INTERNATIONAL AEROSPACE & TECHNOLOGY GUIDE

Special analytical export project of Industrial Weekly

10 (17) November 2017

MAKS-2017
Good development of aircraft engineering

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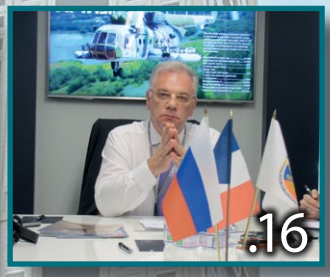
FSMTS of Russia
Solutions for a wide range of tasks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MC-21 in the sky
The test program continues successfully

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World exclusive
Unique system for rescue from any height


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The best aviation innovations for Middle East

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EDITORIAL

Good real perspectives

Aerospace technologies is developing very actively. Experience in the supply of Russian technology to the many countries (include in the Middle East and the Persian Gulf) confirms its high quality and reliability. Today efficiency and reliability are the main criteria. This is especially important given the difficult situation on the world stage. Threat of local conflicts to be evolved into global ones, the failure of the global system of safety and non-ending crisis.

But together with developing of technologies in order to secure people's safety, rivalry among sellers of aerospace systems increases in order to achieve such goals as increasing profits and market share.

World experience shows that it is not about how many airplane you have, but quality and possibilities of every single one of them is what leads to victory on the different fields. 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 technology, solid after-sales service and proven reliability of products, Russia is honest and friendly partner for many countries, ready for mutual work. At the the **Dubai Airshow** 2017 Russia and other great aerospace countries again represents their best products, prepared for use in this region.

Valeriy Stolnikov

AIR DEFENCE RECEIVED PANTSYR-S1

Air defence units located in Saratov region received Pantsyr-S1 air defence systems Crews of the Central MD air defence formation have returned to permanent locations in the Saratov region. They have received Pantsyr-S1 air defence systems in course of the State Defence Order in the Astrakhan region. The units received the hardware in mid-September at the Ashuluk range. The troops had conducted independent, group, and massive firing at day—and nighttime. The servicemen engaged targets, which imitated maneuvering air targets. The Panstyr-S1 systems are to put on combat alert this year.

RUSSIA-BELARUS AIRBORNE EXERCISE

Snipers of the Russian Airborne troops and Belarus Forces of Special Operation will engage an indicated enemy at the Strugi Krasnye firing ground striking the targets at a range of more than 2,000 meters. During the training, the Russian and Belarusian paratroopers covered by machine-gun detachments are to destroy and incapacitate more than 200 targets in a short period of time including those imitating high-precision surveillance systems of the indicated enemy. The sniper live-fire exercise will be held in day and night conditions with the usage of modern high-precision electro-optical guidance and spotting equipment. Long-range fire will be conducted using 12.7 mm guns with different types of ammunition. During the drills the engaged units will use standard communication, reconnaissance, weapon systems and special hardware. In total, the Russia-Belarus tactic drills will involve more than 1,000 troops and more than 200 pieces of military and special hardware from the both countries.

MI-26 HELICOPTERS FOR DEFENCE MINISTRY

Russian Defence Ministry is to update Mi-26 helicopters in course of the state rearmament programme. This was stated by the Deputy Defence Minister Yuri Borisov after his visit to Rosvertol company in Rostov-on-Don. According to the Deputy Defence Minister Yuri Borisov, implementation of this plan has been included into the state rearmament programme. Mi-26 helicopters have the highest lifting capacities in the world. They are used for transportation of Airborne units and large hardware. The helicopters can be used in course of transportation, evacuation, and fire-fighting operations.

Certification trials of K-62

Russian Helicopters Holding (part of Rostec State Corporation) intends to commence certification trials of the bleeding-edge helicopter Ka-62 early in 2018. The trials are to be completed within two years, following which the machine will be available for commercial use.

Progress Aresenyev Aviation Company has by now produced two flight models. The first one has already undergone in-plant tests in May 2017. According to the testing programme, Ka-62 has already performed the first circuit-circling at 110 km/h for 15 minutes. The test pilots of JSC Kamov, the principle principal of Ka-62, have tested its overall operating performance, main energy supply systems, airborne equipment and power unit. The second flight model has been unveiled to the Russian and foreign audiences at the third Eastern Economic Forum.

'We continue preparing Ka-62 helicopter for mass production. We will conduct a series of ground and flight certification trials, following which we will offer the model to the market. This will be a state-of-the-art hi-tech helicopter, which I believe is bound to enjoy a good demand on the market,' said Andrei Boginsky, the CEO of Russian Helicopters.

Moreover, a third flight model of helicopter Ka-62 is scheduled for the development in 2018.

Helicopter Ka-62 is designed for the passenger carriage, offshore works, emergency medical aid, search and rescue, conveyance of cargo inside the cabin and as suspended load, patrolling and environmental monitoring. The high operating ceiling and high power loading of its engines enable Ka-62 to perform search-and-rescue and evacuation works in mountainous areas.

Ka-62 was made of the most advanced polymeric composite materials (PCM). The amount of PCM in the helicopter was brought to

60% in weight, which allowed reducing the weight of the empty machine, consequently increasing its speed, manoeuvrability and lifting capacity, as well as reduce fuel consumption. The helicopter stands out with perfect aerodynamic lines of the airframe, high capacity of the cargo and passenger cabin, and the tricycle landing gear with tail support.

UEC and AECC CAE

The United Engine Corporation (UEC, part of Rostec State Corporation), as part of Aviation Expo China 2017, has signed a memorandum with the Chinese company AECC Commercial Aircraft Engine Co., Ltd. (AECC CAE). The Memorandum determines the objectives and main principles of interaction in the joint development of a gas turbine engine for a prospective long range wide-body aircraft (LRWBA/C929).

Under the Memorandum, the primary objectives of the program for creating an engine for the LRWBA will include engaging in joint research and competitive analysis, defining the potential customers' requirements to the engine, forming the appearance of the engine, and determining its basic technical parameters.

'The signing of the Memorandum on the development of the engine for the LRWBA is a milestone for the civil aviation of Russia and China. It's not just a matter of being competitive, it is a matter of technological independence for our countries,' said Sergey Chemezov, CEO of Rostec State Corporation. 'Our ultimate goal is the creation of our own powerful world-class engine certified in accordance with the highest international standards.'

The UEC has previously started to develop a high-thrust civil engine PD-35 for prospective wide-body long-haul aircraft. There is currently research and development groundwork under way under the PD-35 program in order to bring the degree of its development up to level 6 that will allow implementing research and development work as a whole with minimal technical risk. During the implementation of the PD-35 project, the scientific and technical groundwork carried out during the development of the new Russian PD-14 engine for aircraft MS-21-300 will be widely used.

'The Memorandum of interaction in the joint development of a gas turbine engine for a prospective long range wide-body aircraft defines the basic principles and tasks of Rusaian and Chinese parties within the framework of the project,' said Denis Manturov, Minister of Trade and Industry of Russian Federation. 'In general the project is carried out according to the agreed schedule — the start of engine test is scheduled for 2022, its certification for 2027.'

AECC CAE is part of the Aero Engine Corporation of China, created in 2016, and is engaged in the development, manufacture and maintenance of civil gas turbine engines. The UEC is working closely with AECC and its divisions.

HIGH-PRECISION WEAPONS IN RUSSIA AND IN THE WORLD

ВЫСОКОТОЧНОЕ ОРУЖИЕ в России и в мире

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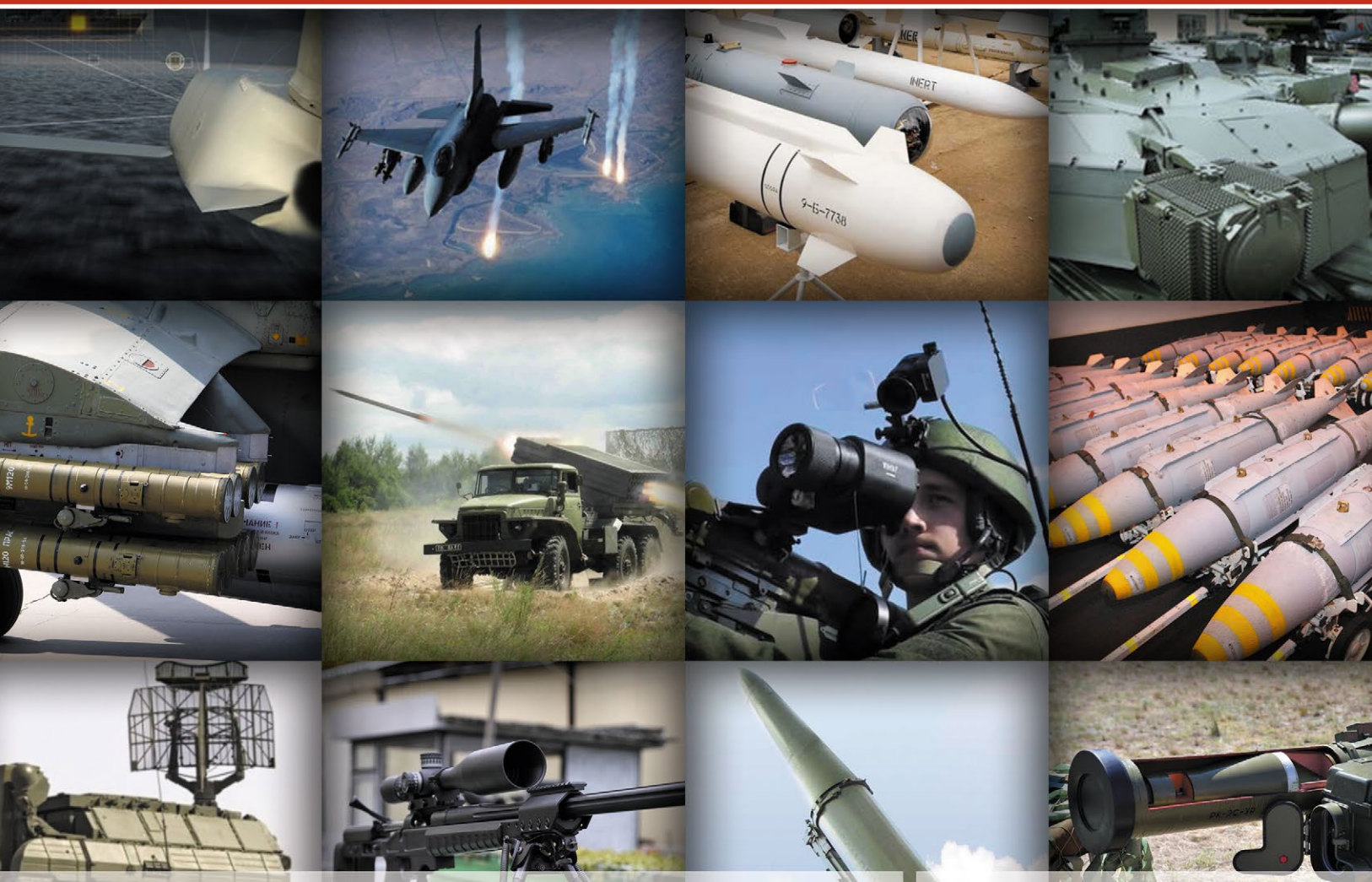

"United Industrial Edition" preparing to publish a new quarterly international research project dedicated to the development, creation, production, delivery, maintenance and use in the armed forces of various types of precision weapons. The publication of the bilingual (Russian and English), addressed to professionals, creators and operators of high-precision weapons. Distribution is by subscription.

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SECURITY IN MIDDLE EAST

The Russian Defence Minister General of the Army Sergei Shoigu and the King of Saudi Arabia Salman bin Abdulaziz Al Saud discussed issues of regional security in the Middle East in course of their meeting in Moscow. According to Sergei Shoigu, Russian military department paid much attention to development of bilateral cooperation between two countries in military and military-technical fields. 'I suppose that issues of regional security in the Middle East could be discussed in course of the meeting. Today, cohesion of the international community in fighting against international terrorism is required,' stressed the Russian Defence Minister. 'I hope that out meeting will promote strengthening of friendship between armed forces of two countries,' stated Sergei Shoigu.

TARIFFS AND TARGET INFLATION

At the meeting of the Government Russian Minister of Economic Development presented Social and Economic Outlook for 2018-2020 years. Russia's Social and Economic Outlook 2018-2020 is in general approved by the Government, said the head of the Ministry of Economic Development Maxim Oreshkin during the briefing on the outcomes of the Cabinet meeting. Maxim Oreshkin: Among the recent changes that were made at the meeting of the Government related to clarifying the latest economic trends, it is, first and foremost, a reduction in the inflation rate to 3.2% for this year. This was certainly included into the Outlook. In addition, there were changes caused by a slightly higher oil price over this year and a slightly stronger Ruble reflecting the actual trends of the last month. The forecast takes into account, among other things, an increase in the rate of economic growth for the three-year period, which we have already mentioned and which is stimulated by industrious activities of the Government in implementing changes in different fields including investment support and launch of a variety of priority projects.

