developing, and our companies' profits have increased by 18 percent over the past year. Many investors seem to like the RDIF model very much, because the government does not just spend money, but invests it with profitability, so that for every ruble we attract nine rubles from our partners. Moreover, we attract not only funds, but also expertise and help our companies to enter foreign markets. At present, seven other countries are creating their own funds that use the Russian Direct Investment Fund model.

Let me briefly outline our work with China. As you may know, the Russian-Chinese investment fund has invested in more than 30 projects. We are working with yuan funds in China and are creating a $10 billion fund with China Development Bank, also in yuan.

Technology cooperation with China is especially important. I am referring to our deal with Alibaba, Mail.ru and Megafon, which is being finalised, the creation of a Russian-Chinese innovation fund with a target size of $1 billion and the first venture investment by the Russian-Chinese venture capital fund.

In conclusion, I would like to say that investors are extremely interested in financing national projects in Russia. At this forum, we will announce 10 new investments of the Russian Direct Investment Fund: investment in NefteTransServis; a cattle breeding project with Inalko; joint investment with Baring Vostok in the development of ivi – a huge online cinema; partnership with DP World; with Rosatom and Norilsk Nickel in the development of the Northern Sea Route and the modernisation of the Baikonur space centre – its Site 1 nicknamed Gagarin's launch pad. Investors have confirmed interest in these and many other projects.'

Opening the next meeting – with foreign business leaders – Vladimir Putin said: 'Allow me to welcome you once again. I hope the forum, which will end tomorrow, will be useful and interesting, and will lead to an exchange of information and opinions on how our work is organised, and to the establishment of necessary conditions for further promoting this work. Anyway, that is what forums are for, and in my view, it has been fairly busy this year – many participants, 75 countries represented at a high government level, several thousand people.

I would like to thank the organisers who arranged all of this, and to thank you for your participation – not only in the plenary session, naturally, but also mainly for your participation at different venues. I looked at the TV screen in-between my meetings with colleagues, and I could see that the discussions were very lively. And I would like to assure you that we will carefully analyse the course of the discussions and our meeting today, of course, so as to make adjustments – it is always necessary to do that – in our practical work in order to improve conditions for your work here, in Russia.

You know, I spoke about this today, that we made a decision, identified development priorities and goals and planned our work within the so-called national projects, which presume combined efforts of the state, the regions of the Russian Federation, society, and, naturally, the business community to work on the shared tasks. The projects also require concentrating considerable resources to achieve the goals we set before us. The overall budget of the national projects should total around 25.7 trillion rubles, which is about $400 billion. This is a fairly big number for Russia, for our economy. For example, investments in the digital economy are to more than triple.

Our priorities are healthcare, education, research and development, and support for entrepreneurship, which we consider an asset by itself. Also, considerable funds will be allocated to develop major infrastructure, transport and the energy industry. We have earmarked 6.4 trillion rubles for it, which is $100 billion. Housing construction and road quality and safety are to increase, the urban environment is to become more comfortable, and significant progress must be made in tackling environmental problems.

'We made a decision, identified development priorities and goals and planned our work within the so-called national projects, which presume combined efforts of the state, the regions of the Russian Federation, society, and, naturally, the business community to work on the shared tasks. The projects also require concentrating considerable resources to achieve the goals we set before us. The overall budget of the national projects should total around 25.7 trillion rubles, which is about $400 billion. This is a fairly big number for Russia, for our economy. For example, investments in the digital economy are to more than triple.'

Vladimir Putin

Obviously, implementing national projects is a huge area for cooperation and partnership, for joint initiatives from Russian and foreign businesspeople. I very much hope that you understand us and are making plans to work together with us. Especially since many of you have been working successfully in Russia, located your manufacturing here, and have taken the goods to third countries' markets. We are watching all that very closely and trying to support you. We greatly appreciate this and are set to go on in this vein.

However, we believe that there is every potential to make progress even faster, to qualitatively boost trade and investment interaction, production and research cooperation.

In order to launch new mutually beneficial projects we keep on improving the legal framework for foreign companies' operation, offer extra incentives and tools for investment and business activities, and use modern market instruments. This support from the state will continue.

I am certain that you are well aware of the capacities of the Russian market and the advantages of operating in it, you can see the most lucrative fields of cooperation, and you will be able to achieve new results in most diverse areas of activities, in your work thanks to your experience and business expertise.' /IA&TG/

EXPORT REGULATION

FSMTC of Russia

Dmitry Shugaev: 'Our military equipment is highly efficient, quite easy to maintain and is much better than its competitors in terms of its unsurpassed ability to operate in severe geographical and weather conditions'

Major areas of FSMTC of Russia activities shall be:

To perform control and supervision functions in the area of military-technical cooperation in compliance with laws of the Russian Federation; efficient functioning of the MTS system; implementation of MTC related international treaties;level of foreign trade prices for military purpose products.

Decision making on MPP import and export; issue of licenses for MPP import and export; authorizing MPP developers and manufactures to conduct foreign trade operations to supply spare parts and support materiel to MPP, their repair, certification, etc.;

Consideration of applications from foreign customers, their registration, record and control over their implementation;

Record and registration of foreign trade contracts;

Maintenance of the register of MTC entities and issue of appropriate certificates to them.

In accordance with the law of the Russian Federation, activities in the field of military-technical cooperation (MTC) with foreign countries shall be controlled and supervised by the Federal Service for Military-Technical Cooperation (FSMTC of Russia) that, among other things, shall ensure implementation of basic principles of the Russian government policy in the field of MTC. Dmitry Evgenyevich Shugaev, the Director of FSMTC, discusses main directions and tendencies in development of military-technical cooperation between the Russian Federation and foreign countries, the peculiarities of Russian military purpose product exporters' activities at the present stage in his interview to our magazine.

– Mister Shugaev, many countries need defense exports to capitalize on the economy of scale effect and make their systems more affordable. At the same time there is a considerable political component to arms trade. As for Russia is it more of a political or a commercial issue today?

– Well, the military-technical cooperation (MTC) is in essence a special area where economic and political interests of a country intertwine. It is the same for the majority of the countries no matter whether they export or import military purpose products (MPP). The economic aspect of MTC is certainly extremely important. Along with the scale effect, which you have aptly mentioned, for any country, not excluding Russia, successful military-technical cooperation contributes to the federal budget and helps us modernize the national industry. It is no secret that export contracts ensure work-load for domestic industrial enterprises all over our country increasing production and creating jobs. Importantly, global competition of defense producers forces them to analyze success stories of rivals as well as the requirements of their partners so that they can better understand global industrial and technological trends.

At the same time even from the economic point of view the military purpose products' market is substantially different from other global markets such as raw materials, end-goods and services. First, fluctuations are quite rare in global arms trade while military purpose products are traditionally in high demand. However, the demand for arms is usually subject to the influence of such factors as national armies' modernization programs, importer states' overall economic stability and, in particular, funds allocated to purchase arms. So, evidently, even in economic terms arms market is influenced by both economic and political factors.

And, of course, MTC is an extremely «sensitive» area. Both for the Russian Federation and for any other leading exporter of military purpose products it remains an important foreign policy tool.

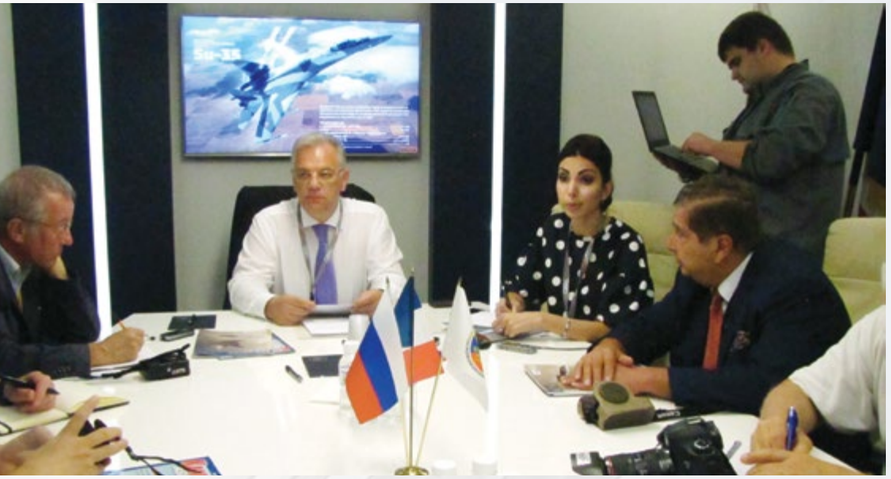
Therefore, it will be correct to say that in pursuing our military-technical cooperation with foreign states Russia proceeds from its strategic interests that have both an economic and a political component.

– What are the principles, the system of cooperation in the field of MTC is based on today?

– Today the system of military-technical cooperation of Russia is built as a vertical relationship where Rosoboronexport is the only exporter of final military purpose products. Concurrently, there is also a number of entities in the field of military-technical cooperation of Russia that are authorized to provide service of the equipment previously purchased by customers, to upgrade it and to supply spare parts for this equipment. These, in particular, include such integrated structures of the defense industry as the United Aircraft Corporation, the United Shipbuilding Corporation, Almaz – Antey Air and Space Defense Corporation and others. They obtained this right to service their equipment supplied to foreign customers as they represent defense industry itself, they embrace the factories that manufacture spare parts, components, etc.

'Russo-Turkish military-technical cooperation is fairly dynamic: the Turkish Armed Forces currently operate Russian-made APCs, helicopters, anti-tank missile systems and small arms of different designs. We also have joint projects in various phases of implementation and discussion.'

Federal Service for Military-Technical Cooperation is an agency that controls and supervises all the activities related to military-technical cooperation and issues licenses. From strategic point of view the FSMTC of Russia plays the role of government policy 'conductor' in the field of military-technical cooperation and acts as a controlling and licensing agency at the same time.



However, all decisions regarding final supplies anyway are made at the highest level in Russia. That is, either an appropriate ordinance or instruction of the President or the Russian government should be issued. That's why I call it a 'vertical type of relationship.'

– How can you describe the development and dynamics of Russian activities in the field of MTC?

– First of all, I'd like to note that Russia is second in the list of world top exporters of military purpose products. It is not a secret that part of our export is made up by aviation equipment; export of the equipment related to aviation varies in the range of 40-50% of the total volume. Of course, we positively appreciate this fact, and we wish exporters of other weapon types to achieve these figures as well.

At the same time we understand, that the market of military purpose products (MPP) is a very specific market having cyclic nature. A number of factors should be taken into account, including rearmament programs of armies, financial solvency of countries depending on their general economic health. Therefore, we do not expect any abrupt jumps, we are building long-term relationships that allow us to speak with confidence about stable growth of export supplies.

It is important to participate in long-term programs, providing technical support to our clients and creating maintenance stations with an understanding that many of our clients aspire to improve their own industry, for example.

– What trends currently drive the development of Russian arms exports?

– Russia is a world-leading arms exporter. If we are to analyse Russian military exports over the past several years, the country has reached a steady level of weaponry and hardware exports at some 15 billion dollars per year.

Despite the sanctions which the USA and its allies keep piling up on Russia's defence companies and banking sector, and the threat of similar sanctions being introduced against our foreign partners, Russia continues successful military-technical cooperation with foreign countries in keeping with national norms, in strict adherence to the rule of international law, and in full conformity with its contractual obligations.

– Which classes of weapons and military hardware are particularly popular with foreign customers?

– Historically, or air force, air-defence and army equipment enjoys the greatest international demand. These three segments used to account for some 90% of Russia's entire arms export portfolio. We predict further growth in the military aviation segment, including as regards rotorcraft. We also expect an increase in orders for air defence systems. There is also good reason to expect the naval market to grow as the leading world powers are demonstrating an increasing interest in upgrading and bolstering their navies.

– You have mentioned the projected growth in demand for air defence systems. Which objective advantages make Russian systems particularly appealing in this segment?

– The experience of contemporary local conflicts demonstrates that the side which commands the more powerful air defences usually has an edge over the adversary. It is, therefore, only natural for Russia, which is a world-leading manufacturer of advanced air defence systems, to be looking to capitalise on this advantage in the global arms market.