Major Forest Fire in China

The Mi-26Ts helicopter produced by Russian Helicopters (part of the Rostec State Corporation) supplied to China in the summer of 2016 extinguished a major forest fire near Dzianide, in Zhejiang province, Republic of China. The Ka-32 helicopter of the local fire station was also involved in the operation. The fire was extinguished within several hours.

The fire occurred 60 km from a settlement in a mountainous area, therefore, access for ground transport was hampered. The Mi-26Ts and Ka-32 helicopters promptly flew to the fire site and threw more than 250 tons of water on the fire. Within several hours, the fire was fully extinguished. The neighbouring settlements did not suffer.

'We are happy that our equipment performed commendably in the emergency situation. China has traditionally demonstrated interest in Russian fire fighting helicopters, and the experience has shown that this choice is justified in actual operational conditions,' said Alexander Shcherbinin, Deputy CEO for marketing and business development, Russian Helicopters.

Mi-26Ts (certified according to the flight standards of China) is the world's heaviest serially produced helicopter. It can carry the total maximum payload of up to 20 tons in the transport cabin or on the external sling. The helicopter has proven its efficiency during suppression of major fire spots in the PRC on numerous occasions. The main objective of Mi-26Ts in emergency response is to deliver special-purpose machinery and fire brigades to the fire point and throw water on the burning forested area.

Ka-32A11BC is a medium multi-role coaxial helicopter designed for complicated fire suppression assignments, search and rescue operations, evacuation of patients and injured persons and patrolling and support of operations of intelligence services. The fire fighting Ka-32A11BC has more than 40 fire fighting equipment options, including Bambi-Bucket and Simplex systems, water cannons for horizontal fire suppression.

At present, the State Forestry Administration of China operates four Mi-26Ts and 15 Ka-32A11BC helicopters. They serve successfully and take part in forest fire fighting every year.

Russian-Chinese Long Range Aircraft

Technodinamika holding (part of Rostec State Corporation) has been shortlisted as a candidate to supply systems and components for Russian-Chinese long range wide-body CR929 aircraft. The final selection of suppliers of systems will begin before the end of 2017.

Under the competition, Technodinamika plans to focus on the development of landing gears, air conditioning, fire protection and oxygen equipment systems. Moreover, the holding offers electrical systems, cabin air pressure, secondary cooling, fuel and de-icing systems to include in the project for building the aircraft.

Technodinamika is expected to have an opportunity to develop the equipment in cooperation with a number of Russian and foreign companies under the project. All the critical systems and components will be created at the holding's own facilities.

'CR 929 is one of the key projects in the field of civil aircraft construction both for Russia and for China. Rostec takes an active part in it,' said the CEO of Rostec State Corporation Sergey Chemezov. — 'The entry of Technodinamika into the number of potential suppliers for CR 929 once again confirms the strong position of our holding in the production of components for the aviation industry.'

In 2016, Technodinamika holding was announced as the winner of an open contest of the Ministry of Industry and Trade and was awarded a contract for research and development on eight systems for the project of the long range wide-body aircraft. The value of the contract amounted to 250 million rubles.

On September 29, during an official ceremony in Shanghai, the aircraft was named CR929, where the letters C and R stand for China and Russia. The project of the aircraft is developed by the United Aircraft Corporation in cooperation with the Chinese Commercial Aircraft Corporation of China. The China-Russia Commercial Aircraft International Corporation (CRAIC) enterprise will function as the operator of the program.

In September 2017, United Engine Corporation (UEC, part of Rostec State Corporation) signed a memorandum with the Chinese company AECC Commercial Aircraft Engine Co., Ltd. (AECC CAE). The Memorandum defines the tasks and the main principles of interaction during the joint development of a gas turbine engine for a future long range wide-body aircraft (LRWBA).

ARMY INTERNATIONAL MILITARY-TECHNICAL FORUM 'ARMY-2018'

International military-technical forum 'ARMY-2018'

August 21-26, 2018

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Four issues: 'First day', 'Second day', 'Third day', 'Fourth day'

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THE ECONOMY IS ALREADY STABLE

Maxim Oreshkin, Russian Minister of Economic Development, held a meeting of the Executive Committee of the Foreign Investment Advisory Council (FIAC) to sum up the year results of the Council WGs and discuss topical issues that would be reviewed at FIAC plenary session attended by Russian PM Dmitry Medvedev. 'The key indicators now demonstrate that the economy is already stable, while inflation rate is easing at 3.3%, the latest data say. In the next three years, economic growth rate is expected to be no less than 2%, with inflation rate being at the target level estimated by the Bank of Russia,' he said. Maxim Oreshkin compared the current situation in the Russian economy to that moment of the U.S. economy in the first half of the 1980s, when the country had had low and steady inflation rate, which opened the doors for a positive credit cycle that lasted 27 years. 'The overall debt burden in the Russian economy is very low and the credit cycle can be expected to be long. The Government and the Central Bank of Russia are tasked to ensure that the credit cycle is supportive of economic growth. This suggests sharper focus on corporate and investment lending and developing financial instruments such as mortgage loans,' he said.

COOPERATION AGREEMENT AT EXPORT-IMPORT

On September a memorandum of understanding was signed between EXIAR (part of the Russian Export Center Group) and the Export-Import Bank of Korea (KEXIM). The document was signed at the Eastern Economic Forum by Alexey Tyupanov, Executive Director of the REC Group and CEO of EXIAR, and Hong Young-Pyo, Acting Chairman and President of KEXIM. The document sets out plans for the organizations to work together on long-term projects, and set up information and staff exchange programs. This agreement with the Export-Import Bank of Korea marks a significant step forward in our efforts to establish cooperation channels with the world's biggest ECAs. South Korea is one of the Asia Pacific's leading economies. On top of that, it is an export-oriented economy, with a focus on growing production of high-tech products. I firmly believe that by working together on projects, we will be building an environment conducive to the expansion of non-commodity exports, which will in turn have a wider positive effect on subsequent economic cooperation between our countries.

Mi-35M for Mali

Russian Helicopters holding company produced two Mi-35M transport/attack helicopter for Mali under Rosoboronexport-related contract. Aircraft and all property necessary for their operation is delivered to the customer.

'Performance of the contract on Mi-35M delivery to our Mali partners once again confirms that the holding company holds a leading position in the world market of attack helicopters. I am sure that successful implementation of this order will result in growing demand for Russian helicopters in the region,' said Russian Helicopters CEO Andrey Boginsky.

'I am confident that the helicopters we delivered will help Mali to protect its sovereignty and fight against the universal threat of terrorism. I also would like to mention that the supply of Russian Mi-35M helicopters is another significant contribution to the development of military and technical cooperation between our two countries, which in recent years has demonstrated a good upward trend,' said Rosoboronexport CEO Alexander Mikheyev.

Mi-35M is the world's only universal attack helicopter, which in addition to effective performance of fire missions is able to transport up to 8 soldiers with weapons, up to 1,500 kg of ammunition or other cargo inside the cabin, and up to 2400 kg of cargo on external sling; evacuate those who are wounded; deliver technical staff to the autonomous deploying sites.

The firepower of the Mi-35M is by 140% higher than that of its main competitors in the market due to a significant mass of equipment payload. Helicopter's unguided missile and missile-gun armament is 30% more powerful than that of competitors, which allows it to carry out air support for troops on the battlefield more effectively.

Due to the fact that the helicopter can be used in combat 24/7 in any weather conditions, it can perform combat tasks on aviation support of ground forces accordingly.

The helicopter demonstrates impressive high-altitude performance and is able to take off and land on concrete and ground sites located at altitudes up to 4000 m above sea level. In addition, effective design solutions used in Mi-35 allow to use this Russian helicopter in many physiographic regions and climates, including in the mountains, at temperatures from -50°C to +50°C, and humidity up to 98%.

JSC Russian Helicopters (part of Rostec State Corporation) is one of the world leaders in helicopter industry, the only developer and manufacturer of helicopters in Russia. The holding company was established in 2007. The head office is located in Moscow. The holding company is comprised of five helicopter plants, two design bureaus, enterprises for production and maintenance of components, aircraft repair plants and a service company providing after-sales support in Russia and abroad. Among the buyers of the holding company's products are the Defense Ministry of Russia, the Ministry of Internal Affairs of Russia, EMERCOM of Russia, and other state customers, Gazprom Avia and UTair airlines, as well as major Russian and foreign companies. In 2016, the revenue of Russian Helicopters under IFRS amounted to RUB 214.3 billion, its shipments totaled to 189 helicopters.

'Production Line 2020'

Concern Kalashnikov, a member of the Rostec State Corporation, presented the 'Production Line 2020' by introducing Industry 4.0 business processes in this production area. The purpose of the project was to reflect the changes that occur in the industry as influenced by information technologies.

One of the monitoring and management tools are VR technologies that combined the data of various systems into a single cabinet — now the head of the production line can obtain full information on the processes even remotely.

'Concern Kalashnikov is a clear embodiment of the Russian industry's success. We can positively expect that the proceeds of the Kalashnikov Group will be about 40 billion rubles this year. Today the concern has gone far beyond the limits of manufacturing the world-beating machine guns: apart from AK-12 and AK-15, sniper rifles, sports and hunting rifles Kalashnikov builds motor boats, motorcycles and unmanned aerial vehicles. Today was saw a pilot project on the road to introducing Industry 4.0 at our plants and factories. And the first step was made here, in Izhevsk. I am sure that this experience will be positive, and in the future we will be able to apply it at other large production facilities,' said General Director of the Rostec State Corporation Sergey Chemezov.

In the nearest future additional artificial intelligence-based technologies will be introduced to allow not only to manage current contingencies, but also to materially anticipate them.

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BEST CARGO CHARTER AIRLINE

Volga-Dnepr Airlines has won the coveted 'Best Cargo Charter Airline' award in The BACA Excellence Awards 2017, voted for by members of BACA – the Air Charter Association. A 'global voice' of the air charter industry, BACA was founded in 1949 by members of the Baltic Mercantile and Shipping Exchange to bring to aircraft chartering the same standards of integrity and professionalism for which the Baltic Exchange and the Institute of Chartered Shipbrokers have for so long been known and respected.

Alexander Kraynov, Charter Commercial Director of Volga-Dnepr Airlines, was presented with the award by Transvalair's representative at the Association's annual Autumn Luncheon at the Guildhall in London. The event was attended by hundreds of senior executives from the aviation and air charter sectors, representing some 130 companies.

BACA members also voted for their Passenger Charter Airline of the Year, Aircraft Manufacturer of the Year, and Handling Agent/FBO of the Year. This is the seventh time Volga-Dnepr Airlines has won BACA's 'Best Cargo Charter Airline' trophy since the awards began.

Commenting on this latest accolade, Alexander Kraynov said: "BACA, the Air Charter Association, is so highly respected because of the quality and calibre of its membership and for its important role in representing the air charter industry. That makes winning this award very special to us because the members who voted for Volga-Dnepr are among the world's most experienced and knowledgeable air charter professionals. They are clearly best-placed to judge the quality of airline performance."

Richard Mumford, BACA's Chairman, said: "Volga-Dnepr was fully deserving of the award for the Best Cargo Charter Airline. Members of BACA report that they consistently deliver a strong and reliable service, handling complex projects with a high degree of professionalism."

This was the second award presented to Volga-Dnepr Airlines in October for service excellence. It was also voted 'Charter Operator of the Year' by a panel of leading air cargo industry executives in the annual Payload Asia Awards 2017, presented in Singapore. The award was judged on each nominated company's market leadership, operational performance, unique service and production innovations, and key factors differentiating it from its competitors. The 2017 judging panel included senior executives from Boeing, Airbus, IATA, the Association of Asia Pacific Airlines, Lufthansa Cargo, DHL Global Forwarding and The International Air Cargo Association.

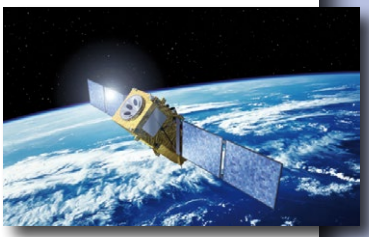
Satellite Navigation in Armenia

Russian specialists will participate in building the infrastructure for satellite navigation in Armenia. This provision is contained in the letter of intent signed in Yerevan during the second International Forum of Eurasian Partnership. Pursuant to the agreement, the parties intend to deploy an infrastructure in Armenia to ensure the functioning of equipment for calling the emergency services similar to the Russian ERA-GLONASS system.

The specialists will also develop and improve promising navigation and information technologies based on deployable infrastructure. According to the agreement, there will be built authorized centres for the sale, installation and testing of equipment and qualified staff training.

'The Russian Federation and the Republic of Armenia are interested in building harmonised navigation and information systems based on the GLONASS satellite navigation technology', commented General Director of JSC GLONASS Andrey Zheregelya.

General Director of NIIMA PROGRESS Vasily Shpak noted that as of today there is more than 1 million vehicles equipped with emergency calling units registered in the ERA-GLONASS system. Possessing a high technology capacity, ERA-GLONASS is an eco-environment allowing to create and implement new products and services.



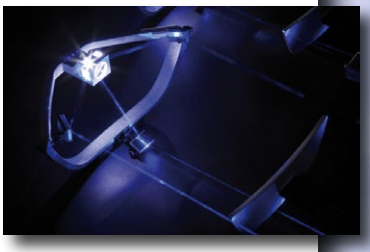
Test Bench for Laser System

The Shvabe Holding Company, a member of the Rostec State Corporation, has developed and manufactured an interference test bench for control of extra-axial aspheric lenses with a light aperture of 600 mm in diameter for a high-energy laser system. The equipment has no comparable counterparts in the world.

The bench has been developed by specialists of Shvabe's member, Scientific Production Association Optika (NPO Optika). It ensures precision measuring of various technical parameters of extra-axial aspheric components with a light aperture of 600 mm in diameter.

'The development allows to quickly adjust the geometry shaping of lenses used for building a high-energy laser system. This system is designed for various researches in the field of physics. It guarantees manufacturing of components with the required precision features,' states General Director of NPO Optika Sergey Kuznetsov.

The new bench manufactured by Shvabe allows to measure wave deviations generated by lenses and determine their extra-axial parameter. At the same time, the equipment is capable of analyzing point images generated by components in real time mode.



For Recognize

Elbrus computers will be equipped with a passport and other standardized document recognition system developed by Smart Engines (Russia). PJSC Research Institute for Control Computers named after I.S. Bruk (included in Roselektronika holding) transferred system to the basic workstation Elbrus 101-PC.

Smart Engines presented the document recognition system in 2016. It's construction is based on superfast neural networks. Thanks to this system, Elbrus 101-PC can recognize identification documents used in Russia and more than 35 other countries and machine-readable zones on any documents (passports, ID cards and visas). The system can recognize such Russian documents as passports, insurance cards, driving licenses, vehicle registration certificates, visas and birth certificates.

This functionality makes it possible to use Elbrus 101-PC computers to organize compact workplaces for employees engaged in data input from questionnaires, applications, various forms and other standard documents. Elbrus 101-PC computers can be used at security checkpoints and services fixing parking and driving violations. This solution enables to find and recognize one or several car numbers with a height of symbols of at least 10 pixels.

ОПК РФ

СПЕЦИАЛЬНЫЙ ИНФОРМАЦИОННО-АНАЛИТИЧЕСКИЙ ПРОЕКТ

ОБОРОННО-ПРОМЫШЛЕННЫЙ КОМПЛЕКС РФ

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MAIN AVIATION TOPICS

Yuri Slyusar, President of United Aircraft Corporation (UAC) and Irkut Corporation, held working meeting at Irkutsk Aviation Plant, dedicated to implementation of plant's major programs.

While evaluating the second stage of MC-21 factory finishing tests, Yuri Slyusar said: 'The aircraft undergoes tests successfully, in accordance with the schedule. We gradually expand operational envelope in altitude, speed, and weight. Recently, the aircraft has reached the altitude of 10 000 meters and speed of 900 km/h. For today, the aircraft confirms to all declared characteristics.'

Currently, four MC-21-300 test aircraft are under construction. Till the end of this year, the second aircraft is planned to be transferred to the Flight Test Facility of the plant. During working meeting, the progress of military programs of Irkut Corporation was also discussed. Yuri Slyusar expressed confidence that all this-year contract obligations on aircraft deliveries to the Russia's MOD and foreign Customers would be timely implemented. The plans on future state and export orders for Su-30SM, Yak-130, Yak-152 aircraft were also discussed at the meeting.

In conclusion, President of United Aircraft Corporation (UAC) and Irkut Corporation noted that currently Irkutsk Aviation Plant is facing the complicated task of organizing serial production of MC-21 aircraft, together with rotating production tempo of military products. That is why, Yuri Slyusar stressed, it is important to implement programs directed to retention of professional cadre at the plant. In particular, United Aircraft Corporation develops housing program, which envisions that successful plant's employees may obtain 50% subsidies for purchasing ready-made housing.

Ansat to Mexico

Russian Helicopters held negotiations with the Mexican company Craft Avia Center for the sale and maintenance of Ansat helicopters on the Mexican market. Today, the Russian helicopters fleet in Mexico includes about 50 vehicles of Mi-8/17 series, and two Mi-26 helicopters.

As of today, Craft Avia Center has submitted an application to the aviation authorities of Mexico for validation of the Russian flight certificate for Ansat. Besides, Craft Avia Center has commenced construction of a service centre with a total floor area of 4,000 m2 and a show room for sale of Russian helicopters.

Dmitry Lelikov, Deputy General Director of the Rostec State Corporation, and General Director of the Russian Helicopters holding company Andrey Boginsky have held negotiations with the General Director of Craft Avia Centre José de Vicente. During the negotiations the issues of potential demand for Russian civil helicopters on the Mexican market, as well as the issues of obtaining the Mexican certificate for the Ansat helicopter were discussed.

'Craft Avia Center applied to us with an offer for distribution of Ansat helicopters on the Mexican market. We have already prepared and sent them our commercial proposal for supply of one vehicle that will be used for purposes of demonstration to potential buyers. As of today, our

proposal is being reviewed by the counterparty and we hope that in the nearest future we will reach the stage of contract signing,' stated General Director of the Russian Helicopters holding company Andrey Boginsky.

Own Cloud Platform

The Ruselectronics holding company has presented ECP Veil (Enterprise Cloud Platform) at the largest North European technology exhibition Teknologia 17 that was held in Helsinki.

ECP Veil platform developed by the Research Institute Mashtab, a member of Ruselectronics, allows to virtually combine the resources of an entire IT infrastructure of a company into a single computation centre, thus ensuring the possibility of creating converged and hyperconverged systems. ECP Veil is designed for building a virtualised infrastructure based on multi-purpose x86-84 server platforms.

Research Institute Mashtab established in 1991 based on the Leningrad Scientific Production Association Krasnaya Zarya has developed and put into operation the high profile networks of national standing, completed more than 70 research and development projects dedicated to the respective systems and equipment, communication devices and systems, hardware/firmware platforms and software solutions for purposes of increasing the defensive potential of the country and ensuring national security.

Mashtab is the leading research institute specialized in developing scientific and industrial telecommunication solutions of dual and civil use for the Rostec State Corporation.

Research Institute Mashtab develops and commercially manufactures routers, network firewalls, service platforms and solutions, solutions for virtualisation of telecommunication and IT infrastructures, network system diagnostics, monitoring and control.

Mobile Maintenance System

Rosoboronexport transferred to Venezuela a mobile system designed to provide maintenance, current and medium repair of the ground force weapons and military equipment. As noted by Sergey Goreslavsky, Deputy Director General of Rosoboronexport, this system is the first of its kind delivered abroad by Russia.

'With the mobile maintenance system delivered to Venezuela Rosoboronexport discovers a new segment of the worldwide weapon market. For today, Russia can offer packages equipped with modern automated hardware and software systems. They allow users to obtain information on the equipment condition in real time, to plan its maintenance and repair in the field, to keep the electronic logbook of military equipment, to automatically generate applications for spare parts,' he said.

The main part of the system requires only 25 days for its complete deployment on a prepared soil or hard stand, after that the system can work effectively. All parts of the mobile maintenance system are adapted for transportation by rail, water and road over all distances without any losses of their operational readiness after transportation.

‘GK LAUNCH SERVICES’

Within the frameworks of implementation of the strategy to develop commercial potential of the Russian space industry and in accordance with ROSCOSMOS decision, Joint Stock Company GLAVKOSMOS (a part of State Space Corporation ROSCOSMOS) and Limited Liability Company International Space Company Kosmotras (KOSMOTRAS) established a Joint Stock Company ‘GK Launch Services’. This new Russian entity will become an operator of commercial launch services for satellites with the use of Soyuz family launch vehicles and the launchers developed on the basis of RS-20 rockets from the Russian launch sites. GLAVKOSMOS owns 75% and KOSMOTRAS – 25% of the new company’s stock.

Establishment of GK Launch Services is driven by new challenges on the launch services market, and creates a new level of public-private partnership for business in space domain. Combined efforts of GLAVKOSMOS and KOSMOTRAS will give an impetus to the promotion of Russian launch vehicles on the international market. Bringing together unique expertise and resources of the two companies will significantly expand a scope of the launch services offered and thus enable orbital injection of various types of spacecraft with the mass ranging from 1 kg to 6 metric tons into the most popular orbits. This also meets an increasing demand in the segment of commercial space projects dealing with development and launch of small class satellite constellations and individual spacecraft.

According to Alexander Serkin, CEO of GK Launch Services, creation of a dedicated company will facilitate strengthening the positions of Russia on the international market and increase the workload of the Russian launch sites. The GLAVKOSMOS and KOSMOTRAS cooperation will enhance competiveness of products and services of the Russian space industry, first of all, through optimization of launch costs and shorter timelines of the launch projects implementation.

JSC GLAVKOSMOS is an enterprise of ROSCOSMOS State Space Corporation (the only shareholder) with the key objectives to promote the Russian space industry capabilities on the world market and to manage challenging space projects. During more than 30 years of its history, GLAVKOSMOS has successfully implemented 120 international contracts. Launches of more than 20 small satellites have been carried out since 2012. In 2017, the company plans to launch more than 100 small satellites for 15 foreign and Russian customers under the existing contracts. GLAVKOSMOS is an operator of Soyuz-2 commercial launches and a coordinator of ROSCOSMOS international projects. Spacecraft for the following customers have been launched on Soyuz-2 launch vehicles to date: Skybox Imaging, Norwegian Space Center, UTIAS SFL, SSTL, UK Space Agency, and DLR. The company’s wide range of activities includes integrated solutions in creating satellite systems of various applications, turnkey solutions for Earth observation, telecommunications, space research and exploration, provision of Earth observation data from the Russian satellite constellation, as well as export of Russian space equipment. It is also responsible for coordination of Russian enterprises activities for Soyuz-ST commercial launches in the Guiana Space Center. Among partners and customers of GLAVKOSMOS are NASA, Arianespace, Great Wall China and other private companies, as well as Russian and European universities.

International Space Company KOSMOTRAS

LLC (a Joint Stock Company until August 2016; from then on — a Limited Liability Company) was established in 1997 under the Russian law. The company’s head office is located in Moscow, Russia. KOSMOTRAS is a launch service provider offering launches of converted RS-20 rockets on international and domestic markets. The rocket is capable of delivering payloads with the mass of up to 2 metric tons into LEO. These payloads are launched either in dedicated missions or as part of cluster (multiple small satellites) launches. Since the inaugural mission in April 1999, KOSMOTRAS has carried out 22 commercial launches lofting 128 payloads into orbit for 37 customers from 28 countries. Among KOSMOTRAS’ customers are major aerospace companies and space agencies such as ESA, CNES, JAXA, KARI, EIAST, KACST, NEC, Airbus Defence and Space, MDA, SSTL, SSC, as well as universities and private companies. /RA&MG/

DEVELOPMENT OF AIRCRAFT ENGINEERING

During The 13th International Aviation and Space Salon MAKS-2017 the President of Russia Vladimir Putin chaired a meeting on the development of civil aircraft engineering. This meeting can be considered a milestone for the Russian aircraft industry in General.

Aviation for Russia is not only one of the branches of the industry. It is the embodiment of national pride. International Aviation and Space Salon MAKS is one of the largest aerospace trade fairs in the world. Some 700 Russian and 180 foreign corporations and companies from 36 countries were taking part in MAKS-2017. At the opening ceremony of the 13th International Aviation and Space Salon MAKS-2017 President of Russia Vladimir Putin said:

'This is an anniversary year for MAKS. It was first held 25 years ago, back in 1992. Since then it has established itself as a high-profile event, but we all know that this recognition did not come right away. Building on the persistence and talent of its organisers and with comprehensive support from the state, MAKS has definitely reached new highs, becoming an anticipated event for all those interested in aerospace technology.

Russians have always taken a keen interest in the development of aviation technology and space exploration. It has to be said that this is an important element of our shared culture, and the history of Russian cosmonautics and aviation is a matter of national pride, and rightly so. We are proud of the outstanding achievements by prominent engineers Sergei Korolev, Nikolai Polikarpov, Pavel Sukhoi, Andrei Tupolev and Sergei Ilyushin. Our goal today is to build on the traditions they established.

Over the next few days, Zhukovsky, Moscow Region, will be hosting a large exhibition where leading

Russian and foreign companies will present their products, conferences and workshops will be held on matters that are currently relevant for the industry, and where a number of talks are scheduled to take place and major contracts to be signed.

We hope that all this activity will help step up industrial cooperation, foster international ties and promote Russian products on the domestic and foreign markets. We have much to offer. In recent years the aerospace industry benefited from substantial government support: its production assets underwent substantial upgrades, projects to create new, competitive civilian aircraft are underway, including the Ka-62 helicopter and the MC-21 aircraft.