This market segment is highly competitive. There are a number of countries that used to import air defence systems but are now entering the international market with indigenous products. These include India, South Korea, Turkey and South Africa, which could become our rivals in the future.

Despite the broad choice of air defence systems available in the global arms market, Russian products enjoy a steady demand. They surpass foreign equivalents in a number of important technical parameters, and their price is also more appealing. The optimal combination of these characteristics is what ensures the steady global popularity of our products, as conceded by US and West European military experts.

Foreign customers note that Russian air defence systems meet the highest contemporary requirements. They appreciate the reliability, low maintenance and excellent repairability of Russian products. In addition, Russia offers a broad range of air defence equipment, from complex solutions to more affordable but nevertheless equally effective options for those governments which require protection of their airspace while not commanding significant financial resources.

The greatest international demand is currently observed for the Kub, Buk, Tor-M2E and S-300PMU SAM systems; for the Pantsir-S1 gun-and-missile system; and also for the S-400 and S-300VM Antey-2500 SAM systems. The S-300PMU Favorit and the S-400 Triumf are worthy of special mention. They have performed excellently in actual combat environments in Syria.

'We do not differentiate between countries that are members of military blocs and the rest of our customers. Russia sets no additional politico-military conditions in its bilateral relations when it comes to military-technical cooperation. Our country is open to mutually beneficial cooperation with all countries, irrespective of their affiliation with any military alliances.'

– How difficult is it for Russia to export weaponry and military hardware to countries that are members of military blocs (such as NATO)? Is politico-military affiliation a serious obstacle for those countries interested in procuring Russian weapons?

– We do not differentiate between countries that are members of military blocs and the rest of our customers. Russia sets no additional politico-military conditions in its bilateral relations when it comes to military-technical cooperation. Our country is open to mutually beneficial cooperation with all countries, irrespective of their affiliation with any military alliances.

That said, the global arms market generally remains highly politicised. Quite illustrative in this respect was the introduction of sanctions against Russian defence enterprises by the NATO member states and their allies. The sanctions have caused direct economic damage to many hi-tech manufacturers in NATO countries. This is why the political component and bloc mentality should not be disregarded.

Nevertheless, Russia is prepared to continue dialogue on military-technical cooperation with all interested partners. We continue such cooperation with Bulgaria, Greece, Slovakia and Turkey, all of which are NATO member states, and we discuss further prospects of this cooperation with the respective governments.

/IA&TG/

The Federal Service for Military-Technical Cooperation (MTS) is a key element of the power vertical managing the MNS system. As federal executive authority. Federal Service for Military-Technical Cooperation (FSMTC of Russia) performs MTS control and supervision functions. FSMTC of Russia reports to the Russian Federation President. FSMTC of Russia is subject to jurisdiction of the Russian Federation Defense Ministry.

Masterpieces from Russia

Rosoboronexport continues defence and security MTC-projects in all over the world

Rosoboronexport (part of the Rostec State Corporation) will be showcasing the best selling and promising new products from the Russian defense industry at the Paris Air Show 2019 Le Bourget. Company will provide information on more than 300 pieces of equipment for defence and security, including the best models from the Rosoboronexport's catalog: the newest Kalashnikov AK-200 series assault rifles, 30-mm 32V01 remote weapon station, Viking SAM system and the 76.2-mm AK-176MA automatic naval gun and many others.

Among the Russian products that Rosoboronexport is actively promoting in global market can be called for example the Yak-130 combat trainer, MiG-29M multirole tactical fighter and Su-35 multirole air superiority fighter. Russian helicopters that catch the interest of foreign customers include the Mi-28NE, Ka-52 and Mi-35M attack helicopters, Mi-26T2 heavy transport helicopters, Ansat light multirole helicopters and Mi-17 military transport helicopters. Russia's partners in the world are also interested in such AD systems as the Pantsir-S1 air defense missile/gun system, Igla-S man-portable air defense system, Antey-2500 air defense system and others.

Rosoboronexport supports the Russian defense industry, which is especially important under difficult conditions in the global market. High-tech products are in increased demand in the world arms market today and thus the company is interested in developing smart manufacturing in Russia.

Rosoboronexport also presents a number of popular military equipment designed for the armed forces and special counterterrorist and anti-corruption units. The equipment includes the VPK-233136 Tigr armored vehicle, BTR-82A and BTR-80 armored personnel vehicles, BMP-3 infantry fighting vehicles, various Kalashnikov rifles and Pecheneg Kalashnikov-designed machine-gun. Navies experts particular interest in the Project 14310 Mirazh, Project 12200 Sobol and Project 12150 Mangust patrol boats. Several countries show interest in the Russian equipment designed to operate in the Arctic Region, in particular, hydrographic survey vessels.

One of the new pages of the exhibition's activity of Rosoboronexport is the presentation of a new series of Kalashnikov assault rifles, which Rosoboronexport started promoting from beginning this year. 'Export permits for the newest Kalashnikov AK200 series assault rifles have been obtained. From now on, Rosoboronexport may offer its partners the AK200, AK203, AK204 and AK205 versions,' said Rosoboronexport Director General Alexander Mikheev. Rosoboronexport hold presentations of these rifles in the course of negotiations with foreign customers on the supply of small arms. 'We expect strong demand for them around the world,' Alexander Mikheev said.

The Kalashnikov AK200 series assault rifles are in line with all current trends in small arms development, while retaining the best qualities of the AK-47, the legendary brainchild of the great Russian gunsmith Mikhail Kalashnikov, whose 100th anniversary of the birth will be marked in 2019.

'Currently, AK200 series assault rifles are supplied to government customers in Russia and are also ready to be exported abroad to partners who impose more stringent requirements on small arms. The Kalashnikov AK200 series rifles are our strategic product in the export area,' commented Vladimir Dmitriev, Director General of Kalashnikov Concern.

'The newest Russian Kalashnikov rifles have a considerable export potential,' said Sergey Abramov, Industrial Director of the Armament Cluster at Rostec.

The AK200 series rifles have retained all the advantages of the traditional AK pattern: reliability, durability and ease of maintenance. The rifle is equipped with integral Picatinny rail and can be fitted with necessary detachable equipment for the effective use of the weapon in various conditions, including in reduced visibility.

The length-adjustable buttplate and a number of ergonomic solutions for optimizing controls enable the users to fully realize their shooting skills, regardless of their anthropometric indicators and the availability of a variety of personal clothing, gear and equipment. The AK200 series has successfully passed the testing program, meets all the requirements for modern small arms and is an effective small arms system.

The second famous new product from Rosoboronexport is the Pantsir-

Only Rosoboronexport has the right to supply the world market with a full range of arms and military equipment manufactured by Russia's defense industrial complex and approved to be exported. Rosoboronexport accounts for more than 85% of Russia's arms exports. Rosoboronexport is among the major operators in the world market for arms and military equipment. Last year Rosoboronexport marked its 18th anniversary.

ME shipborne air-defence missile and artillery system developed and produced by the Instrument Design Bureau JSC KBP named after Academician A.Shipunov (High-Presition weapons Holding, part of Roctec).

'The current trends in the development of the navies force the maritime powers to equip their ships with reliable assets to counteract air threats, i.e. cruise missiles, unmanned aerial systems, helicopters and planes. A sophisticated system of countering practically all the possible aerial kill assets has been developed in Russia. Pantsir-ME can be installed on most Russian warships and is very well fit for ships manufactured by other countries. I am confident that it has very good export prospects in the Arab countries, South-East Asia and Latin America,' said Rosoboronexport's Director General Alexander Mikheev.

The Pantsir-ME air-defence missile and artillery system can be set up on ships with water displacement of more than 300 tons. The system provides a reliable protection of vessels from all the existing and prospective air assault weapons in the whole spectrum of their combat capabilities with an unconditional probability of kill, which is practically equivalent to one, including low-flying anti-ship missiles and unmanned aerial vehicles.

'Currently the Pantsir-ME air-defence missile and artillery system has no direct countertypes in the world market in the segment of ship-borne air defence systems, and such will hardly pop up in the near future,' noted Sergey Abramov, the industrial director of the Armaments cluster in the Rostec State Corporation.

The high effectiveness of intercepting anti-ship missiles is explained by high performance tactical and technical characteristics of the Pantsir-ME air-defence missile and artillery system. The system is capable of simultaneous firing at four targets attacking the ship while the kill zone for guided anti-aircraft missiles reaches 20 kilometers in distance and up to 15 kilometers in height. Besides, Pantsir-ME can first utilize its missile weapons, and then, in case of a miss, the target will be hit by the artillery fire with a 100 percent guarantee.

The system includes a high-intelligent multimode adaptive radio-optical control system. All the stages of operator work – from the target acquisition to the firing – are completely automated. A combined use of the radio and optical control system provides for the all-weather and round-the-clock operability of the system. All this permits a guaranteed elimination of targets at long distances and in close proximity.

In Paris Rosoboronexport plans to discuss the implementation of current contractual obligations and promising MTC projects. Numerous meetings and talks are expected to take place at the event with representatives of the armed forces and other security agencies of many countries, as well as with traditional partners from many regions of the world.

It is important to remember that only Rosoboronexport has the right to supply the world market with a full range of arms and military equipment manufactured by Russia's defense industrial complex and approved to be exported. Rosoboronexport accounts for more than 85% of Russia's arms exports. Rosoboronexport is among the major operators in the world market for arms and military equipment. Last year Rosoboronexport marked its 18th anniversary.

Rosoboronexport was set up by RF President's Decree as a federal state unitary enterprise tasked to implement the national policy in the area of military-technical cooperation between Russia and foreign countries. Since 1 July 2011 Rosoboronexport has been operating as an open joint stock company. Rosoboronexport operates under the strict supervision of the Russian President, the Russian Government and in full conformity with the UN arms control treaties and the relevant international agreements.

Rosoboronexport pursues a marketing strategy targeted to expand the geography, range and volume of export deliveries. A number of special programs and projects for exporting products to specific countries have been developed based on a comprehensive analysis of the arms markets and foreign partners' needs. Rosoboronexport seeks to operate flexibly and efficiently in the market, using modern and advanced marketing and customers' settlement methods.

The main result of biography of Rosoboronexport, despite the difficult economic conditions and fierce, often unfair, competition in the global arms market, that company have managed not only to carry its sales, but also significantly enlarge its footprint in the traditional and new arms markets. Through integrated marketing strategies, company have ensured that order book today exceeds US$ 46 billion. The special exporter makes painstaking efforts on a daily basis to increase Russian arms exports resulting in more than a thousand contract documents signed with foreign customers every year. Over the period of its operation in the international market, Rosoboronexport has delivered hundreds of thousands of units of military equipment and weapons worth more than US$ 120 billion to 115 countries.

The official status of the exclusive state intermediary agency gives Rosoboronexport unique opportunities to expand long-term mutually beneficial cooperation with foreign partners, provide guaranteed state support of all export-import operations, and strengthen Russia's leadership in the world arms market.

The main result of biography of Rosoboronexport, despite the difficult economic conditions and fierce, often unfair, competition in the global arms market, that company have managed not only to carry its sales, but also significantly enlarge its footprint in the traditional and new arms markets. Through integrated marketing strategies, company have ensured that order book today exceeds US$ 46 billion.

The special exporter makes painstaking efforts on a daily basis to increase Russian arms exports resulting in more than a thousand contract documents signed with foreign customers every year. Over the period of its operation in the international market, Rosoboronexport has delivered hundreds of thousands of units of military equipment and weapons worth more than US$ 120 billion to 115 countries.

Rosoboronexport pays great attention to both major billion dollars contracts and small deals. The company seeks to operate flexibly and efficiently by using modern and advanced marketing and customer settlement methods. The special exporter cooperates with more than 700 Russian defense-industrial enterprises and organizations, which enables it to offer partner countries the comprehensive and cost-effective solutions for strengthening their defense capability and national security.