Let me also note that Russia retains its leadership in military aircraft, as well as missile and space manufacturing. We will continue developing these sectors. Of course, I have to say a few words about the flying displays, which is one of the most spectacular parts of the MAKS Salon. The show will feature the best Russian and foreign pilot groups, whose mastery is not just respected but admired.'

'I would like to note that the industry is currently receiving substantial support. Last year alone, almost 52 billion rubles were allocated for these purposes under the Aviation Industry Development programme, and there are plans to allocate 60 billion in 2017.'

Vladimir Putin

At the Meeting on the development of civil aircraft engineering Vladimir Putin said: 'Our meeting is taking place as part of the International Aviation and Space Salon MAKS-2017. I think this is a good venue for discussing the development of civil aircraft engineering. Incidentally, it is not the first time we are doing this. We have just seen the latest designs from Russia's leading producers of aviation and missile space technology. I must say the Russian companies' potential is enormous and should be used in full.

For Russia the construction of competitive aircraft is one of the key conditions for easing access to remote regions and making air travel more comfortable. For such a vast country as Russia with its, let's be honest, poorly developed infrastructure, which has proved difficult to improve even during all the previous years of its history, considering the limitless expanses of Eastern Siberia and the Far East. However, it is vital to use modern technology to consolidate the country and make every corner equally accessible to every person regardless of his or her place of residence. People should be able to move easily and freely throughout the country, travel to our major

industrial and cultural centres and return in the same easy and free way.

It is also important in this context to increase the production of high-tech, science-intensive products and promote the development of the entire national economy. Finally, this is a matter of the state's technological prestige.

I would like to note that the industry is currently receiving substantial support. Last year alone, almost 52 billion rubles were allocated for these purposes under the Aviation Industry Development programme, and there are plans to allocate 60 billion in 2017.

These measures are yielding positive results. Last year, civil aircraft production grew by 21 percent on 2015. This is a good indicator.

At the same time, I am confident that the national aviation industry has the required technological and human potential for long-term growth, for strengthening its positions on the domestic and global markets.

We have mastered batch production of regional airliners. We have just seen the Sukhoi Superjet here. Other promising projects are being implemented involving civil aircraft that can compete with foreign equivalents, including the new Ka-62 helicopter and the MC-21 passenger airliner. We have seen the Ansat helicopter today. There are other highly promising and interesting aircraft, and demand for them will undoubtedly soar in the future.

Today, we will discuss various measures making it possible to support these projects and to address the entire industry's tasks.

I would like to focus on the following.

First, the MC-21, which I have already mentioned, is currently undergoing flight tests. Today, I would like to hear how these tests are proceeding, to discuss the current aircraft certification stage and preparations to launch batch production of this airliner. I would like to focus on the aircraft's certification, and I would like to note technical issues that we know about. Everything must proceed smoothly in this area.

Second, as you know, the United Instrument Manufacturing Corporation is expected to diversify and expand civil output. This also concerns the defence industry's aircraft enterprises.

Helicopter deliveries under defence procurement contracts will

'For Russia the construction of competitive aircraft is one of the key conditions for easing access to remote regions and making air travel more comfortable. For such a vast country as Russia with its, let's be honest, poorly developed infrastructure, which has proved difficult to improve even during all the previous years of its history, considering the limitless expanses of Eastern Siberia and the Far East.'

Vladimir Putin

soon peak. The Defence Ministry has already reduced its orders under these contracts. It is high time that we ponder ways to guarantee that the production capacities are utilised by creating demand from civilian customers. This should be done without delay. Among other things, Russian oil and gas companies, and other state-owned companies could play their part. They buy quite a few helicopters abroad. I believe that this has to change, as we have discussed with the heads of Russian companies. They should opt for Russian equipment, of course on the condition that it offers the same level or even better quality compared to similar imports. I think that this matter should be included in the agenda of the Government Import Substitution Commission.

Moving on, I would like to emphasise once again our intention to expand the market share of Russian aviation equipment on the domestic and international markets. For that, it is essential not only to improve its quality and reliability, but also to develop after-sales maintenance services. By the way this is also an issue for the defence industry: we need warehouses, spare parts, training, and we need to open service centres. We all know that those who are able to ensure after-sales maintenance, guarantee timely repairs and promptly deliver parts stay on top of the competition. Today we will discuss how this work is organised, and what is there to do for ensuring effective maintenance of Russian aircraft.'

/RA&MG/

SOLUTIONS FOR A WIDE RANGE OF TASKS

Dmitry Shugaev: 'The countries of the Middle East and North Africa altogether make up almost 50% of Russian total defense exports'

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 Shugayev, 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.

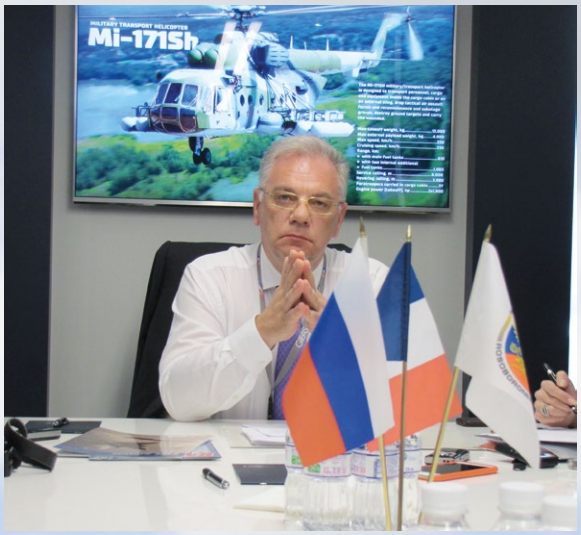
Federal Service for Military-Technical Cooperation is an agency that controls and supervises all the activities related to military-technical cooperation and issues licenses. From strategic point of view the FSMTC of Russia plays the role of government policy 'conductor' in the field of military-technical 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 last year our defense exports exceeded $15 bln. The major part of this export is 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



'The countries of the Middle East and North Africa are our time-tested partners in various fields including the military-technical one. Therefore, they have been using almost all types of Russian military purpose products. Armored machinery, aviation equipment, air-defense systems and naval equipment of Russian (Soviet) origin are in high demand in this region. And in all the above mentioned directions we cooperate closely.

Russian weapons and military equipment have made a good showing in the world. Today experts state that our weapons are: first, highly technological; second, proving their 'mission survivability'. In addition, it is relatively easy to maintain our weapons. Combination of the above mentioned factors explains why our products are so popular in the world. At the same time today we offer the best value for money in the global market. This is recognized by many, including our competitors. Therefore, I state it proudly and not for the sake of advertising, but because it is common knowledge.

products (MPP) is a very specific market having cyclic nature. A number of factors should be taken into account, including modernization programs of defense ministries, financial solvency of countries that in its turn depends on their general economic health. Therefore, defense exports can hardly be expected to soar. Russia is aimed at building long-term relationships that will provide for sustainable growth of our 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 is the share of the Middle East and North Africa in Russian defense exports and the country's export order portfolio? What military and defense equipment is in demand among the countries of the region?

– The countries of the Middle East and North Africa altogether make up almost 50% of Russian total defense exports, which is a considerable share. Our country's military- and dual purpose products are traditionally in great demand with the countries of the region. We are totally satisfied with the current state of our military-

technical cooperation with these countries as well as with the pace at which we are moving forward. As for specific types of equipment that are popular with our partners in the Middle East and North Africa one cannot but mention armor materiel, air defense means, anti-tank missile systems and small arms.

– What main competitive advantages does Russian equipment have in terms of its operational capabilities in this region?

– No doubt, the main competitive advantage of the Russian equipment, from the point of view of any foreign customer, is its quality-price ratio. As for its operation in the countries of the Middle East and North Africa I will add another important factor highly assessed by our partners after many years of usage. This is high efficiency and excellent capabilities of our weapons and equipment in extreme climatic conditions. I believe these two major advantages altogether make our military purpose products so popular with regional customers.

– How long have Russia and the countries of the Middle East and North Africa been cooperating in the military-technical field?

– We have been developing military-technical cooperation with the countries of the region since the middle of the 20th century, that is for more than 50 years. Symbolically enough, the inception of interaction in the military-technical field with the countries of the Middle East and North Africa coincided with the period when our system of military-technical cooperation was established. For our regional partners it was the time they obtained independence. Thereafter our cooperation in the military-technical sphere has developed steadily and in a constructive manner.

– What can the Russian Federation offer today to the countries of the Middle East and North Africa in this regard?

– At present, some operators of our military equipment in the region are facing the necessity to repair and modernize the equipment produced in the USSR and supplied earlier. I can say with full confidence that all those products, as well as the Russian origin military equipment, have considerable potential for renovation. As an example, there are several large-scale projects on repair of domestic armored materiel and air defense systems under implementation that are quite successful. Our country is ready to offer a comprehensive service program of maintenance, repair and upgrade of our military products according to the highest quality standards.

– What current offers of the Russian aircraft equipment and other defense solutions, according to experts of FSMTC of Russia, are more promising for the countries of this region?

– Long-term experience of successful cooperation with the countries of the Middle East and North Africa and the relationship of trust at bilateral level give us a strong cause for optimism about the future of military-technical cooperation with these countries.

Armor materiel, air defense systems and aviation equipment are traditionally in demand here because they enable our partners to optimize the protection of special infrastructural objects, which is of paramount importance.

However the need for a more integrated approach to the issues of national security amid security challenges and looming threats compels the countries of the Middle East and North Africa to actively diversify and modernize their national Armed Forces. Therefore, we consider the regional market a promising one for a wide range of military purpose products.

– Is Russia ready to consider JVs in the countries of the Middle East? Is there any existing positive experience of such cooperation?

– A number of our partners from the countries of the Middle East and North Africa show interest in establishing joint ventures (JVs). The Russian Federation is ready to consider different models of cooperation, including various forms of JV. Some projects are already under implementation. We hope that they will be successfully fulfilled to further promote cooperation between the Russian Federation with the countries of the region.

– There is much discussion about the positive influence the operation of Russian Air Force in Syria has had on Russian defense exports. Please, if you can, name any particular type of equipment that has been ordered by a foreign customer due to its successful implementation in Syria?

– Since the very start of the Russian Air and Space Forces counterterrorist operation in Syria, the demand among foreign customers for the Russian military-purpose products has significantly increased. At the same time one has to realize that signing a contract is a time-consuming multi-phased process with lots of preparatory work to be accomplished before a deal can materialize.

We are having a busy time marketing the systems that are successfully used in Syria. You might be aware that S-300 and S-400 air defense systems, Pantsyr S-1 surface-to-air missile and anti-aircraft artillery weapon system, Kornet-E antitank guided missile system and other air-launched weapons are in the top wishing-list of our customers. Of course, the increased popularity of these weapons is to an extent due to their successful performance in Syria.

– Some of the systems used in Syria are the ones that have gone through comprehensive modernization with their performance substantially increased…

– Modernization of arms and military equipment produced in the USSR is a full-fledged area of military-technical cooperation of our country with its foreign partners. Competition with Eastern Europe, CIS and China has recently become rather tense. Nevertheless, the countries that use our equipment should well understand that high quality work on improving performance and ensuring safety of defense equipment can be only carried out by certified enterprises and under the supervision of Russian experts in relevant fields. At present Su-24 and MiG-29 aircraft, Mi-8 and Mi-24 type helicopters, T-72 tanks and BMP-1 infantry combat vehicles are being successfully overhauled and modernized in the region.

– What can you say about Russian Safe City Project and its defense export prospects?

Well, Defense Ministries and their various agencies remain major customers of the Russian military equipment in the region. And there is no surprise about it since they require our state-of-the art systems to successfully carry out their basic function which is to protect their countries' sovereignty and territorial integrity.

At the same time, there is growing interest in the military-purpose products from the Ministries of Internal Affairs and other security agencies. Despite the fact that so far it has been limited to procurement of small arms we hope that our cooperation with these agencies can turn out mutually beneficial and fruitful.

As for the Safe City, we have made our presentations and respective proposals to partners. Some of them have expressed much interest in the project. Still at this stage it is too premature to talk of any specific contracts on the Safe City.

– Are the countries of the region interested in producing Russian equipment under license and establishing joint ventures for maintaining and servicing Russian equipment on-site?

– It is no secret that many countries of the Middle East and North Africa are seeking to advance their defense industry. And, to our satisfaction, they consider Russia as a qualified and reliable partner that can help them do it.

Taking into account the volumes of equipment supplied to the armed forces of the region, Russia is pretty much interested in launching service centers for our equipment here. At present, we are exploring a number of projects on aviation and armor materiel, as well as air defense systems maintenance centers. Hopefully we will soon come up with some mutually beneficial solutions.

As for license production of Russian military equipment, we proceed from the premise that at first partners have to procure large consignments of finished products. Only after that we can start a reasonable discussion of production under license.

We have been developing military-technical cooperation with the countries of the region from the middle of the 20th century, that is for more than 50 years. Symbolically enough, the inception of interaction in the military-technical field with the countries of the Middle East and North Africa coincided with the period when our system of military-technical cooperation was established. For our regional partners it was the time they obtained independence. Thereafter our cooperation in the military-technical sphere has developed steadily and in a constructive manner.

– Is Russia open today for new cooperation ties?

– Yes, we are open to new partnerships and we understand that this is the trend. Of course, the approach 'buy it as it is or search for it elsewhere' is becoming obsolete. Naturally, sales of the final product is our main priority, but our partners increasingly aim at building their national manufacturing facilities to develop their industries.

The relationship with partners within the pattern 'end products only' is being gradually replaced by comprehensive cooperation in the field of high-technology products. And we are ready for this kind of cooperation as a country that has built its own defense industry. We are ready for cooperation and we will help our partners to create systems they need today.

– Can you give any particular examples worldwide?

– A case in point is the joint venture to manufacture Ka-226T helicopter, which is registered in India in accordance with appropriate intergovernmental agreement. It will start its active work soon. Another example of technological cooperation is BrahMos joint venture established in India.

In addition, the establishment of a chain of maintenance stations in Latin America, in particular, in Peru and in Brazil can be invoked here too. We have a lot of cooperation projects with Chinese companies etc.

Therefore, our foreign partners can be sure that we are ready for technological cooperation based on many years of experience and strong reputation of Russian weapons in the world.

– Is it really strong?

– Yes, it is. Russian weapons and military equipment have made a good showing in the world. Today experts state that our weapons are: first, highly technological; and, second, proving their 'mission survivability'. In addition, it is relatively easy to maintain our weapons. Combination of the above mentioned factors explains why our products are so popular in the world.

At the same time today we offer the best value for money in the global market. This is recognized by everybody, including our competitors. I state this proudly and not for the purpose of advertising, because it is not only our opinion, but assessments of experts of the global market of military purpose products.

As for license production of Russian military equipment, we proceed from the premise that at first partners have to procure large consignments of finished products. Only after that we can start a reasonable discussion of production under license.

– And did Soviet equipment prove its high efficiency?

– Yes, it did. And it is still doing so. For example, Vietnam has been our partner in the field of military-technical cooperation for a long time for one reason only: Vietnamese army uses soviet military equipment for decades and is satisfied with it and with Russian products supplied in replacement of older soviet equipment.

– Does it ring true amid the evidently growing competition in the weapon market…

– We live in the real world and we clearly understand that competition is strong. Russian manufacturers take into account the trends of the global military equipment market.

Today Russia is a manufacturer of a large number of advanced and very expensive weapons, including some most innovative pieces. But this is not to say that we shall offer exclusive solutions only. Russia is aimed at active expansion of its niches in the global market participating in many international tenders for both state-of-the art weapons and traditional products. This stimulates national industry to manufacture the best products at most competitive prices.

– During the Saudi monarch's recent official visit to Russia the two countries reached agreement on such Russian weapons S-400, TOS-1A, AK-103, AGS-30, Kornet-EM). Is Russia open to technology transfer or is it just about finished products supplies?

– Yes, our countries have agreed on supplies of S-400 «Triumph» anti-missile defense system, TOS-1A anti-tank guided weapon system, Kornet-EM anti-tank guided missile system, as well as AGS-30 and AK-103. At present we are discussing the practical implementation of the agreements reached. And, to our full satisfaction, talks are proceeding in an utterly constructive and open manner.

– What is impact (if any) of sanctions of some Western countries on the MTC of Russia with foreign countries?

– Sanctions is a bad notion in principle, they contradict the logic of free market per se. Suffice it to say that WTO, of which Russia is a member, upholds freedom from any restrictions. Unfortunately, many international institutions intended to strengthen mutually beneficial cooperation are failing today. And in this particular case we are witnessing politically motivated and absolutely unjustified discrimination. However, being realists, we have to work and find solutions.

There is also a downside of the medal for European companies that are forced to follow the sanctions. It is not only that they are bearing considerable losses as a result of this. It will also be extremely difficult for them to return to the Russian market after the sanctions are lifted. Perhaps, it will be even impossible as all the niches they used to have already been taken by their rivals.

Our partners complain that they have a kind of a 'fatigue' about the sanctions. Everybody understands that this should be stopped, because nobody gains from it. We shall see how things turn out. The Russian Federation has never shut any doors or burnt down bridges. We take the situation in a pragmatic and unimpassioned way.

– So we are still to see who suffered from the sanctions more, aren't we?

– Those who lost the Russian market have suffered most. In a longer term our industry can gain from sanctions. Russian manufacturers due to the imports substitution program and new cooperation ties are at minimum risk of contractors refusing to supply parts or equipment because of some politically motivated reasons. They are not at risk of having to delay supply dates or to negotiate new conditions with their customers. If a MPP is manufactured completely within the country, it is a guarantee for its national army that everything will be done in a time. And it is a big competitive advantage in the opinion of foreign customers. **/RA&MG/**

KA-52 TO TEST NEW MISSILE WEAPON

'Russian Helicopters' Holding Company together with the Russian Ministry of Defence will conduct tests of the newest guided missiles on Ka-52 ship-based reconnaissance and combat helicopter. Specialists of the Holding Company will also test on-board equipment and armament of the helicopter for their resistance to electromagnetic fields.

Currently, the tests are performed on four Ka-52K prototypes. One of the helicopters is being prepared for tests to evaluate the resistance of avionics and air weapons to external electromagnetic fields. The second helicopter undergoes preliminary tests at the airfield, and on the third helicopter a new inertial navigation system is tested.

The fourth Ka-52K prototype is at the testing site of the Rusian Ministry of Defence, it is planned to test new guided missile weapons on this helicopter.

'Ka-52K helicopters are going through the final stages of the tests, and the Holding Company is ready to start serial production of this helicopter in the near future. We note interest of the Russian ministry of Defence in this helicopter. The design of the helicopter allows it to be placed on the decks of frigates, anti-submarine destroyers and the Admiral Kuznetsov aircraft carrier. Moreover, the Ministry of Defence made a decision to develop Russian helicopter carriers,' Andrey Boginsky, CEO of Russian Helicopters Holding Company, noted.

During tests Ka-52 helicopter was significantly improved. The helicopter was equipped with the state-of-the-art target sight systems and weapon control systems, combat survivability of the helicopter was enhanced and autonomous deployment system was improved. These modifications provided the Ka-52K with a range of competitive advantages as compared to the similar helicopters of foreign production.

Ka-52K helicopter is the next product in the range of sea helicopters designed by Kamov Design Bureau. The helicopter is designed for patrolling, fire support of assault forces when landing, performing anti-airborne defence missions on the forefront and in tactical depth, under any weather conditions and at any time of day or night. State-of-the-art on-board equipment ensures helicopter navigation in conditions with no visual references at sea.

Ka-52K helicopter differs from the baseline model by availability of a shortened folded wing, which was upgraded for the installation of heavy weapons, and a blade-folding mechanism, which ensures its compact arrangement inside a ship's hold. Reduced dimensions of Ka-52 shipborne helicopters allow increasing the number of helicopters located on a ship to maximum. Armored cockpit and unique ejection system provide pilots with the maximum safety level, which cannot be ensured on any helicopter of this class produced abroad.

Another important feature of the Ka-52K is the use of corrosion resistant materials, which is conditioned by the necessity of helicopter's operation in conditions of humid marine climate. The helicopter is equipped with a single-point refueling and a modernized air conditioning system ensuring ventilation of sea rescue suits of the crew members. In addition, the helicopter is equipped with short-range radiotechnical navigation system, which was not used on the baseline model. /RA&MG/

The MiG-35 main features are the following:
– the fifth generation information-sighting systems integration into aircraft airborne avionics;
– possibility of advanced Russian and foreign origin weapons application;
– increased combat survivability due to integration of airborne integrated defense system.

MIG-35

MiG-35 is the "4++" generation multi-role fighter, exhibiting the further development of the MiG-29K/ KUB and MiG-29M/M2 fighters in the field of the combat efficiency enhancement, universality and operational characteristics improvement.

State-of-the art avionics in combination with advanced weapons allow the MiG-35 fighters fulfill a great number of missions:

– air superiority gaining against four & fifth generation fighters;
– interception of existing and being developed air attack means;
– ground/surface targets destruction with high precision weapons without entering the air defense zone day and night in any weather conditions;
– air reconnaissance using optical-electronic and radio-technical equipment;
– participation in group actions and air control over groups of fighters.

ROSOBORONEXPORT: 17 YEARS OF SUCCESS

One of the major operators in the world market for arms and military equipment

On November 4, JSC Rosoboronexport (part of the Rostec State Corporation) celebrated its 17th anniversary. The company was set up by the Russian President's Decree in 2000 as Russia's state intermediary for importing and exporting a full range of military and dual-use products, technologies and services. Rosoboronexport is a 100% state-owned company. In 2007, the management of its stocks was transferred to the Rostec State Corporation.

At the International military-technical forum Army-2017 Rosoboronexport will present their exposition in the framework of the demonstration center of the Rostec Corporation in the joint exhibition of the Corporation. Rosoboronexport's stand will be 222 sq. m, and will use the modern multimedia tools (a table with the effect of levitation, video wall, touch panels, etc.), where will be presented for a wide range offered for export military products from Russia. There is the latest exhibition technology, also with holographic multimedia catalogs and many other innovations.

'Over 17 years, Rosoboronexport has become one of the leaders in arms supplies, having sold products worth a total of over $140 billion. We show good results in foreign trade, and the country's leadership doesn't leave this success unnoticed. For their great contribution in developing military-technical cooperation with foreign countries, 34 Rosoboronexport employees were awarded by Russian President Vladimir Putin,' said the CEO of Roctes, Sergey Chemezov.

In 2017, Rosoboronexport did a lot to expand export geography of Russian armament and military equipment, as well as to increase the range of Russian military and dual-use products, supplied to foreign customers. Rosoboronexport is actively cooperating with more than 50 countries worldwide; and their number will further increase by the end of 2017, despite unscrupulous actions of some countries, competing with Russia in the global arms market.

'Rosoboronexport's order portfolio currently amounts to about $45 billion, which proves high competitive edge of Russian defense products on the global level. A considerable share of the portfolio are contracts to purchase Russian high-tech systems, primarily aircraft and air defense systems. In addition, Rosoboronexport is discovering new market segments, developing exports of civilian and sporting weapons and making turnkey national security systems that use cutting-edge information security solutions. For hundreds of Russian companies Rosoboronexport became a guide to international success, an indispensable assistant, and sort of a one-stop service, which has powerful governmental support, respect from foreign partners, expertise accumulated over tens of years, and latest marketing technologies,' said the CEO of Rosoboronexport Alexander Mikheev.

The first Soviet state intermediary agency for military-technical cooperation with foreign countries was created on 8th May 1953 after the USSR Council of Ministers had decided on forming the General Engineering Department within the then Ministry of Domestic and Foreign Trade. Other special foreign trade bodies were created later on to provide for further expansion of military-technical cooperation activities. In the late 1990s there were two federal state unitary enterprises in Russia acting as state arms exporters Rosvoorouzhenie State Corporation and Promexport.

In November 2000 the two enterprises were merged into a single one – Rosoboronexport Federal State Unitary Enterprise, the sole state intermediary for export/import of defence products, by the Presidential Decree No. 1834 dated 4th November 2000 aimed at restructuring the system of military and technical cooperation of the Russian Federation with foreign states, and improving its performance. Since September the 1st, 2014 Rosoboronexport has been operating as a joint stock company.

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.

Rosoboronexport – the sole Russian state intermediary agency, which is responsible for import/export of the full range of defense and dual-use end products, technologies and services. 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.

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 dollar 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. /RA&MG/

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.

CORE AREAS OF ACTIVITIES OF ROSOBORONEXPORT

- **Export / import of all types of conventional weapons, military and dual-use equipment and services.**
- **Organization of licensed production of armaments and military equipment abroad, joint R&D efforts with foreign partners.**
- **Maintenance and repair of earlier supplied weaponry and military equipment.**
- **Modernization of Russian-made weapons and military equipment.**
- **Training foreign specialists in Russia and customer countries in the operation and maintenance of supplied military equipment.**
- **Technical assistance in the construction of military infrastructure facilities: defense plants, airfields, depots, ranges, training centers.**

Under the auspices of the
PRESIDENCY OF THE
REPUBLIC OF TURKEY

Dear readers,

Although the aviation industry is susceptible to the vagaries of the global economy it is still able sustain its dynamism owing to its openness to international trade and competition. This first began with the unipolar new world order that emerged several decades ago, and which enables the discovery of new regions that offer new opportunities for the aviation industry.

In this regard, Turkey is situated in a geopolitically strategic position. As is the case in all other areas of trade, Turkey also serves as a bridge between the aviation industries of the West and the East. While the global aviation industry's growth rate has been 5 per cent in the last 13 years, Turkey's aviation industry achieved 15 per cent growth during the same period. Moreover, Turkey is still far from reaching its saturation point in the aviation industry.