By concluding export contracts, Rosoboronexport supports the Russian defense industry, which is especially important under difficult conditions in the global market. High-tech products are in increased demand in the world arms market today and thus the company is interested in developing smart manufacturing in Russia. In addition, Rosoboronexport is actively involved in a number of charitable and sponsorship projects. The company provides assistance to military hospitals, military historical museums, and children's educational institutions. Rosoboronexport supports major sporting events and various sports federations, acts as sponsor and partner of the largest industrial exhibitions and cultural events held in Russia and abroad.

Rosoboronexport pursues a marketing strategy targeted to expand the geography, range and volume of export deliveries. A number of special programs and projects for exporting products to specific countries have been developed based on a comprehensive analysis of the arms markets and foreign partners' needs. Rosoboronexport seeks to operate flexibly and efficiently in the market, using modern and advanced marketing and customers' settlement methods.

Foreign customers are offered package solutions for national systems intended to defend land, air and seaside borders, which feature the optimal trade-off between cost and performance. These solutions may include both the supply of military products and services and organization of licensed production in customer countries, the setting-up of joint ventures to manufacture and maintain equipment, as well as joint R&D efforts. Rosoboronexport widely uses the optimal offset programs. With regard to foreign customers' interests and the opportunities of the Russian defense industrial complex to increase its exports, Rosoboronexport pays much attention both to major billion-dollar contracts and small deals worth the hundreds of thousands to several millions of dollars. /IAATG/

IL-76MD

AT THE LIMA-2019

The IL-76MD-90A can carry 126 paratroopers with parachutes, 145 personnel in the single-deck version and 225 – in the double-deck. The second-generation heavy transport aircraft IL-76MD received a new flight-navigation system, an automatic control system, a communication complex and a 'glass cockpit' (there are six multifunctional digital screens on the pilots' dashboard, that display all the necessary information to control the aircraft). The equipment meets all modern requirements for aircraft avionics and significantly increases flight safety, navigation and landing accuracy.

Under the UAC-brand

United Aircraft Corporation continues to develop international aviation projects

The largest company in Russia and one of the largest in the world aviation holding United Aircraft Corporation (UAC, part of Rostec Corporation) has been a regular participant in the French air show since 1997. At the 53rd International Paris Air Show (the Exhibition Center of Le Bourget UAC presents several aircraft models: MC-21, Be-200, IL-112V, Su-57, Su-35, MiG-29K, MiG-35, Su-30SM, Yak-130, Yak-152 and others.

The main participant of the all international aviation projects from the Russian side is the United Aircraft Corporation (UAC), which is the major Russian aircraft manufacturers and one of the biggest in the world. As part of the development of a multi-faceted and mutually beneficial partnership with other countries, UAC is ready to present its new technologies, perspective projects and industrial potential of the well-known aviation plants.

It should be noted that according to experts, it is Russian aircraft which in terms of life-cycle cost appears today as the most attractive in international markets. And this makes the UAC and the Russian aircraft industry very attractive, including for cooperation.

UAC was established in 2006 and its member companies are leading in a wide range of aviation industries: development, production, sales, operational support, warranty and servicing, modernization, repair, and disposal of civil and military aircraft. The main provisions of UAC's Development Strategy through define the principles and directions for dynamic development of the Corporation in order to gain the status of one of the world's largest aircraft-manufacturing centers with a widely-diversified product range.

Now UAC unites all major design and production assets of Russian aircraft industry. It also manages all key and most promising programs of development of the industry. UAC, which under one company represents the most well-known Russian aviation brands such as Sukhoi, MiG, Tupolev, Yakovlev and others, is today one of the world's biggest manufacturers and suppliers of aircraft. Thanks to the success of its products UAC is one of the world's leading aircraft manufacturers. UAC's revenues have been lately growing on average more than 20% per year. Superjet 100 civil airliners, Su-30 and MiG-29 fighters, Yak-130 operational trainers are among the most popular aircraft exported by UAC. UAC is working to simplify foreign market procedures, which is good news for present-day and future UAC's partners worldwide.

The new capabilities confirm there is a steadily growing demand for UAC aircraft. Moreover, operational reliability and relatively low prices become increasingly significant. In this regard there is a reasonable increase of export of Russian aircraft having better reliability, up-to-dateness and well-balanced prices both for airplanes and further maintenance.

UAC continues to implement a large-scale program to create a new family of MC-21 passenger aircraft. With all the scope of this project, work on it is proceeding as planned and progressively. For example, at the end of last year Irkut Corporation (a UAC member) completed construction of the third MC-21-300, intended for flight tests. The aircraft was transferred from the final assembly shop to the flight test unit of Irkutsk aviation plant.

Testing results of the first MC-21-300 aircraft passing certification tests were taken into account in the production of the new aircraft. The components and units of the fourth flight test aircraft are being assembled at the Irkutsk Aviation Plant. Currently, three MC-21-300 aircraft are taking part in flight certification tests at the airfield of Flight Test Institute named after M.M. Gromov.

President of UAC Yuri Slusar said about MC-21: 'Flight and ground certification tests of aircraft prototype confirmed the main design solutions. UAC enterprises have begun to manufacture parts and units of MC-21-300 aircraft intended for customer's delivery. Joining to the flight tests of new aircraft and production intensification of mass-produced airplanes are the main tasks of 2019.'

Absolutely, UAC has serious plans for the MC-21. This new-generation family of civil aircraft is aimed at the largest segment of the global airliner market. Demand for aircraft of this class in the many regions is very high and expected to increase in the future. The MS-21 has better flying, operating, economic and consumer characteristics than any existing or future equivalents. Four MC-21-300 will take part in the ongoing flight test programme, and production aircraft will be put into operation shortly.

The development programme comprises two models: the MC-21-300 (160 to 211 seats) and the MC-21-200 (130 to 176 seats). Advanced technological solutions as applied to aerodynamics and propulsion, as well as the latest onboard systems and new solutions pertaining to passenger comfort make the airliners objectively competitive over products by other manufacturers. The interest in this programme is huge, we can see it at aerospace exhibitions when demonstrating the project.

The MC-21 is one of the world's most advanced aircraft. It is being developed and manufactured with the comprehensive use of digital technology. Fuselage components are manufactured and assembled on an all-new automated assembly line. The aircraft incorporates many composite components, making it more reliable, lightweight, efficient and easy to operate.

'We can confidently say that 2018 turned out to be productive for the aircraft industry. Construction of the new aircraft and certification tests of the first aircraft confirm that the MC-21 program is developing steadily. As part of the program, a deep modernization of aircraft manufacturing enterprises was carried out, new high-tech companies were created, an environment for development of promising civil aviation projects was formed,' – mentioned Denis Manturov, Minister of Industry and Trade of the Russian Federation.

In recent years rather good results have been shown by civil segment for which UAC has been making big plans. Among Russian civil aircraft the Superjet 100 regional aircraft of a new generation is the most popular at foreign markets. The aircraft combines new aircraft engineering technologies, passenger convenience, significant economic advantages for airlines, proper environmental specifications.

The key advantage of Superjet 100 is lower operational costs as compared to its 100-seat competitors. Operational costs are minimized due to higher fuel efficiency and lower take-off weight. According to the aircraft operation study, its ownership cost is averagely 15-20% lower than the other similar class aircraft. The highly competitive lease rate supported by a state guarantee

UAC was established in 2006 and its member companies are leading in a wide range of aviation industries: development, production, sales, operational support, warranty and servicing, modernization, repair, and disposal of civil and military aircraft. The main provisions of UAC's Development Strategy through define the principles and directions for dynamic development of the Corporation in order to gain the status of one of the world's largest aircraft-manufacturing centers with a widely-diversified product range.

Now UAC unites all major design and production assets of Russian aircraft industry. It also manages all key and most promising programs of development of the industry. UAC, which under one company represents the most well-known Russian aviation brands such as Sukhoi, MiG, Tupolev, Yakovlev and others, is today one of the world's biggest manufacturers and suppliers of aircraft. Thanks to the success of its products UAC is one of the world's leading aircraft manufacturers. UAC's revenues have been lately growing on average more than 20% per year. Superjet 100 civil airliners, Su-30 and MiG-29 fighters, Yak-130 operational trainers are among the most popular aircraft exported by UAC. UAC is working to simplify foreign market procedures, which is good news for present-day and future UAC's partners worldwide.

of depreciation value is also worth being taken into account.

SSJ100 capable of carrying 98 passengers is the first in its class aircraft featuring five-across seating, with big 32 inch distance between seats. Thanks to a combination of wider seats and higher cabin (over 2 meters) SSJ100 has more cabin space and bigger stowage bin capacity than such of competitors. The airplane has been built with the use of the latest design procedures and technologies by leading manufacturers such as French Snecma (engines) and Thales (avionics), US Goodrich (wheels) and Honeywell (APU). The interior has been designed by Italian office Pininfarina. In February 2012 the aircraft was certified by European Aviation Safety Agency (EASA).

According to UAC President Yuri Slyusar the Corporation has stable rate of mass production of Superjet 100. There are plans that every year more than 30 such aircraft shall be delivered to customers. Today about one hundred fifty SSJ100s are being operated including those in other world regions, from South America to Southeast Asia.

Currently with available manufacturing capacities UAC enterprises are capable of producing up to sixty Superjet 100 per year. The Russian aircraft sparkles profound interest in Southeast Asia and Latin America. Experts confirm that in the context of 70-100-seaters this aircraft is becoming the most attractive for many international airlines. When interviewed Yuri Slyusar said UAC is intended to focus on further development of the Superjet 100 aircraft family to offer customers a range of regional planes.

Yuri Slusar said: 'Among our civil projects, I can mention not only the SSJ100 family, which is now in operation around the world both in the standard and business configuration. The programme continues to develop: by 2022, we plan to offer the market an upgraded version of the aircraft. The aircraft will have its wing, fuselage, engines and systems modified, including a new wing and a new avionics suite.

We also expect a high interest in the unique Beriev Be-200 amphibian aircraft, whose primary firefighting role is very topical for virtually all the regions of the world. This airplane can operate from water at wave height of up to 1.3 m, and special anti-corrosion measures allow for its operation in the open sea.

Our lighter, multirole Be-103 amphibian can transport passengers and freights, serve as an air ambulance, for patrolling and monitoring… I could go on and on about Russian aircraft, but the main thing is that Russia has been and remains a great aerospace power capable of manufacturing aircraft in all the market niches. We know what aircraft world market needs, and are prepared to offer them on advantageous conditions.'

Russian Corporation intends to seriously compete for the expansion of its share in the global market for civil aviation products. Last

The new capabilities confirm there is a steadily growing demand for UAC aircraft. Moreover, operational reliability and relatively low prices become increasingly significant. In this regard there is a reasonable increase of export of Russian aircraft having better reliability, up-to-dateness and well-balanced prices both for airplanes and further maintenance.

autumn UAC presented its annual Market Outlook for the next 20 years. The market outlook is based on UAC proprietary methodology and mathematical models and demonstrates the views of the Corporation on the development of air transportation and the demand for new commercial aircraft.

According to the forecast, UAC estimates the total demand for new passenger aircraft with more than 30 seats in 2018-2037 to exceed 43.6 thousand aircraft worth over US$6 trillion in 2018 catalogue prices. The market outlook is a comprehensive marketing analysis devoted to the civil aircraft segment of the world's aviation that analyses the tendencies and trends in the development of commercial air transportation in the world's regions and the whole world. Most attention is devoted to the passenger transportation segment as the most capacious both in terms of value and delivery numbers. This segment is also very important to UAC as, according to the Corporation's long-term development strategy, UAC's revenue from sales of commercial aircraft should reach 45% from total sales, outgrowing other revenue segments.

UAC President Yury Slyusar noted: 'The innovative development of the industrial model, increasing production rates of narrow- and wide- body aircraft are paving the way to new market segmentation approaches. The changing competition conditions are leading to further fleets optimization, adjustment of air transportation models, and the demand for new civil aircraft in general.'

According to the outlook, the annual passenger turnover rates during 2018-2037 will grow by 4.6% per year. Narrow body aircraft with 110 and more seats will be the most demanded by the airlines, capturing 68% of the whole market in quantity and 56% by value. The total demand for wide body aircraft will amount to almost 8 thousand aircraft, which is by value 40% of the total market in 2018 prices. Demand for new jet aircraft with 30-110 seats will amount to about 4 thousand aircraft – with only 3.1% of the total market value. The demand for turboprop aircraft will is estimated at 2.2 thousand aircraft.

(In this article we would like to bring a few ideas and thoughts from this strategic forecast of the UAC).

The wide-body aircraft traffic share prevailed over that of narrow-body aircraft by 13 p.p. at the beginning of this century (52% and 39% respectively). But the ratio had been changing rapidly: percentage of narrow-body increased and the stake of wide-body aircraft lowered. The traffic volumes for aircraft of both classes equaled to 46% in 2007, but then the changes continued and a share of narrow-body aircraft increased to 52%, and wide-body aircraft – declined to 44% by 2017. The trend

will continue within the forecasted period: narrow-body transportation will reach 58%, and a share of wide-body aircraft will decrease to 39% by 2037. This trend is typical for all regions except Africa and CIS (excluding Russia)

The total share of regional transport is declining (the whole world now is at 4.5% (0.9% for regional turboprops and 3.6% for regional jet aircraft), at this it was equal to 8.3% in 2001) and will continue to decline (to 3.1% in 2037). Exceptions are China (growth from 1.4% to 2.0%) and the CIS (without Russia) – from 11.9% to 12.7%.

Rise of the GDP is the main transportation growth driver. GDP gain rate was 2.8% within 2000 – 2017 period. It is expected that GDP will grow by 3% (average) during the first decade of the forecasted period and by 2.6% – in the second.

Global population growth rates are decelerating. This indicator was 1.2% in the retrospective period (2001-2017). It will be 1% within the 2018-2027 and 0.8% during 2028-2037 periods. Average growth will be 0.9% for the 20 years.

Passenger turnover is growing at a faster pace compared to GDP. This 'outstripping' is reduced as the air transport develops. Thus, the growth rate ratio of the passenger turnover to GDP was 2.02 in the retrospective period, it is expected to be 1.70 in the first decade of the forecast period, and 1.54 in the second. It is expected to be at a level of 1.63 times for the total period. In other words the saturation effect is being witnessed: air travel becomes a routine event and people begin to fly as much as they really need (regardless their income level).

The forecast from the UAC presented many interesting observations and conclusions. For example, about changes in transportation patterns and aircraft fleets. Despite the 'standard' seven-year cycle of growth in the profitability of air transport, the market shows no signs of a significant decline in profitability. This circumstance contributes to the inflow of long-term capital into the industry, including non-investment class companies.

Optimistic assessment of aircraft leasing is confirmed by extension of capitalization and impact of leasing companies from the Asian region, where companies based on investment from China take on particular importance. In the period up to 2023, a share of the Chinese leasing companies in the value of the operating fleet is projected to grow steadily from current 18% to 22-25%. China's high GDP growth rates sustaining may lead to the future drastic changes in this segment of the world market.

The dynamics of the aircraft industry development in recent decades have contributed to transition to the mega-associations, being the next stage of the global aircraft manufacturers consolidation. Study of the financial stability of the new industrial configuration and its main players competencies sufficiency requires special attention in the current situation. Modern conditions for aircraft creation and future supply of such products to the market cause special risks for air transport that are yet to be revealed by the decisions on aircraft manufacturers unification of their product lines.

Development of an innovative industrial model, increase of the wide-body and long-haul aircraft serial production rates create reasons for new approaches to market segmentation. Changed conditions of the competition will lead to optimization of aircraft fleets, adjustment of air transportation models, and overall change in demand in aeronautical engineering.

The transformation rate of the previously established vision for the international relations, role of globalization, forms and directions of goods, services, financial and human resources movement takes an outstanding role – in terms of its impact to the world.

Complicated modern processes taking place in the world economy create a real threat of 'trade wars'. Expanding state protectionism in economic matters, non-compliance with WTO rules, refusal to conclude and execute agreements on free trade zones, tariff barriers and differences of views of the world's financial centers on monetary policy form new challenges and obstacles to the development of air transport.

Consistent implementation of 'Industry 4.0' principles in the world economy is naturally and actively reflected in the aircraft building industry. Digitalization as a juggernautic force accompanies the aviation in the air and on the ground.

Transition to product life cycle management based on modern digital technologies contributes to radical organizational transformation of aircraft corporations. This business is becoming more thoughtful, dynamic and efficient.

Competition in the air transport market is a continuous search for new ideas and solutions by players in the globalization environment. A significant number of mergers and acquisitions have formed a new corporate structure of the industry in the recent years.

The wide-body aircraft traffic share prevailed over that of narrow-body aircraft by 13 p.p. at the beginning of this century (52% and 39% respectively). But the ratio had been changing rapidly: percentage of narrow-body increased and the stake of wide-body aircraft lowered. The traffic volumes for aircraft of both classes equaled to 46% in 2007, but then the changes continued and a share of narrow-body aircraft increased to 52%, and wide-body aircraft – declined to 44% by 2017. The trend will continue within the forecasted period: narrow-body transportation will reach 58%, and a share of wide-body aircraft will decrease to 39% by 2037. This trend is typical for all regions except Africa and CIS (excluding Russia)

The total share of regional transport is declining (the whole world now is at 4.5% (0.9% for regional turboprops and 3.6% for regional jet aircraft), at this it was equal to 8.3% in 2001) and will continue to decline (to 3.1% in 2037). Exceptions are China (growth from 1.4% to 2.0%) and the CIS (without Russia) – from 11.9% to 12.7%.

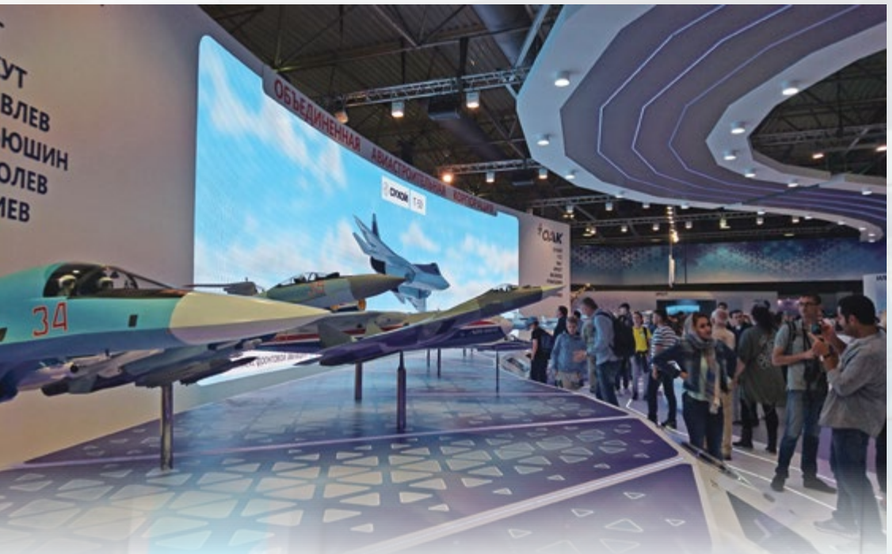
Rise of the GDP is the main transportation growth driver. GDP gain rate was 2.8% within 2000 – 2017 period. It is expected that GDP will grow by 3% (average) during the first decade of the forecasted period and by 2.6% – in the second.

Global population growth rates are decelerating. This indicator was 1.2% in the retrospective period (2001-2017). It will be 1% within the 2018-2027 and 0.8% during 2028-2037 periods. Average growth will be 0.9% for the 20 years.

Passenger turnover is growing at a faster pace compared to GDP. This 'outstripping' is reduced as the air transport develops. Thus, the growth rate ratio of the passenger turnover to GDP was 2.02 in the retrospective period, it is expected to be 1.70 in the first decade of the forecast period, and 1.54 in the second. It is expected to be at a level of 1.63 times for the total period. In other words the saturation effect is being witnessed: air travel becomes a routine event and people begin to fly as much as they

UAC continues to implement a large-scale program to create a new family of MC-21 passenger aircraft. With all the scope of this project, work on it is proceeding as planned and progressively. For example, at the end of last year Irkut Corporation (a UAC member) completed construction of the third MC-21-300, intended for flight tests. The aircraft was transferred from the final assembly shop to the flight test unit of Irkutsk aviation plant.

UAC has serious plans for the MC-21. This new-generation family of civil aircraft is aimed at the largest segment of the global airliner market. Demand for aircraft of this class in the many regions is very high and expected to increase in the future. The MC-21 has better flying, operating, economic and consumer characteristics than any existing or future equivalents. Four MC-21-300 will take part in the ongoing flight test programme, and production aircraft will be put into operation shortly.



really need (regardless their income level).

The narrow-body aircraft with more than 110 seats are the most numerous on the market with a total amount of 15.4 thousand tails (58.1% of the total fleet). They are being followed by wide-body aircraft whose share equals to 4.6 thousand (17.3%). Regional aircraft are calculated at a level of 6.5 thousand tails (24.6%), of which jets are 3.9 thousand (14.9%) and turboprops – 2.6 thousand (9.7%).

Average aircraft calendar service life of the commercial passenger fleet was 10.8 years at the beginning of 2018.

The 'oldest' one is the regional turboprop aircraft fleet (15.8 years of age), it is followed by the regional jets (12.1 years), narrow-body aircraft (10.0 years), with wide-body aircraft being the 'newest' ones (9.9 years) if the average calendar service life estimation is applied.

Age-wise distribution of the aircraft fleet shows that in all classes, except the regional turboprop aircraft, the age structure is relatively even, but the long-haul aircraft have the newest (less-then-five-years) share as the most numerous and the regional turboprop segment by contrast has the 'elderly' (aged more than 20 years) aircraft share as the most significant.

The global demand for regional turboprop aircraft for the next twenty years will be ≈2,190 tails, of which 78% will be aircraft with more than 60 seats and 22% – aircraft with 30 to 60 seats. The share of regional turboprop aircraft in the total quantitative demand for new aircraft will be 5%.

Existing firm orders cover 16% of the expected demand for this class of aircraft.

According to UAC's forecast, the demand for non-ramp cargo aircraft in the period 2018-2037 will remain within the range of 2,350 – 2,450 units (new aircraft – 63%, converted – 37%). The main factors affecting freight traffic growth have not changed.

Cargo turnover growth rate is less than the growth rate of passenger turnover. The share of air cargo transportation using passenger aircraft is slowly declining and will decrease to about 50% freight-ton-kilometers (FTK) for all segments by 2037.

In the medium term, air cargo growth rate may be significantly affected by infrastructure constraints, including ability of airports to handle cargo. USA's policy to return the center of world production of goods and services to its territory forms risks of reduction of air cargo traffic on USA-Asian and Asian- European routes. At the same time, emergence of new destinations with relatively high traffic intensity is predicted: China-Central Africa and China-Latin America.

The desire of the leading countries to execute a new stage of the resource base development in Africa creates conditions for subsequent growth of trade turnover and expansion of its directions. Conditions for increasing demand for cargo transport to/from Africa are emerging.

Demand for new passenger wide-body aircraft for the twenty-year period is expected to be at 7,745 aircraft or 18% of total sales.

The ratio of the capacity group's shares within the segment will change: minding the retirement of existing fleet the 325+ seats subgroup share will increase to 35% by the end of the forecast period.

Announced firm orders cover 28% of the total forecasted demand, including 24% and 34% in the subsegments of the 'smaller' and 'larger' capacity groups, respectively.

The total cost of new aircraft in the wide-body segment, which are expected to be delivered in the forecast period, is USD 2,439 billion (2018 catalog prices), which is equivalent to 40% of the total market of new passenger aircraft.

The most profitable will be supplies of the airliners designed for 300, 350 and 250 seats (USD 825, 513 and 481 billion, respectively). Demand for extra-large passenger aircraft with capacity of more than 425 seats is estimated at 615 aircraft, and the cost – at USD 279 billion.