Once the Istanbul's third airport is completed in 2018, this investment will become a hub for global air traffic, as the world's largest airport. The airport, which will offer employment opportunities for 225,000 people, is expected to host 3,500 flights and 200 million passengers annually.

"The Eurasia Airshow brings together Global Aerospace Industries' brands and their executives in Antalya, Turkey."

Taking advantage of high potential and the developments in the Turkish aviation industry and its region, we are adding a new air show to the premiere league of international exhibitions.

The Eurasia Airshow, which will be Turkey's first biennial international commercial and military aviation exhibition, is preparing to bring together global brands and their executives in a massive event that will take place in Antalya between April 25 and 29, 2018. We expect the Eurasia Airshow to create a business volume of approximately $40 billion in the commercial and military aviation industry.

We are organizing the Eurasia Airshow under the high auspices of His Excellency President Recep Tayyip Erdoğan. Our aim is to make the Eurasia Airshow (Turkey's first show-based aviation event) one of the most important Turkish global brands in the international aviation industry, along with Turkish Airlines and Turkish Aerospace Industries.

will be an aerospace summit which already has 12 senior airline executives confirmed as speakers.

The air show will serve as a business development platform, where the aviation products of our country, as well its partnerships and business models in this field, will be introduced. Furthermore, all

"Eurasia Airshow brings together aviation giants of the West and East."

We will hold the Eurasia Airshow in Antalya, which is Turkey's most popular tourism destination, and one that hosts very important events, such as the G-20. At the Antalya International Airport _ which, with its enormous size and tremendous infrastructure, is one of Turkey's three busiest airports _ there will be a 50 square metre indoor area, 65 chalets, and a static display area for 100+ aircraft with a total area of 300 square metres. At the Eurasia Airshow, our aim is to host 150 military and civil delegations, 100,000 professional visitors and more than 400 distinguished companies plus many airlines and aircraft maintenance companies. Alongside the airshow there

parties concerned will come together to talk about business, learn about each other's capabilities, and establish business contacts.

The Eurasia Airshow will also be a platform that will be attended by the industry's decision makers, the producers of commercial and military aircraft, sub-components and systems.

We are honoured to invite you to attend the Eurasia Airshow, as our guest, which will be a gathering point for the aviation industries' key players, from West and the East.

Ferhat Yenibertiz
CEO of Eurasia Airshow


Under the auspices of the
PRESIDENCY OF THE
REPUBLIC OF TURKEY
Guess where they are going?
An airshow which is going to accelerate
the aerospace sector!
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MOTOR SICH IN DUBAI AIR SHOW – 2017

Motor Sich JSC specializes in development, manufacture and aftersales service of aircraft gas-turbine engines, industrial gas-turbine drives, as well as gas-turbine generating sets powered by those drives. Over the last years we have been developing the helicopter industry in Ukraine as well. High quality and reliability of our aero-engines are proved by a many years' experience of service on airplanes and helicopters in more than 100 countries worldwide.

V.A.Boguslayev, President of Motor Sich, JSC

Our representative office in Sharjah ensures a prompt solution of questions regarding cooperation with other companies in the United Arab Emirates. One of the company's success criteria is participation in international air shows. Motor Sich JSC participates on a regular basis in airshows in the UAE, France, Germany, Great Britain, India, China, Russia, etc.

Our company is a permanent and active participant of the Dubai Airshow.

At present, the list of our engines in serial production and those under development for utility aircraft covers turboprop, turbofan and turboshaft engines with a power range from 400 to 14,000 h.p., as well as bypass turbojet engines with a thrust range from 400 to 23,400 kgf.

Among all the engines, one should emphasize the D-436-148 engine for An-148 passenger airplanes. This engine complies with ICAO requirements and its performance is as good as that of foreign engines.

The An-148 airplane in different versions ensures carriage of 68 to 89 passengers for 2.1 to 4.4 thousand km with a high level of comfort. The airplane performance and engine elevation above the runway provide for possibility of operation from unpaved airfields, while its low life cost makes it attractable for various airlines worldwide. After mid-2013, a hundred of An-158 airplanes, local versions of the An-148 airplane, have entered service in the Republic of Cuba.

Motor Sich JSC´s and Ivchenko-Progress SE´s specialists have developed the D-436-148FM engine for the An-178 cargo airplane with a load-carrying capacity of 16 to 18 tons intended for replacement of the vintage An-12 cargo airplane.

The D-436-148FM engine is a D-436-148 engine version with a takeoff thrust of 7900 kgf and a maximum contingency thrust of 8790 kgf, which were increased thanks to new and more efficient components.

First of all, this is a next-generation wide chord fan with new solutions for better efficiency, higher thrust and less noise. Along with performance improvement of engine main components this will enhance airplane performance significantly as well.

Currently, our company cooperates with Ivchenko-Progress SE in development of next-generation AI-28 bypass engines with a design thrust of 7 to 10 tons. The basic engine of that family is being developed based on advanced and cutting-edge technologies and will feature a fan reduction drive and a superhigh bypass ratio. This engine is designed for powering advanced passenger and cargo aircraft. On basis of its gas generator we can develop turboprop and turboshaft engines with high performance.

Our company has developed the D-18T Series 3 engine to improve efficiency and reduce exhaust emissions and noise of the An-124-100 airplane that has the highest load-carrying capacity among other airplanes with a cargo ramp in the world.

Among all the basic differences of that engine are the following: the takeoff thrust is flat rated up to +30°C, reduction of the noise level by 10 EPN dB and exhaust emissions to satisfy ICAO requirements. Besides, we have also implemented new solutions for extending total service life up to 50,000 hours, modernized the thrust reverser control system, and equipped the engine with the automated electronic control.

At present, more than three thousand Czech L-39 and Chinese K-8J trainer aircraft powered by gas-turbine engines of our company operate in 45 countries worldwide.

Continuing this tradition, we cooperate with Ivchenko-Progress SE in development of

AI-222 engine versions. They can provide a maximum thrust of 2,500

to 3,000 kgf and with the afterburner installed — up to 5,000 kgf.

The AI-222K-25 (without afterburner) and the AI-322F (with afterburner) engine versions are designed for powering L-15AJT subsonic trainers and L-15 LIFT supersonic fighter trainers produced by Chinese Hongdu Aviation Industrial Corporation (HAIC).

At present, the L-15 LIFT aircraft and the engine are passing flight tests, while L-15AJT aircraft have already started to come into service with the Chinese Air Force. At the same time we continue work on AI-450C и AI-450C-2 turboprop engine versions with a takeoff power of 450 to 495 and 630 to 750 h.p., respectively. These engines are designed for utility aircraft and trainers, including aerobatic aircraft (AI-450CP and AI-450CP-2 engine versions). In 2016, the AI-450C engine has successfully passed flight tests on the DA50-JP7 airplane produced by DIAMOND AI, world-famous Austrian company.

In 2017, AI-450C engine versions, such as AI-450CM and AI-450CD, have received Type Certificates.

At the time being, DIAMOND AI is also working on construction of the DART-450 trainer powered by the AI-450CP engine. The first official debut of that aircraft took place in the Farnborough Airshow-2016 and it arose great interest among all the specialists. The AI-450C-2 and the AI-450CP-2 engines are designed for utility airplanes, commuter passenger airplanes and trainers, including DART-450 aircraft.

The MS-14 engine is designed to replace veteran engines on An-2 airplanes. Flight tests of the An-2-100 airplane powered by the MS-14 engine, which were conducted by Antonov SE, clearly show that this new engine has provided for significant improvement of the airplane performance.

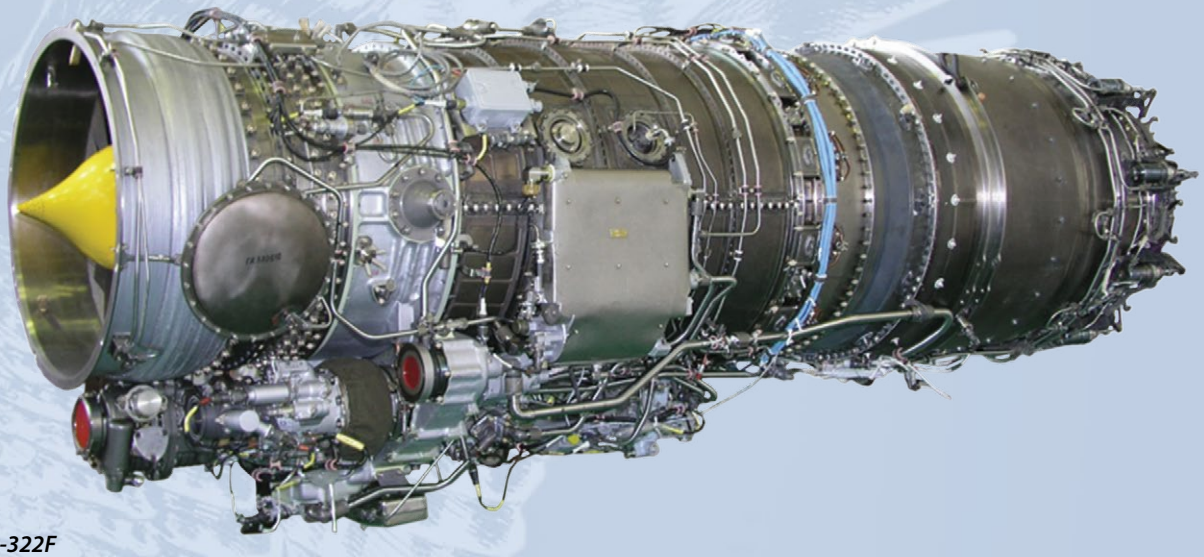
Our company is a world leader in production of engines and helicopters. It all started in 1947 with production of the AI-26 piston engine for the indigenous series-produced Mi-1 helicopter. At present, we offer a wide range of helicopter engines, including the most powerful D-136 turboshaft engine for the Mi-26 helicopter with the highest load-carrying capacity in the world.

For example, our company has produced more than 30 thousand engines of just TV3-117/TV3-117V family and still continues with their further improvement.

To further enhance the helicopter performance and efficiency at high altitudes and temperatures, Motor Sich JSC has developed the TV3-117VMA-SBM1V engine with total life of 12,000 hours and first overhaul life of 5,000 hours.

Engine power ratings fit for operation on different helicopter types. The engine automatic control system (ACS) allows setting one of the

L-15



AI-322F

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Mi-8MSB

following take-off power ratings: 2,500, 2,400, 2,200 or 2,000 h.p. and maintains it to higher altitudes and ambient temperatures as compared to current TV3-117V engine versions and the VK-2500 engine installed on Mil and Kamov helicopters.

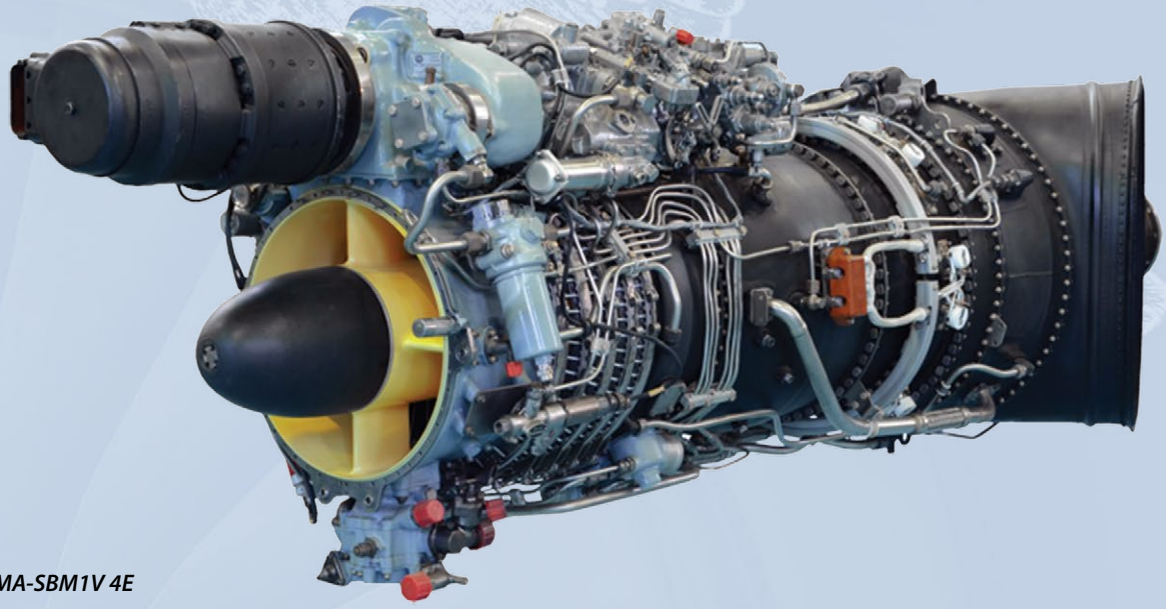
On basis of the TV3-117VMA-SBM1V engine Motor Sich JSC has created the TV3-117VMA-SBM1V-02KS version with the power specifically adjusted for Ka-32 helicopters to improve their customer appeal and competitiveness. At the end of 2015 that version received the Type Certificate from IAC AR and in 2016 — the GASU Certificate.