Average annual growth rate of passenger traffic in the forecasted period will be 4.5%, which is 0.1 percentage points less than the world average.

Relatively short flights prevail in the traffic distribution by range. At this Russian airlines generate 75,5% of the turnover at ranges less then four thousand km, which is considerably higher than the world average (61.9%). This trend will generally sustain in the forecasted period even though the Russian airlines share at these distances may reduce to 69.9% by 2037, unlike the world average that is expected to increase to 62.0%.

Total demand for new aircraft is estimated at 1,290 aircraft, of which 860 (67%) are narrow-body ones, 125 (10%) – wide-body, 200 (16%) are regional jets and 100 (8%) are regional turboprop aircraft. Catalog value of the new aircraft will be USD152 billion.

Available firm orders cover 40% of expected demand in quantitative and 45% in value terms.

Global share of Russian airlines in purchasing of new passenger aircraft within the next 20 years will be 2.9% in quantitative terms and 2.5% in value terms. The modern passenger fleet consists of 359 aircraft, average age of the aircraft is 17.8 years. Of these, only 74 units (21%) will remain airworthy in the world fleet by 2037.

Europe's share of the world population was 8.3% in 2017. Expected rate of population growth in Europe (0.1%) is small compared to the world average (0.9%) and in this regard, Europe's share will be reduced to 7.1% by 2037.

The GDP passenger traffic growth rates (1.8% and 3.5% respectively) in the region are smaller than the world's average (2.8% and 4.6%, respectively), which is quite typical for regions with developed economy and air transportation.

Europe is the region with one of the highest levels of income per capita (2.85 times the world average in 2017). This allows Europeans to significantly exceed the world average by 3.3 times, which, along with per capita income, is the second indicator in the world after North America.

Traffic distribution by range has a distinctive bimodal form: value of the first mode in the forecast period will grow, and second – will decline. As a result, median of the distribution will significantly reduce from 3,108 to 2,830 km. Comparing the European distribution by range for with the world average, large shares of traffic for range of 6-10 thousand km and relatively small shares of traffic for the longest ranges (>10 thousand km) can be seen.

Europe overtook North America and became the leader of the world ranking in passenger turnover in 2017. It is expected that the region will hold this position until 2032, when Asia-Pacific region (excl China) will move to the first place.

The share of regional traffic of the European companies is decreasing all the time: in 2001 it was 9.2% (regional jets – 7.1% and regional turboprops – 2.1%), by 2017 it decreased to 3.3% (regional jets 2.3% and regional turboprops 1.0%). In the forecast period, reduction in the share of regional transportation will continue, but its pace will decrease: in 2037, share of regional jet transport will account for 1.3%, and share of regional turboprop – 0.6%. The effect of the reduced share of regional air transport in Europe is partly due to the replacement of short-haul air transportation by alternative modes of transport.

/IAATG/

CIVIL AVIATION

Superjet 100

Sukhoi Civil Aircraft Company presents Russia's new-generation airliner

Russian company Sukhoi Civil Aircraft Company (SCAC) is engaged in promotion in the world market Russia's new-generation regional airliner Superjet 100 (SSJ100). Despite the fierce and often underhanded competition on the regional airliner market, 100-seater SSJ100 has undoubtedly carved itself a niche. SSJ100 commercial operation started in 2011 and as for May 2019 total flight hours surpass 570 000. More than 40 million passengers were transported by the SSJ100. There are more than 130 aircraft under operation. Interested potential customers are everywhere around the world, from Asia to Latin America. The global SSJ100 fleet grows steadily, including in the VIP configuration, and more carriers come to value the aircraft for its objective economic and technological advantages.

Objective advantages

The SSJ100 was developed, and is manufactured and marketed, by Russia's Sukhoi Civil Aircraft Company (SCAC). The airliner represents a successful blend of the national aviation industry's decades-long experience and the latest achievements in the broader aerospace domain. The SSJ100 offers unsurpassed passenger comfort, significant cost benefits for carriers, a highly ergonomic cockpit and maximum environmental friendliness.

The SSJ100 incorporates a number of innovative solutions that combine to make it one of the most convenient, comfortable and economical airliners in the world. The philosophy behind the SSJ100 comprises such principles as maximum passenger comfort, maximum revenue for the operators, the best onboard systems, high environmental friendliness, and maximally convenient maintenance for carriers.

The SSJ100 is the first 100-seat airliner to feature a full-fledged fly-by-wire system, which optimises control of the aircraft, reduces crew workloads and helps save fuel. The cockpit features intuitive control systems whose design is based on crew feedback and recommendations.

Passengers appreciate the spacious cabin, which offers the same level of comfort as the cabins of mainline aircraft. The SSJ100 has improved take-off and landing performance and can be operated in all weather conditions. All these factors enable operators to inaugurate new destinations and optimise their route networks and schedules.

The SSJ100 exceeds the ICAO noise and emissions requirements, resulting in a quieter and more comfortable cabin experience. Low fuel burn and low emissions are the key parameters making the SSJ100 one of the most environmentally friendly airliners.

The SSJ100 first flew in May 2008. Its maximum cruise speed stands at 0.81 M, and its cruise altitude is 12,200 m. The airliner's range is 2,960 m for the baseline version and 4,320 for the extended-range modification. The SSJ100 is powered by two SaM 146 turbofan engines. It features 1.5 tonnes lower CO2 emissions than the competition. The aircraft has been certified by AR IAC, EASA, and a number of national aviation authorities. The first production SSJ100 was put into operation in 2011.

The plane SSJ100 has a wide range of objective advantages.

Certification from IAC AR and EASA

The certification campaign was accomplished with four prototypes for flight testing and two prototypes for static and fatigue trials. The experimental flying jets have accumulated 2.594 flight hours in 1.087 flights. The number of testing programs totaled 200.

In February 2011 the Russian Certification Authority IAC AR presented Superjet 100 Type Certificate to Sukhoi Civil Aircraft Company. The Type Certificate confirmed compliance of the SSJ100 with the airworthiness regulations and it authorizes the commercial operation of the airplane.

SSJ100 is the first Russian aircraft to accomplish the full scope of the certification HIRF testing program. These tests were required to demonstrate that the aircraft's on-board systems, as well as electric and electronic equipments are not influenced by any external electromagnetic fields.

During the certification campaign the aircraft has completed the stringent program of certification which checked all the aircraft systems and the airframe well beyond the operational limits to be sure the passenger airplane meets all the airworthiness directives.

A year later, in February 2012, the European Aviation Safety Agency (EASA) issued its Type Certificate A-176 for the Superjet 100. This certificate recognizes that the SSJ100 aircraft demonstrated compliance with the EASA airworthiness and environmental requirements. The recognition allowed the European airlines, as well as those airlines operating in countries which use EASA regulations as a reference standard, to accept and operate the SSJ100 aircraft.

SSJ100 has become the first ever Russian passenger 'Large Airplane' to achieve the EASA CS-25 Certification.

The SSJ100 was developed, and is manufactured and marketed, by Russia's Sukhoi Civil Aircraft Company (SCAC). The airliner represents a successful blend of the national aviation industry's decades-long experience and the latest achievements in the broader aerospace domain. The SSJ100 offers unsurpassed passenger comfort, significant cost benefits for carriers, a highly ergonomic cockpit and maximum environmental friendliness.

The SSJ100 is the first 100-seat airliner to feature a full-fledged fly-by-wire system, which optimises control of the aircraft, reduces crew workloads and helps save fuel. The cockpit features intuitive control systems whose design is based on crew feedback and recommendations.

The EASA certificate, which is a validation of the certificate issued by the Interstate Aviation Committee Aviation Register (IAC AR), is the result of the vast certification campaign performed by EASA, IAC AR and SCAC in association with Certification centers and key aircraft systems suppliers.

The European validation started after IAC AR certification application in 2004 and went through in parallel with the Russia Certification process. The overall process allowed to assess the compliance with the strict European Airworthiness Code, resulting in the issue of the Type Certificate.

The European validation program included several dedicated flight and ground tests.

In particular the EASA pilots went through many sessions on the 'electronics bird' (SCAC integrated simulator and RIG for the SSJ100) and participated in 45 certification flights (total duration about 70 flight hours) in order to prove the safety and in-flight performance of the SSJ100 aircraft in any situation.

The ground tests covered, among others, the ultimate pressure load of the fuselage, the bird strike of the front upper cockpit panel, the broken-tire strike of the lower hatch cover of the wing fuel tank and the fire-resistance of the composite flap. In the frame of ten working groups ('Panels') 84 Certification Review Items and 60 Certification Action Items were analyzed, substantiated and agreed while more than 500 actions and questions received from the Authorities were timely and satisfactory closed.

Thanks to the experience and dedication of the fully integrated multicultural SSJ100 Team, the EASA Certificate has been granted only one year after the achievement of the IAC AR Type Certificate.

SSJ100 Systems Functioning

Since the very beginning there were toughest safety standards since the initial stages of the design applied towards every stage of the SSJ100 design, tests, production and certification. As the result, SSJ100 is certified not only by Russian but also by European aviation authorities. The tests showed that the impact of the lightning and the magnetic fields of high intensity do not bring to the onboard systems shut down – and this fully complies with the requirements of both Russian and European aviation authorities.

SSJ100 avionics informs the crew about entering the wind shear, and one of the functions allows foresee it during take-off and landing. Flight operation manual in both cases prescribes that the crew in case of wind shear should perform go-around flight manoeuvre.

The SSJ100 is equipped with the weather radar of the latest generation showing the pilots the real-time meteorological situation along the route. It provides the crew with the detailed information about the thunderstorm activity for the precise altitudes requested by the pilots. The lightning strike impact is both complex and dangerous, that is why IATA and ICAO strongly recommend to avoid entering the thunderstorm front.

The radio contact is secured by three independent VHFs. They guarantee the robust communication with the ground services. The location of the VHFs, antennas and the cable network is made in such a manner that in case of the lightning strike, bird strike or hail strike to one of the antennas two other would not run out of service. In case of all three VHFs failure the crew sets 7600 squawk code that means 'radio failure' and it is transmitted to the ground services, and proceeds with the flight procedure according to the national rules of flight. Depending on the situation, the crew might also transmit the code 7700 'Emergency' and 7500 for 'Hijack'. The terms of the usage are also given in the Flight operation manual.

At the aircraft control system transition to the 'direct mode' all the required flight characteristics from the point of view of safety are preserved. The transition from the 'normal mode' to the 'direct mode' is not registered as a failure. In this case, the precise elaborated and tested procedure of the Flight operation manual provides the pilots with detailed recommendations about the required flying technique (the approach speed, the increase of the landing distance, the additional restrictions). Flying in direct mode is included into the training program recommended to the Operator by the manufacturer of the SSJ100.

Besides, the aircraft is equipped with both visual and sound signalization alerts about the dangerous glidescope errors during the approach.

SSJ100 series design is constantly developing under permanent control of Russian and European aviation authorities. All the design, testing, certification and operation processes are strictly governed and are consistent with the requirements of airworthiness regulations AP-25 and CS-25. Inter alia the emergency landing situation with exceeding airframe calculated load was modelled for all cases: with withdrawn, with extended gear. According to the results of this scope of actions there are structural components added to the design (so-called 'weak spots') aimed at minimizing the consequences of the effects of the extreme loads to the airframe.

The SSJ100 is equipped with the weather radar of the latest generation showing the pilots the real-time meteorological situation along the route. It provides the crew with the detailed information about the thunderstorm activity for the precise altitudes requested by the pilots.

Business versions

One of the factors increasing the airliner's appeal to potential customers is the deliberate expansion of the range of its applications and the number of available versions. As part of this process, VEB Leasing, United Aircraft Corporation (UAC), Vnukovo Airport's business aviation centre, Azimuth Airlines and National Reserve Corporation came together in Sochi in February 2019 to sign a letter of intent for the implementation of a domestic corporate charter project using SSJ100 aircraft.

Under the project, business-configured airliners seating up to 56 passengers will be utilised for ad-hoc, on-demand flights in the interests of major corporations, athletic teams, touring musicians and other entities interested in corporate transportation.

'UAC sees one of its key priorities in forming and promoting its range of civil aircraft products,' UAC President Yuriy Slyusar noted. 'The corporate charter niche is particularly appealing to us given its growth potential. Creating a corporate transportation platform with the use of the SSJ100 business variant is an important step in the development of our business. We believe this version of the aircraft can become a unique product that will provide for an optimal balance between the required comfort and economic effectiveness.'

The SSJ100 business variant is well known in the world: it has been promoted both in Asia and in Europe, and many potential customers have expressed their interest. One important factor here is that the aircraft's cabin is larger and more spacious than those of the comparable airliners in this class, providing for exceptionally high comfort and unrestricted possibilities (including as concerns cabin design and outfitting).

Industry expert believe the SSJ100 business version is currently one of the most advanced corporate jets. It combines ultramodern technology with a high level of passenger comfort, and its price tag is comparable to equivalent corporate jets. /IA&TG/

SCAC (www.scac.ru) was founded in 2000 specifically to develop and promote new civil aircraft models. The company is currently focused on further developing the SSJ100 in all possible modifications. SCAC is primarily engaged in the development, manufacture, marketing and maintenance of SSJ100 airliners. Its head office is situated in Moscow, and the production facility is in Komsomolsk-on-Amur.

MC-21: betting on technical superiority

New jetliner from Irkut Corporation undergoes testing

Certification of the innovative passenger airplane MC-21-300 is to be completed in 2020, stated Yury Slyusar, President of the United Aircraft Corporation (UAC) and Irkut Corporation. Irkut acts as the prime contractor in the MC-21 Program. The plane is being developed by the Engineering Center located in Moscow. MC-21 is manufactured at the factory in Irkutsk, which also produces Su-30 family fighters and Yak-130 combat-capable trainer aircraft.

The MC-21-300 next-generation narrowbody jet shall win type certificate in 2020, says Yury Slyusar, President of the United Aircraft Corporation (UAC), who also heads Irkut Corporation, a member in UAC.

Irkut acts as the prime contractor for the MC-21 program. The Corporation's Engineering Center in Moscow is responsible for the design of the airplane, while the type's production line is set up at the factory in Irkutsk, which also makes the Sukhoi Su-30 family fighters and Yakovelev Yak-130 combat trainers.

The MC-21 manufacturer is well known in India. It supplied the Indian Air Force with an initial batch of the Su-30MKI fighters and assisted the Hindustan Aeronautics Limited (HAL) in mastering production of that type under license. In frame of the long-term Su-30MKI program, Irkut provides assistance to local maintainers in carrying out overhaul on Indian air force aircraft.

Today, certification trials involve two MC-21-300 operable prototypes, while a third, completed in the late 2018, is about to join in. The flight test program shall ultimately involve four aircraft.

Besides, two more MC-21-300 airframes have been built for ground testing at the Central Aerohydrodynamic Institute named after N.E. Zhukovsky (TsAGI). One of those has been under static tests since 2017. The other is being prepared for fatigue trials.

During flight trials, the operable prototypes climbed up to altitude of 12,500 m and accelerated to the speed corresponding to Mach number M=0.85. So far, the maximum duration of a test sortie has been 6.2 hours. The prototype aircraft successfully accomplished flight tests at high angles of attack, demonstrating safe recovery from 'stall' regimes.

Successful completion of flight tests and various trials on the ground in a volume required by the aviation authorities made it possible for the manufacturer to commence production of parts and assemblies for deliverable airplanes.

First shipments to customers are planned for 2020. The sales campaign passed a major milestone in 2018, when a contract with Aeroflot was signed. According to it, the national flag carrier and the leader of the Russian air transportation system shall receive fifty MC-21-300s by 2026. Initially, deliverable airplanes will come with a cabin configured for 16 business-class and 153 economy-class passengers. A high density layout also available for the MC-21-300 has a seating capacity of 211.

Airlines of various business models shall benefit from the MC-21 entering the air transportation market. The airplane offers the largest cross section among all contemporary narrow body jets and, therefore, makes it possible to better meet the specific requirements of airline customers. For instance, low-cost carriers (LCCs) will appreciate a cabin layout with a wide central aisle between the seat rows that can substantially reduce time for embarkation and disembarkation of passengers. Irkut hopes that the specious cabin and high comfort of the MC-21 will help airline customers win hearts and minds of the traveling public.

Low fuel consumption insured by a modern power plant of either U.S. or Russian origin is another MC-21's winning point. Customers can choose between the PW1400G-JM or PD-14, both being contemporary turbofans designed for highest fuel efficiency. For that same purpose, the MC-21 comes with a high aspect wing made of composite materials, the most advanced one for the given class of aircraft.

Simultaneously with flight testing and streamlining MC-21 serial production, the Russian aviation industry is striving to set up an aftersales support system to ensure seamless operation of modern jetliner types. Yury Borisov, deputy chairman of the Russian government, has said that this system shall commence functioning upon the MC-21-300 entry into service. Mindful of the MC-21 export potential, Irkut is looking for foreign partners to support aircraft operations in their region of the world.

Superb performance, specious high-comfort cabin, sales promotion measures (coming with special conditions for early customers) and a comprehensive customer care system make it possible for the MC-21 to capture a sizeable portion of the global market for medium range passenger jetliners. Plans call for a production run between nine and ten hundred MC-21s in the course of the next twenty years.

/IA&TG/

Official commentary

About illegitimate overhaul of Mi-17V-5 helicopter by Slovak company LOTN

Due to the published information regarding overhaul of the second Mi-17V-5 helicopter operated by the Air Force of Afghanistan carried out by the Slovak company LOTN, Russian Helicopters Holding Company represented by the helicopter designer (Mil Moscow Helicopter Plant) and manufacturer (Kazan Helicopters) announces the performed work illegitimate. The holding company repeatedly contacted the executives of LOTN proposing to settle the issue of overhauling the Mi-17 type helicopters operated by the Air Force of Afghanistan.

Unfortunately, mutual understanding has not been reached between the parties, and there is no cooperation with LOTN currently in progress. Helicopter overhaul was performed based on the repair documentation developed by the Slovak company without participation or supervision by either the helicopter designer or manufacturer. No actualized repair and design documentation for the Mi-17V-5 military transport helicopter, spare parts or repair group sets were delivered to this aircraft repair company.

The reference of LOTN regarding cooperation with Mil Moscow Helicopter Plant and the Russian side is not true to the facts and goes against the tender terms and conditions.

Russian Helicopters Holding Company disclaims all responsibility for further safe operation of the helicopter repaired by LOTN and has every reason to deny services related to maintenance of this aircraft. /IA&TG/

Russian Helicopters is a leading player in the global helicopter industry, the sole Russian rotorcraft designer and manufacturer and one of the few companies worldwide with the capability to design, manufacture, service and test modern civilian and military helicopters. Russian Helicopters is part of State Corporation Rostec. Russian Helicopters' facilities span the entire country. The Company includes design bureaus, helicopter assembly plants, components production, maintenance and repair enterprises, aircraft repair plants, and helicopter service companies providing after-sales support in Russia and abroad. Russian Helicopters is headquartered in Moscow. It was established in 2007, but its key enterprises date back more than 70 years.

According to our data, there are over 8,000 Russian helicopters operating in over 100 countries. Russian Helicopters products account for approximately 90% of the rotorcraft market in Russia and 10% of worldwide helicopter sales.

Russian Helicopters enterprises produced around 22% of the global military helicopter fleet, 32% of the global combat helicopter fleet, and 42% of the medium-heavy transport helicopter fleet. Russian Helicopters has produced a record 49% of the global ultra-heavy helicopter fleet, as well as 65% of the global medium helicopter fleet with MTOW from 7 to 20 tons.

Now to be certified in Brazil

Russian Helicopters, a Rostec company, and Russia's Federal Air Transport Agency (Rosaviatsiya) have submitted to the National Civil Aviation Agency of Brazil (ANAC) the operating and maintenance documentation for the Mil Mi-171A2 helicopter. ANAC will now decide on certifying the type locally.

'Brazil is our long-standing partner and a key South American market for Russian rotorcraft,' said Russian Helicopters Director General Andrey Boginsky. 'Mi-171A1 helicopters have been operated successfully in Brazil for over 10 year now, and I am confident that the new rotorcraft will shortly be able to gain a no less positive reputation there. The Brazilian certification body is currently processing the Mi-171A2 documentation. Given our prior experience having the Mi-171A1 certified in that country, I believe the issue will be resolved within a short period of time,' said Anatoliy Serdyukov, Aviation Cluster Industrial Director of the Rostec Corporation: 'In the light of Brazil's significant demand for medium-class multirole helicopters, we are bringing a new, advanced, spacious and reliable aircraft to the local market. The Mi-171A2 features a long range, which is particularly important for the country where helicopters are operated intensively in remote areas. As part of the international cooperation drive, we are planning to develop after-sales support for the type in order to guarantee its maximum service life and ensure flight safety.'

ANAC in 2005 validated the type certificate for the Mi-171A1 helicopter, which is optimised to meet the FAR-29 regulations and the requirements of European commercial operators. Particular emphasis during the aircraft's development programme was put on its operational safety. Brazil took delivery of its first example of the type in 2005.

In 2010, the Mi-171A1 bid by the operator Atlas Taxi Aereo won the tender of the Brazilian state-owned oil-and-gas company Petrobras for aerial operations in the Amazon basin. The bid was chosen for its overall positive parameters and for the best price-to-quality ratio.

At the request of the Brazilian company, the Mi-171A1 was, for the first time, fitted with a T-HUMS health and usage management system, which automatically monitors a broad range of onboard parameters in real time, thus significantly improving flight safety. The installation of the T-HUMS system enables the helicopter's on-condition operation, which is expected to drastically cut operators' expenses and improve its operational effectiveness.

The Atlas Taxi Aereo Mi-171A1 fleet has performed remarkably in the punishingly humid environment of the Brazilian rainforest while supporting Petrobras drilling business. One particular aircraft logged over 1,000 flying hours over a year of intensive operations, flying 120 hours monthly on average and hauling a total of 600 tonnes of freight, primarily underslung drilling equipment.

The type was used as the baseline for the profoundly upgraded Mi-171A2 model of the Mi-8/17 family. The new helicopter incorporates over 80 modifications. It is powered by digitally controlled Klimov VK-2500PS-03 engines (the civil version of the powerplant installed on Mi-28 combat helicopters). One important novelty of the Mi-171A2 is an all-new rotor system. It features a more efficient X-shaped tail rotor and a new main rotor with all-composite blades of an improved aerodynamic design. Rosaviatsiya in August 2017 certified Mi-171A2 under Category A, which implies the strictest flight safety requirements for civil helicopters. /IA&TG/

Demonstration tour

Russian Helicopters presented Ansat and Mi-171A2

Mi-171A2 and Ansat helicopters, manufactured by the Russian Helicopters holding company (part of State Corporation Rostec), completed a demonstration tour of the countries of Southeast Asia. Attendees of Airshow China in Zhuhai, China, as well as potential customers from Vietnam, Cambodia, Thailand and Malaysia, familiarized themselves with the capabilities of both aircraft. Full-scale demonstrations in these countries of the latest civil technology made it possible to reach specific agreements and create an extensive portfolio of orders for them.

The delegation of the Russian Helicopters Holding Company demonstrated key competitive advantages of Mi-171A2 and Ansat rotorcraft in Phnom Penh (Cambodia) during the South Asian Heli Tour and provided information to the guests of the event about the after-sales service system. In their turn, partners of Russian Helicopters presented financial instruments for purchasing Russian helicopters. Cambodia has become the second stop for Mi-171A2 and Ansat during the South Asian Heli Tour. Earlier, these Russian-made helicopters were showcased in Vietnam.

'Cambodia has a positive experience of operating Mi-8/17 family helicopters. Moreover, we see a growing demand for light rotorcraft in that country, as well as in Southeast Asia in general. Therefore, Phnom Penh was selected as one of the demo sites during the South Asian Heli Tour of Mi-171A2 and Ansat civil helicopters. Demonstrating our machines to the public has already proved to be efficient: after the Vietnamese stage of the Heli Tour we have noticed a high interest among potential customers and have managed to reach a number of important agreements,' said Andrey Boginskiy, Director General of the Russian Helicopters Holding Company.