First overhaul life of the TV3-117VMA-SBM1V-02K engine if transporting external loads is 3,320 hours without replacement of engine hot section parts while in service, which is 4 times greater than that of the TV3-117VMA(VMA Series 02) engine hot section.

Nowadays, our company advances its helicopter production program. We have established our own Design Bureau that is certified by the Ukrainian Aviation Administration and comprises 300 specialists.

Motor Sich JSC's helicopter production facilities comprise machining and assembly workshops with cutting-edge equipment, the paint shop, the flight test center, and the center for training of aircrews and maintenance personnel. The flight test center features a multi-purpose full-size bench for testing helicopter airframe elements and systems as well as other types of ground testing.

At present time, our company is also engaged in development, manufacture and overhaul of helicopter gearboxes. We have mastered and obtained authorization for overhaul of VR-8A and VR-14 main gearboxes for Mi-8 and Mi-17 helicopters. Moreover, we also continue with development of the VR-17MS main gearbox, which is a VR-14 gearbox version, for Mi-17 helicopters with a takeoff weight increased up to 14 tons and the VR-442 main gearbox for the MSB-2 helicopter. These



TV3-117VMA-SBM1V 4E

Motor Sich JSC´s and Ivchenko-Progress SE´s specialists have developed the D-436-148FM engine for the An-178 cargo airplane with a load-carrying capacity of 16 to 18 tons intended for replacement of the vintage An-12 cargo airplane. The D-436-148FM engine is a D-436-148 engine version with a takeoff thrust of 7900 kgf and a maximum contingency thrust of 8790 kgf, which were increased thanks to new and more efficient components.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upgrading, overhaul
and service support of:
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• Helicopters;
• Industrial ground gas turbine power plants.
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projects allow performing in-house overhaul of Mi-2, Mi-8 and Mi-17 helicopters along with re-engining and modernization of onboard systems.

The Mi-8MSB medium lift utility helicopter with a maximum takeoff weight of 12,500 kg became the first implemented project of the helicopter program. The helicopter power plant consists of two TV3-117VMA-SBM1V Series 4E gas-turbine engines with electrical starting system. The Mi-8MSB helicopter offers the following advantages: increase of the service ceiling by 62% (7,300 m); reduction of the fuel consumption per hour by 14%, which increases the flying range (1210 km with two additional fuel tanks); increase of engine total life and TBO, which reduces their operating costs; engine flat rating in the whole operating range of temperatures and altitudes.

The Mi-8MSB helicopter has already proved to be a better solution for aerial operations at high altitudes. An excellent altitude performance of TV3-117VMA-SBM1V Series 4E engines provides for possibility of operation from airfields at an altitude of 4200 m. Our helicopters are also fitted up with modern navigation equipment that complies with EASA and ICAO requirements.

The helicopter program also includes the development and manufacture of light helicopters. The Mi-2 helicopter powered by AI-450M-B engines with a takeoff power of 430 h.p. and РДЦ-450 digital governors came to be the first certified light helicopter. This helicopter offers the following advantages: reduction of the fuel consumption per hour by 30%, increase of the flying range with additional fuel tanks by 40%, increase of the service ceiling up to 5,000 m. The cockpit instrument panel is fitted with digital engine parameter indicators and provides for possibility of converting it into a fully digital panel. The helicopter structure employs new light and high-strength composite materials. Thanks to possibility of installing a wide range of external and internal accessories, the helicopter can implement various missions. We offer this helicopter model in the following versions: cargo-passenger (rear compartment with a higher level of comfort), search and rescue (with fire extinguisher system, if requested), agricultural (with spaying system), patrol (with aerial monitoring instruments); training (with dual control). Thanks to a remarkable altitude performance this helicopter comes to be an excellent choice for countries with a mountainous terrain. The Mi-2 helicopter powered by AI-450M-B engines holds the Supplemental Type Certificate No. ДТВ0106 issued by the Ukrainian State Aviation Administration.

One of the platforms developed by our company recently is the MSB-2 light utility helicopter, which resembles to some extent the Mi-2 helicopter. This model features more powerful AI-450M-P engines (465 h.p. each) and a new transmission system, which ensures a reliable transfer of the increased power. The MSB-2 helicopter offers the following advantages: spacious rear compartment; advanced fuel measuring system; external fuel tanks; rear compartment doors with automatic drive; "glass cockpit"; air conditioning system; perfect aerodynamic form.

The MSB-2 helicopter features a fuselage nose from composite materials and offers more space for avionics. The helicopter comes with digital avionics that provides for day and night flights in VFR and IFR conditions. The form of the fuselage nose and external fuel tanks was developed based on the test results in the aerodynamic air tunnel. Excellent design features of that helicopter make it perfect for passenger transportation, search and rescue operations and medivac. Besides, the MSB-2 helicopter offers the following advantages: reduction of the fuel consumption per hour by 30%, increase of the cruise speed by 11%, increase of the rear compartment space by 1m3; increase of the service ceiling by 25%; big cockpit windows.

At the time being, Motor Sich JSC is assembling the first flying prototype of the MSB-2 helicopter and preparing its airframe for static tests. A full-scale mockup of that helicopter has already been demonstrated at several air shows and exhibitions.

Currently, our company is focusing on expanding the production and marketing, which will make it highly competitive in the aviation industry. Motor Sich JSC has always been a reliable partner and ready for cooperation with all interested countries and companies.

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VISION OF SUPERSONIC FLIGHT

As part of 'The Future of Travel,' the world's fastest passenger aircraft will transform travel to, from, and through the Middle East

Boom Supersonic (Boom) was founded with the purpose of removing barriers to experiencing the planet. To realize this vision, Boom is building a Mach-2.2 airliner – the fastest civil aircraft ever made–capable of operating economically at current subsonic business-class fares. Boom's airliner will fly 2.6 times faster than today's commercial aircraft.

Earlier this year, Boom debuted its supersonic passenger airliner, slated to enter service in 2023, to audiences in the Middle East. Boom's mission complements the United Arab Emirates' strategy of embracing new and innovative transportation solutions – and the UAE is ideally positioned to become a supersonic hub connecting Europe, Asia, and Oceania.

In June, Boom participated in the Paris Air Show, announcing 76 orders for its airliner. At the same time, the manufacturer unveiled the newest design of its XB-1 supersonic demonstrator aircraft, which is slated to fly in late 2018.

"The Gulf is home to the world's most elevated airline experiences," said Blake Scholl, Boom's founder and chief executive officer. "This year's theme in Dubai is 'The Future of Travel;' supersonic flight is the biggest leap forward since the jet, removing time barriers and allowing passengers to make business and leisure trips to destinations that otherwise would have been too far. We're excited to be here sharing our progress toward a faster future."

On Boom's supersonic airliner, a trip from Dubai to Sydney shrinks from 15 hours to just over 8, enabling a weekend holiday in Australia. Passengers traveling to London save 5 hours round-trip, enabling a day trip from Dubai to London.

Boom Supersonic is a Denver-based company dedicated to removing the barriers to experiencing the planet, starting by building a Mach-2.2 airliner economical enough to operate with business-class fares. Boom is backed by venture capital firms including 8VC, RRE, Lightbank, Y Combinator, and Caffeinated Capital, as well as angel investors including Sam Altman, Paul Graham, and Greg McAdoo. For more information, please visit boomsupersonic.com. /RA&MG/

UAC, RUSSIA

High prospects in the civil and military segments

The United Aircraft Corporation (UAC) participates in the The Dubai Airshow 2017 as the major Russian aircraft manufacturers. This Corporation unites more than 80 per cent of design and production assets of Russian aircraft industry. She 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 30% per year. Sukhoi Superjet 100 civil airliners, Su-30 and MiG-29 fighters, Yak-130 operational trainers are among the most popular aircraft exported by UAC. The document received by UAC is to much more simplify foreign market procedures, which is good news for present-day and future UAC's partners worldwide.

Moreover, in December 2016 as part of an effort to expand foreign presence UAC was given a military-dedicated foreign trade license to be implemented on a direct basis. The military-dedicated foreign trade license has been issued by Federal Service for Military and Technical cooperation. This will help UAC improve maintenance and repairs of equipment previously delivered abroad, which includes every Su, MiG, Il, Yak and Tu airplanes.

Alongside with the right for direct maintenance and repairs of the equipment previously delivered abroad, the document also specifies UAC's capabilities to update such equipment and train foreign personnel to maintain and repair UAC products. Besides, the license authorizes UAC to establish joint ventures abroad which can maintain and repair aircraft.

The license enables UAC to proceed to coordinated efforts in this area, develop a single enterprise after-sale service system based on current experience and ensure the most efficient activities at markets with several brands available.

The new capabilities confirm there is a steadily growing demand for UAC aircraft. Moreover, operational reliability and relatively low prices become increasingly signifi-

cant. 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.

According to experts, it is Russian aircraft which in terms of life-cycle cost appear today as the most attractive in international markets.

UAC products include many aircraft which are proven international bestsellers. Thus, Su fighters exported by Russia number in the hundreds making these fighters come second and first worldwide. In 2011-2014s Su planes were the first in amount: in four years customers have received 139 aircraft, while Lockheed Martin delivered only 89 and Boeing delivered 60 planes.

UAC places big stakes on supplying fighter planes given that many countries plan to have their aircraft fleets upgraded. Among the most world popular planes is Yak-130 operational trainer which has been already delivered and being delivered to many countries. This is a top-class aircraft. It can be upgraded as a light fighter or close support plane which is highly demanded by Indian Air Force.

However, Russian aviation export is notable not only for military aircraft. 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 Sukhoi 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 Sukhoi 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 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 Sukhoi Superjet 100. There are plans that every year more than 30 such aircraft shall be delivered to customers. Today about one hundred 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 Sukhoi 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 says UAC is intended to focus on further development of the Sukhoi Superjet 100 aircraft family to offer customers a range of regional planes.

It is worth noting that today a business jet version of the SSJ100s is also available. Following the results a number of measures, including auxiliary fuel tanks installation and other engineering solutions the range of the business version of the SSJ100 is increased to about 8,000 km-long nonstop flight. **/RA&MG/**

AIRPLANE FOR TOMORROW

MC-21 and aviation components for it

On 17 October 2017 a flight from the test airfield of the Irkutsk Aviation Plant to Zhukovsky Airport (owned by the Rostec Corporation) was performed by test aircraft MC-21-300 in order to continue the flight-testing program. The aircraft covered 4500 kilometres in a non-stop flight that lasted 6 hours. It was performed at an altitude of 10000 meters. A large number of the aircraft's systems were manufactured and installed by the Rostec State Corporation.

'The flight was performed in a routine mode. All the systems were operating smoothly', reported commander Oleg Kononenko, who holds the honorary title of the Hero of Russia, on completing the flight.

On November 2, 2017, the MC-21-300 test aircraft performed the first flight from the airfield of Flight Research Institute n.a. M.M. Gromov (Zhukovsky city, Moscow region). The flight lasted more than three hours. The characteristics of stability and controllability were assessed at the altitudes varying from 6,000 to 12,000 meters. All aircraft systems operated normally.

For the first time in the history of Russian aircraft-building the airliner is offered to customers with two types of engines: the PW1400G model made by US company Pratte & Whitney and the PD-14 made by the United Engine-Building Corporation (which is part of the Rostec State Corporation). The new generation engines use less fuel, they have lower noise levels and reduced harmful substances emission characteristics. The MS-21 aircraft meets advanced environmental protection requirements.

Flight tests of MC-21-300 aircraft are ongoing at the basis of Flight Test and Development Facility of Yakovlev Design Bureau, the affiliate of Irkut Corporation (the UAC member).

Earlier, on October 17, 2017, the new Russian MC-21-300 airliner performed a non-stop flight from the "Irkutsk-2" airfield to the airfield of Flight Research Institute n.a. M.M. Gromov, upon completion of test flights at Irkutsk Aviation Plant, the affiliate of Irkut Corporation.

Specifically for basing MC-21 aircraft, the new hangar with the up-to-date complex for collection, processing, and storage of information obtained during flight and ground tests, had been built in Flight Test and Development Facility of Yakovlev Design Bureau.

MC-21-300 is a new generation passenger aircraft intended for the most massive segment of the air passenger market. The aircraft can carry between 163 and 211 passengers depending on the seating arrangements.

'In terms of its flying and technical characteristics as well as efficiency, the MC-21 aircraft is superior to all its analogues. The aircraft's wing is made of specially developed polymer composite materials, which is the first solution of such kind used for narrow-body aircraft with a passenger capacity of over 130 people. The share of composites in the aircraft's design is over 30%, which is unique for this class of airliners. It is estimated that direct operating costs associated with using the MC-21 aircraft will be reduced by 12-15% compared to its analogues,' said Anatoly Serdyukov, Industrial Director of Aviation Cluster of the Rostec Corporation.