The newest civilian helicopters Ansat and Mi-171A2 were also presented to potential customers of Thailand during the South Asian Heli Tour. The event at the U-Tapao airfield included flight display of Russian-made rotorcraft.

Moreover, during the presentation the Holding's specialists introduced key benefits of Mi-171A2 and Ansat helicopters, as well as the system of after-sales support, to the Thai operators.

'The Holding Company is striving to reinforce business relations with commercial and state customers in Thailand. The first deliveries of Ka-32A11BC helicopters to this country are scheduled by the end of the year; also, the potential operators show interest in Ansat and Mi-8/17 rotorcraft in various modifications, thus we believe, that showcasing our helicopters here is perfectly timed', noted Andrey Boginskiy, Director General of Russian Helicopters Holding Company.

Russian-made rotorcraft receive high praise from state and commercial customers in the Southeast Asia. Thus, Thailand is successfully operating the Mi-17V-5 medium utility helicopters.

'The Southeast Asia including Thailand is a strategic region of presence for Rostec where we intend to actively develop cooperation in various spheres. Helicopter industry is one of the most perspective areas of interaction. Such events as this demonstration tour are aimed not only at showcasing the benefits of our helicopters but also at strengthening our relations with the key partners in the region', noted Anatoly Serdyukov, Industrial Director of the aviation cluster of Rostec.

The Holding Company is also establishing a service center in this country. A Memorandum of Intent was signed with DATAGATE Company in February 2018. Fields of cooperation mentioned in this document include assistance in establishing the MRO center for Russian-made helicopters in the Kingdom of Thailand. The MRO center is expected to perform all types of scheduled maintenance and repair works, troubleshooting and replacement of components.

The final stop on the tour was a presentation in Kuala Lumpur, the capital of Malaysia. The Russian helicopters made demonstration flights over the Sepang F1 International Circuit Formula 1 track, and the holding's experts told guests about the key competitive advantages of the Mi-171A2 and Ansat and presented the after-sales service program.

The Ansat and Mi-171A2 went on demonstration tour of Southeast Asian countries after Airshow China, where they took part in the flight program. The helicopters covered almost 5,000 kilometers. In total, more than a thousand guests from state and commercial helicopter operators visited the flight shows. The helicopters exhibited their flight characteristics and their efficiency of use in high temperatures and humidity close to 100%. This fact was repeatedly noted by operators in the region during demonstration flights.

'The applications received over the month of our demo tour to supply of over 70 Russian helicopters worth more than half a billion dollars to the countries of the Asia-Pacific region over the next three years are vivid evidence of the competitiveness and relevance of Russian civilian helicopter technology abroad, a logical result of comprehensive government measures to support Russian civil export to world markets,' said Russian Industry and Trade Minister Denis Manturov.

'These are both hard and soft contracts. For example, in China, a contract was signed for 20 Ansat helicopters for the Association of Disaster Medicine of China. The remaining 50 helicopters are planned for delivery to Vietnam, Cambodia, Thailand and Malaysia,' said Russian Helicopters CEO Andrey Boginsky.

According to Boginsky, demand for civilian helicopters in Southeast Asian countries may amount to 420 helicopters in the next ten years. 'We are counting on a substantial share of this market, and the results of the demo tour suggest that we have every reason for this,' Boginsky said.

'Southeast Asia is one of the world's fastest growing industrial and financial regions. The demand for civilian helicopters in the countries of the region could amount to 420 helicopters over the next decade,' said Anatoly Serdyukov, Rostec's Aviation Cluster Industrial Director. 'It is strategically important for Rostec to strengthen its positions here in the helicopter industry. The agreements and arrangements reached in the framework of the demo-tour are the best confirmation of the potential of our machines.'

Ansat is a lightweight twin-engine multipurpose helicopter that can be used for the transport of goods and passengers, surveillance, search and rescue, and fire and medical evacuation operations. It has the largest cabin in its class of helicopters, and the cabin easily and quickly transforms to the configuration necessary. Ansat is certified for use in hot climates.

The Mi-171A2 is a mid-class multipurpose helicopter that combines the unique operating experience of Mi-8/17 helicopters with the latest developments of the holding. It can be used effectively and safely day or night, in high mountains, at low or high temperatures, high humidity and over water. **/IA&TG/**

SUCCESSFUL LAUNCH

Two space carrier rockets (CR) were launched on 4th of April: at 14:01 Moscow time from the launch pad of the Baikonur cosmodrome and headed toward the ISS Soyuz-2.1a with the transport cargo vehicle Progress MS-11, and Soyuz-ST-B was launched from the Guiana Space Center with the Fregat-MT upper stage rocket and four O3b communication satellites at 20:03 Moscow time. In both cases, the RD-107A/RD-108A serial production engines of PJSC Kuznetsov, installed on the CR, functioned successfully.

The Progress MS-11 transport spacecraft docked to the Pirs module of the International Space Station at 17:22 Moscow time, thus becoming the fastest spacecraft in the history of flights to the ISS: only 3 hours and 21 minutes passed from launch to docking. Previously, the title of record holder belonged to Progress MS-09, which in July of 2018 docked with the ISS in 3 hours 40 minutes after launching from Baikonur.

The Progress MS-11 ship delivered over 2.5 tons of various cargoes to the station: more than 1.4 tons of dry cargo, 900 kg of fuel, 420 kg of water in storage tanks, and also 47 kg of compressed air and oxygen in cylinders. In the packing of the cargo compartment contained scientific equipment, components for the life support system, as well as containers with food products, clothing, medicines and personal care products for crew members.

Having successfully launched from the Guiana Space Center, Soyuz-ST-B carrier rockets launched four European O3b telecommunications spacecraft to the calculated orbits, which will add to the large-scale homonymic constellation of satellites. There are now 16 such satellites in orbit, they provide high-speed mobile and fixed communications to residents of remote and developing regions.

We remind that the operation of Samara built rockets and engines from the Guiana Space Center began in October 2011. The launch of Soyuz-ST-B carrier rockets with RD-107A/RD-108A engines from the Kourou cosmodrome became the twenty-second in a row.

Equipment Supply

Rostec Electronics holding of Rostec State Corporation had created a matrix of high-speed switches with a control driver for the European Space Agency. The equipment was intended for use in near-earth orbit space radars. The new development was one and a half times cheaper than foreign analogues and surpasses them in a number of technical specifications.

The matrix allowed the radar to switch to either transmitting or receiving a signal. The device was designed on request of the Italian supplier of the European Space Agency. Customers had the need to create a new version of radar – cheaper than existing versions with equal technical parameters.

The development of Rostec was one and a half times cheaper than its foreign counterparts, and surpassed them in some characteristics. Thus, the total loss was not more than 0.3 dB, and the total isolation (signal suppression between certain inputs or outputs of the device) was not less than 60 dB. At the same time, the device was more compact and weighs less.

'Rostec State Corporation created a wide range of high-technology science-intensive products, which were in demand not only in Russia, but also abroad. The interest of the European Space Agency once again confirmed that our developments met the highest international standards. Deliveries of a new matrix for space radars were carried out within the framework of the national project 'International cooperation and export'. In the new radar model, our production matrix will replace expensive foreign analogues. Devices with such characteristics will be used in the civilian field for the first time', said Oleg Evtushenko, executive director of the Rostec State Corporation.

Earlier, Ruselectronics holding supplied ferrite products to the Center for space applications of government of India. The materials supplied were used as part of ultra high frequency devices for space satellites.

Shvabe Revived Telescopes

Novosibirsk located factory of Shvabe holding of Rostec State Corporation was preparing for a serial production of Newton's telescopes. These were the exact replicas of the original reflector created by the great scientist in 1668.

The idea of recreating the classic Isaac Newton's reflecting telescope originated in 2008, when thousands of scientists and amateur astronomers came to the capital of Siberia aiming to see the total solar eclipse on August the 1st. Then the specialists of the Novosibirsk Instrument-Making Plant (IMP), which is part of the Shvabe Holding, released a limited batch of optical instruments for observing stars as memorable souvenirs.

TAL-35 – is the exact copy of the historical original. The only difference is in the image quality. If Newton used a polished bronze plate for reflection, the replica is equipped with an optical mirror processed by aluminium plating. Thus, despite being a purpose made souvenir, these telescopes can be used for observations.

'The souvenirs turned out to be so popular that the first batch was sold out almost immediately, and from 2010 the IMP continued production of its occasional copies – on individual order. At the end of last year, we decided to start full-scale production, which we planed to launch in spring. In doing so, we were guided not only by the popularity of TAL-35 as souvenir products, but also by the fact that teaching in astronomy was resumed in schools of Russia, the homeland of space explorers and great astronomical discoveries, a discipline that forms the mindset of creators and winners. We are confident that Newton's telescopes were the first step in big science for many young people', said Vasily Rassokhin, general director of the IMP.

The first telescope lens was created by Galileo Galilei in 1609 which is considered to be a refractor telescope. Poor image quality encouraged astronomers to constantly modify the device. They found that the image quality increased with increase of focal length of the eyepiece, which led, in turn, to an increase in the size of telescopes – some reached a length of 50-60 meters. In the mid-1660s, Isaac Newton proved that the cause of poor image quality is chromatism, which can be eliminated if a spherical mirror is used instead of convex lenses. Newton introduced his telescope in 1668, which was only 15 cm long and earned him worldwide fame.

MILITARY EQUIPMENT AT FAMEX

Rosoboronexport, a member of Rostec, was setting up a joint Russian exposition at the Mexico Aerospace Fair FAMEX-2019 which was taking place at AFB 1 in Santa Lucia, Mexico, on April 24-27.

'Rosoboronexport took consistent steps to strengthen its positions in Latin America. Here people are well aware of and appreciate Russian aviation, helicopter and automotive equipment for outstanding performance and reliability. We were going to keep cooperating with Latin American countries to the extent of supplying the whole range of military products, including modern Russian weapons, advanced drones, AD platforms and ammunition among them. In a number of states in the region we already demonstrated our expertise in construction of aftersales infrastructure to maintain supplied equipment and train personnel. We were open to any opportunity in the area,' said Director General Alexander Mikheev of Rosoboronexport.

FAMEX has been conducted under auspices of Mexico's Ministry of National Defense since 2015. This year saw Rosoboronexport for the second time at the event.

The joint expo included the booths of Rosoboronexport (No. 121 in Hall C) and Russian Helicopters (No. 118 in Hall D) displaying over 200 pieces of military equipment. Additionally, a delegation of the Irkut Corp. demonstrated its products.

Rosoboronexport believed that the most promising future faced the Yak-130 combat-trainer and MiG-29M multirole frontline fighter. Other platforms that had everything there was to pique the interest of foreign customers are the Mi-17V-5 and Mi-171Sh military transport helicopters, Mi-35M attack helicopter with troop-carrying capacity, Mi-28NE and Ka-52 gunships, as well as Ka-226T light multipurpose helicopter.

There was definite export potential in the Orlan-E, Orlan-10E, and Takhion unmanned aircraft systems, as well as AD systems, namely Pantsir-S1 gun-missile system, Viking and Buk-M2E SAMs, and Verba and Igla-S MANPADS.

Besides, the interest in military assets and gear for agencies fighting crime, terrorism and drug mafia was very much alive in the region. Thus, Rosoboronexport expected the BTR-80A/82A personnel carrier, assorted small arms and grenade launchers, Tigr-M and Typhoon vehicles, which had already gained popularity in the region, to gather crowds of regional specialists as well.

FAMEX 2019 also saw various Russian Comprehensive Security solutions suitable for large sports and cultural events, aerial and off-shore regulation, control of large municipalities, administrative entities and facilities.

Monitoring the State of Runway Strips

Ruselectronics holding of Rostec State Corporation began preliminary tests of the complex for measuring the adhesion coefficient of the airfield pavement to aircraft chassis. The equipment facilitates quick preparation of the airfield for operation and prevents the aircraft from rolling out of the runway strip. The cost of the complex is several times lower than of its foreign analogues currently used at Russian civilian airports.

The automated complex is a two-wheeled device with a control unit that is towed along the runway at different speeds. The device measures the braking force of the wheels and registers the adhesion coefficient to the surface. Data on the state of surface is transmitted to the operator in automatic mode.

'Mass production of the complex is scheduled to start on the fourth quarter of 2019. The equipment enables responding to changes in timely manner to the runway strip conditions, which then ensures the safety of aircraft take-off and landing. Such equipment is essential for safe operation of all aerodromes. Nowadays for these purposes, civilian airports mainly use foreign technological equipment or domestic equipment from the 1970-s. The development of our specialists from Ruselectronics is about 5 times cheaper than their foreign counterparts, and provides higher reading accuracy', commented Rostekh's executive director Oleg Evtushenko.

It was recalled that Rostec created earlier a modern airfield complex SP-2010 for landing an aircraft in adverse weather conditions at any time of the day. Resonator antennas and other know-hows were used in the newest digital complex, thanks to which moisture, precipitation and icing no longer affect its operation. SP-2010 is the best in the world for a number of characteristics.

VK-2500 in China

The type certificate of the helicopter turboshaft engine VK-2500, designed and produced by the Saint Petersburg company UEC-Klimov (part of the United Engine Corporation (UEC) of the Rostec State Corporation), was validated in China. After that the powerplant could be used in Russian-made civilian helicopters in China, which allowed to geographically expand the sales and operation of Russian Mi and Ka helicopters.

The validation process of the VK-2500 engine was carried out in close cooperation between the Chinese aviation authorities and the Russian Mil Moscow Helicopter Plant (part of the Russian Helicopters holding company of Rostec) and the Russian Federal Air Transport Agency. This was the first occasion in 19 years when The Civil Aviation Administration of China has certified a Russian helicopter engine. UEC's next step was to certify the VK-2500PS-03 engine for helicopters in China as well as to validate the type certificate of VK-2500PS-03 in India, South Korea, Brazil and Mexico.

'China is one of Rostec's traditional cooperation partners in the fields of both military and civilian technology, and helicopters are one of the most important parts of this cooperation. In 2017, UEC presented a modernization project of Chinese helicopters aimed at replacing the TVZ-117 engine to the more advanced VK-2500, which sparked significant interest of the helicopter operators. Last year, demonstration flights of the Mi-171 helicopter equipped with VK-2500 engines were held in the Chinese city of Lijiang. The Ministry of Emergency Situations and Civil Aviation Administration of China highly appreciated the capabilities of the helicopter for cargo transportation and extinguishing high altitude fires. The successful validation of the VK-2500 type certificate allowed us to start the modernization project of Russian helicopters in China', noted the Aviation Cluster Industrial Director of the Rostec, Anatoly Serdyukov.

VK-2500 has been designed to replace the TVZ-117 helicopter engine. It has three different modifications within the take-off power range of 2000 – 2400 hp. The powerplant introduces a digital integrated automatic control system (ACS) instead of analog one, advanced sensors, operating hours and monitoring counter and better construction materials. This provides better performance indicators, such as increased power in emergency flight modes, temperature control in a wider range of outdoor conditions and higher service life. VK-2500 gives fundamentally new possibilities for helicopter operations in high-mountain regions and regions with hot climate.

Today, UEC is increasing production rates of VK-2500 engines to meet the needs of state and export contractors. The engines are exclusively assembled from Russian components.

MC-21-300 certification flights

MC-21-300 aircraft completed the flight test program and flew from Irkutsk to Ulyanovsk, where it was painted according to production technologies.

On February 2, flight test experts of the European Union Aviation Safety Agency (EASA) completed the first flight session of the MC-21-300 certification program.

During the certification tests, the behavior of MC-21-300 aircraft was evaluated in various modes, including high angles of attack and stalling. Flights duration from 2.5 to 4 hours were performed at altitudes from 3 to 10 km.

Aircraft was piloted by EASA test pilot. Test pilot of the Yakovlev Design Bureau (a branch of Irkut Corporation) monitored the performance of flight modes. Flight crew also included Russian and EASA flight test engineers to analyze current flight parameters. In September 2018, EASA test crew completed a special course in theoretical and practical training, as a result of which they obtained permission to fly on MC-21-300 aircraft.

On March 16, 2019, the maiden flight of the third MC-21-300 test aircraft took place at the airfield of Irkutsk Aviation Plant, the affiliate of Irkut Corporation (a UAC member).

The duration of flight was 1 hour 30 minutes at an altitude of 3500 meters at a speed of up to 450 km / h.

The plane was piloted by the crew of Andrey Voropayev and Roman Taskaev test pilots. According to the crew report, the task was performed completely, the flight was in normal mode.

Minister of Industry and Trade of the Russian Federation Denis Manturov said: 'MC-21-300 flight tests continue. Today the third aircraft joined to them. On this plane, in addition to special testing equipment, a passenger cabin was installed'.

According to Denis Manturov, it was decided to hold the premiere public debut of the MC-21-300 aircraft with a passenger interior at the Moscow international aviation and space salon MAKS-2019. 'This allowed us to visually demonstrate to potential customers and future passengers one of the most important competitive advantages of the Russian airliner – an increased level of comfort,' – mentioned the Minister of Industry and Trade.

Yuri Slyusar, President of UAC and Irkut Corporation, added that in 2019 the fourth MC-21-300 prototype, built at the Irkutsk Aviation Plant, should join the flight tests. 'Airplanes are built on new automated lines that provide high precision and quality of assembly,' – said Yuri Slyusar.

Finally, on April 27, 2019 MC-21-300 test aircraft, equipped with a passenger cabin made the non-stop flight from Irkutsk to Ulyanovsk Vostochny airport.

In Ulyanovsk, MC-21-300 aircraft was painted according to production technologies, and then flew to Ramenskoye airport (Zhukovsky, Moscow region) to continue flight tests. The aircraft was piloted by a crew of Hero of Russia, honored test pilot Roman Taskaev and 1st class test pilot Vasily Sevastyanov. Roman Taskayev said: 'The flight was in normal mode, without complaint'.

Ulyanovsk enterprises are the largest participants of the MC-21 program. Aviastar-SP Plant produces fuselage panels, empennage and many other units for MC-21-300 aircraft.

AeroComposit-Ulyanovsk Company produces the wing made of composite materials. The painting of MC-21-300 aircraft was conducted by the Ulyanovsk company Spektr-Avia. The enterprises participating in the MC-21 program underwent technical re-equipment.

The President of UAC Yuri Slyusar said: 'The Irkutsk aviation plant has completed the assembly and systems installation of the fourth MC-21-300 flight test aircraft. Joining the third and fourth aircraft to flight tests increased intensity of the certification program.'

ATTACK AND MULTI-PURPOSE HELICOPTERS

Rosoboronexport, a member of Rostec, was expecting the interest in Russia's military helicopters to spike in the wake of the International Helicopter Industry Exhibition HeliRussia 2019 which was taking place at Crocus Expo, Moscow, on May 16-18.

'We were facing a growing demand for attack helicopters in the helicopter market on a global scale. Rosoboronexport responded to this in a timely manner, figured out its major parameters and now offers to the customers the most advanced designs proven in combat, Ka-52 and Mi-28NE. Besides the dynamic was on the rise in the utility sector, where we had the Ansat and Ka-226T to offer. For production of the latter we had set up a joint venture with India's HAL,' noted Director General of Rosoboronexport Alexander Mikheev.

At the exhibition, Rosoboronexport offered its customers Russian helicopters suitable for any task regardless of weather conditions. The company's booth advertised helicopters of all classes, required in the world market, as well as UAV systems.

Apart from attack and utility helicopters, other types boasting high export potential included combat-transport, military transport and transport Mi-35P, Mi-35M, Mi-17V-5, Mi-171Sh, and Mi-26T2. They owed their popularity to the outstanding combat and operational performance, demonstrated in combat during anti-terrorist operations conducted by the Russian military.

Combat and transport capabilities of Russian helicopters made them unique in many ways. Deployed in almost all regions of the world, they had proven to be suitable for operation in hard-to-access mountainous zones notorious for height variation and temperature fluctuation, as well as tropics and dusty environs.

Rosoboronexport's list of partners included 70-plus states in the Middle East, Asia Pacific, Latin America, Africa, the CIS, and Europe. The company delivered helicopters to army, anti-terrorist, and special purpose units, as well as law enforcement and emergency agencies in foreign countries.

Direct supplies to the customers being Rosoboronexport's major activity, the company also offered technological partnership options, construction of service centers and facilities for training of pilots and maintainers. Similar infrastructure projects had already been commissioned in a number of countries.

INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES IN 2019

In 2019

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'RA&MG' №01 (32)	February 12th	**IDEX 2019 / NAVDEX 2019** (17-21.02.2019, UAE, Abu Dhabi)
'RA&MG' №02 (33)	February 15th	**AERO INDIA 2019** (20-24.02.2019, India, Bangalore)
'RA&MG' №03 (34)	March 24th	**LIMA 2019** (26-30.03.2019, Malaysia, Langkawi)
'RA&MG' №04 (35)	April 01th	**LAAD 2019** (02-05.04.2019, Brazil, Rio de Janeiro)
'RA&MG' №05 (36)	April 01th	**IDEF 2019** (30.04-03.05.2019, Turkey, Istanbul)
'RA&MG' №06 (37)	May 12th	**IMDEX ASIA 2019** (14-16.05.2019, Singapore)
'RA&MG' №07 (38)	May 14th	**SITDEF 2019** (16-19.05.2019, Peru, Lima)
'RA&MG' №08 (39)	June 16th	**Paris Air Show 2019 Le Bourget** (17-23.06.2019, France, Paris)
'RA&MG' №09 (40)	June 24th	**ARMY 2019** (25-30.06.2019, Russia, Moscow)
'RA&MG' №10 (41)	July 01th	**IMDS-2019** (10-14.07.2019, Russia, Saint Petersburg)
'RA&MG' №11 (42)	August 27th	**MAKS-2019** (27.08-01.09.2019, Russia, Moscow)
'RA&MG' №12 (43)	September 16th	**AVIATION EXPO CHINA 2019** (18-20.09.2019, China, Beijing)
'RA&MG' №13 (44)	October 01th	**INMEX SMM India 2019** (03-05.10.2019, India, Mumbai)
'RA&MG' №14 (45)	October 13th	**SEOUL ADEX 2019** (15-20.10.2019, Korea, Seoul)
'RA&MG' №15 (46)	October 28th	**BIDEC 2019** (28-30.10.2019, Bahrain, Manama)
'RA&MG' №16 (47)	November 02th	**Defense & Security 2019** (04-07.11.2019, Thailand, Bangkok)
'RA&MG' №17 (48)	November 16th	**Dubai Airshow 2019** (17-21.11.2019, UAE, Dubai)
'RA&MG' №18 (49)	December 08th	**Gulf Defense & Aerospace 2019** (10-12.12.2019, Kuwait, Al Kuwait)

The 'Russian Aviation & Military Guide' is English-language international magazine distributed all over the world.

The 'Russian Aviation & Military Guide' magazine subscription can be ordered after any issue of the magazine with the delivery anywhere in the world. The price of any one issue of the magazine is $8,88 plus the cost of postal delivery.
Send your requests for invoicing for the subscription at the address ramg@ramg.info or rus.avia.military@gmail.com. The number of copies, period of the subscription, the address for invoicing and for delivery and your contacts, including information about the person who pays for the subscription, should be in the request.

The editing office send only paid subscription.

doc@promweekly.ru
promweekly@promweekly.ru
www.promweekly.ru
www.ramg.info

Media postal address:
Moscow, Russia, 123104, mailbox 29, Industrial Edition

AT A NEW LEVEL

MAKS 2019

Organizers

MINPROMTORG RUSSIA

Rostec

MOSCOW • ZHUKOVSKY • **AUGUST, 27–SEPTEMBER, 1**