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To ensure maximum comfort for passengers, the MS-21 aircraft has been designed to have the largest body diameter among other narrow-body aircraft of this class. This solution ensures that passengers are not prevented from moving up and

An innovative ergonomic cabin was developed for the pilots of MC-21 with the participation of the Rostec State Corporation. The high requirements for comfort levels and economic efficiency of the aircraft have necessitated the implementation of technical solutions in the field of aerodynamics, engine-building and aircraft systems.

down the aisle if there is a food trolley in their way and allows airlines to reduce passenger turnaround time at airports. There is more natural light in the passenger cabin thanks to its large windows. Air pressure levels that are comfortable for passengers and an improved micro climate are maintained inside the aircraft.

The initial portfolio of firm orders for 175 aircraft MC-21 ensures that production facilities will be operating at full capacity in the next few years. Advance payment has been received for firm orders.

The main systems of MC-21 aircraft were manufactured and installed by Russian companies. As part of the implementation of the MC-21 program think tanks were created in Russia aimed at developing and making products from composite materials. To introduce new technologies, a wide-ranging upgrade of the production facilities of the Irkutsk Aviation Plant was carried out, a subsidiary of Irkut Corporation PJSC, and of a number of aircraft-building companies and related branches of industry.

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Rostec's enterprises also make composite aviation components for the tail unit. It is the technologies of

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making finbox components and stabiliser made of polymer composite materials that will give the airliner its competitive edge. They are distinguished by a high level of process automation. The weight of composite parts in the aircraft's design will be between 30 % and 40 %. In addition, the facilities of the State Corporation meet the MC-21 program requirements for titan by 100 %, they supply components (chassis), avionics and aviation electronics.

In 2016 the Rostec State Corporation presented its aviation cluster strategy. Its key objective is increasing the revenue of the cluster's holdings and organisations at the average rate of 11.9% a year between 2015 and 2025. Moreover, the strategy envisages a 75 % increase in the market share of the cluster's enterprises in RF's aircraft-building (in such sectors as engine, helicopter and equipment building as well as avionics) and an increase of the market share in global aircraft-building in the relevant sectors by a factor of 1.5 up to 5 % by 2025.

These levels will be achieved partly as a result of the development of after sales competencies. Military and transport aircraft service centres will be opened in the RF, in Asia, Latin America and Africa. Servicing the MC-21 will become a special area.

/RA&MG/

Sergey Kulik

SECURE RESCUE AT ANY HEIGHT

Unique autonomous rescue parachuting back-pack system for emergency escape

The innovative Russian private Space Rescue Systems Ltd. (SRS Ltd.) company (www.cosmic-rs.com) proposes a unique and unrivalled emergency rescue vehicle SPARS® — an Autonomous Rescue Pneumo Transformable Chute Back-pack System — a validated forefront rescue solution for guaranteed secure individual emergency escape from nearly any high elevation structure (skyscrapers, offshore platforms etc.). The SPARS® project is resulted in a creation of a brand new pneumo-framed aerodynamic devices technology. There is no doubt in the near future this solution is going to be a must-have in skyscrapers construction all over the world

The SRS Ltd. proposes a SPARS® high rise escape technology that has a global nature. It is uncovered market niche with an obvious but unrealized human requirement to be and to feel safe while living or working in high elevation buildings. In case of emergency than traditional evacuation is impossible or ineffective those people all over the world have practically no means of urgent secure rescue from the height and need an alternative solution.

Actually the technical reviews shows that at present there are practically no means for secure alternative escape starting from 60÷80 m height and higher available on the market. But according to the said firefighter's statistics about 3÷5% of people being caught in alarm situation on the high-rise building used to try escaping from the windows and usually perished. On the other side homeland security analytics says that in average an every skyscraper in the world is expected to be subjected to a fire case (terroristic attack or other emergency) once in every 47 years.

So the SRS Ltd. has decided to resolve the problem in finding an alternative to traditional evacuation methods technical solution. It takes about eight years of R&D to resolve the task. Finally it is resulted in creation a brand new escape technology — an Autonomous Rescue Pneumo Transformable Chute Back-pack Solution for secure personal rescue from high-elevation structure in case of emergency than traditional evacuation methods are impossible.

The SRS. Ltd company in outsourcing cooperation with 18 leading Russian and foreign aerospace companies has fulfilled full-scale research and development activities to develop the project from conceptual proposal stage to releasing operating prototypes unparalleled anywhere in the world.

The SPARS® escape technology is based on a synergy of sophisticated aerospace technologies such as Air-Aspirator Rapid Inflation; Elastic Pneumo-Frame Catapult Ejection; Air-Drag Deceleration; Air-Bag Shock Absorbing and others. Such technologies were invented for space probes deceleration during descent in atmospheres of Solar system planets and its landings on surfaces.

The SPARS® device provides a secure individual escape of untrained person or valuables cargos with weights 45÷120 kg. from about any of existing high-rise (50÷1000m) facilities (skyscrapers; towers; offshore platforms etc.) with guaranteed safe landing on any underlying surface in urban terrain or water in

case of emergencies than traditional evacuation methods are impossible.

The SPARS® solution meets the Russian Ministry of Emergency Situations (EMERCOM) requirements for high-rise emergency escape apparatus (GOST R 22.9.08–2005; GOST R 12.4.206–99) and provides for the following unique capabilities, never implemented before:

1. Alternative of emergency escape (so-called 'last resort rescue')
2. Emergency evacuation of an untrained person having weight of 45÷120 kg, from heights of 50÷1,000 m;
3. Ready-for-use in 45÷60 sec;
4. Self-sustained operation and independently selected escape route;
5. User-friendly operation for untrained persons and fully automated rescue procedure right from start;
6. Personal protection against external hazards during evacuation;
7. Appropriate weight of a back-pack-type carried device;
8. Secure injury-free landing on any underlying surface.

The SPARS® unit for individual use had required a special certificate basis. In this regard the National Standard (GOST) 4240-001-2012 specifying medical and technical requirements for injury-free operation by untrained persons rescued by means of new type SPARS® shock-absorbing systems entered into force in 2013.

To have certification tests performed a special Hybrid-III (USA) crush test dummy-based anthropomorphous (bionic-like) instrumentation station has been developed and created by the SRS Ltd., which has no equals in Russia.

A full cycle of comprehensive calculations and testing to validate design properties and performance has been performed. Up to now the SPARS® device technical operational reliability is 98.7% but further testing is under way.

New SPARS® escape solution provides the following advantages:

1. Alternative (a 'last resort') escape mean for ordinary person in case of emergency in the high-rise structure;
2. Secure rescue of untrained personnel (18÷70 years old) from high elevations from 5 till 1000m (no practical means available starting from 50 m height);
3. Off-line capability of the system provides mobility that helps to find optimal self-escape way of out from emergency situation;
4. Smooth automated ejection from the emergency object after manual initialization of the system;
5. Guaranteed deploy of the canopy with 3÷5 m loss of height irrespective of air flow speed pressure;
6. Protection from dangerous external factors (fire, hits, smoke) during descent;
7. Safe landing on any underlying surface in urban terrain;
8. Reusable and does not sink.

In packed and assembly complete mode the SPARS® system weights 25 kg with back-pack dimensions

The SPARS® General Specifications

1. Total Assembly Weight — 25 kg
2. Rescue Payload Weight — 45÷120 kg
3. Descent Elevations — 5÷1000 m
4. Landing Velocity — 5÷7 m/s
5. Landing Angle — < 30°
6. Footboard Barrier Elevation — 1.5 m
7. Descent Time — 3÷150 s
8. Ready-to-use Time — 45÷60 s
9. Launch Initialization Time — 15÷20 s
10. Inflating Gas — Air;
11. General Dimensions:
    a. Aassembled — 900x450x300 mm
    b. In Descent mode — 6,500x2,700mm *(without conopy)*

Actual Landing Impact Loads:

Acceleration directions:

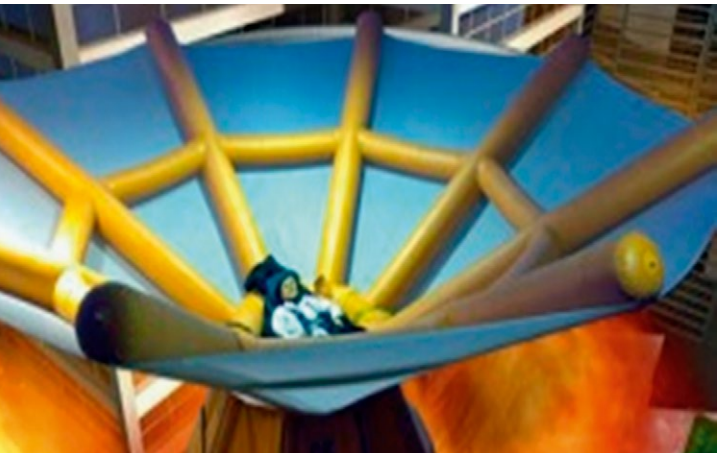
'chest-to-back' — up to 8÷10 g

'side-to-side', 'head-to-pelvis' — up to ± 6 g

Acceleration Exposition Time — less than 0.5 s

Acceleration Growth Velocity — less than 500 1/s

User's age — 18÷70 years



850x450x350mm and has easy — to-use suspension system.

The SPARS® has its Technical Data Sheet (TU 801130–5047075064–01–10) and working design documents issued. Under the SRS Ltd requirements Russian gas-filling systems (GFS) manufacturing company has mastered Autonomous Two-Stage GFS for SPARS® (TU 8042–017–45307693–2013).

The SRS Ltd. Intellectual Property Rights on SPARS® and its 'know-hows' have been completely protected within Russia (9 Patens, 3 Trade Marks) and abroad under PCT (Patent Cooperation Treaty) procedures 2 'umbrella' requests for SPARS® have entered national level in 15 countries and covered 78% skyscrapers and 95% potential SPARS® manufacturers. 13 Patents of the US, China, Japan, Canada, South Korea, Singapore, the Ukraine, Indonesia, Malasia and Australia have been already received.

Three Russian EMERCOM Certificates of Conformity were received for the SPARS®. 'Aerospace medicine and military ergonomics' R&D Institute of the Russian Air Force has granted an official approval for the SPARS® physical adaptability.

The SRS Ltd. company now is looking for cooperation with a strategic Partner and/or investor in order to industrialize the brand new SPARS® product; to make it commercial; to prepare and set up its production and to enter with it into a global commercial market having all necessary intellectually property rights protected.

An accurate assessment of the terms, timeframes and investments required for the SPARS® industrialization it is foreseen that a Partner from the region where product itself (or its production) could be demanded (Middle East, China, US, Europe, Asia-Pacific etc.) could formulate and provide the SRS Ltd. Company with the regional authority technical requirements to upgrade the product specifications and also could determine the necessary level of licensing.

At the same time in order to reduce production costs it is desirable to find and select a local manufacturer taking into account its technical capabilities and possibility to use appropriate production process technologies.

Upon receiving necessary information from a Partner the SRS Ltd. Company could finalize the design documentation, to fabricate a prototype with specifications meeting local needs and to determine expected investments and timeframes necessary to prepare and to run mass production of the product in the region.

Shares and Conditions in the business organization is a matter of further negotiations. The SRS Ltd. Company would be ready to demonstrate its good willing approach and to meet a Partner in negotiations halfway with necessary flexibility in some critical questions aiming to achieve mutually beneficial cooperation.

Such forms of cooperation as Joint Venture, Technical, Manufacturing or License Agreements are feasible.

For a strategic industrial Partner sought who would be interested to

There are following innovations in the proposed SPARS® technology:

1. A brand new free parachuting technology (means and escape method) was created for emergency escape from heights higher than 50 m where practical methods for safe evacuation of a person are not available on the market.
2. Sinergy solution based on specially designed and produced from film-laminated fabric a rapid inflatable air-beam single volume frame structure for:

– Elastic catapult ejection of a human from a window of an emergency object;
– Forced deploy of the canopy with only 3÷5 m loss of height and irrespective of air flow speed pressure for deployment (usual parachute requires of 25÷100 m free fall and/or 250÷350 km/h speed of airplane to be deployed);
– Guaranteed safe landing with 5÷6 m/s vertical velocity on any underlying surface in urban terrain using integrated air-frame shock absorbing pneumo dumper.

3. Fully automatic mode of usage (after manual initialisation of the apparatus) and all the descend envelope accelerations bearable for an ordinary person make the escape solution available for use by untrained people from 18 till 70 years old;
4. New type of light weight air-proof film coated fabric for air-beam inflatable frame structure was created.

The Special National Standard (GOST) for shock acceleration limits for untrained human using new type of lodgment Rescue Parachuting Systems was issued.
The Crash test dummy Hybrid-III 50% percentile was instrumented, calibrated with the help of centrifuge, certified and used as anthropomorphic instrument for human acceleration checking during field tests and validation of the Autonomous Pneumo Transformable Escape Chute.

run mass production of the SPARS® in the region and enter an empty market with protected rights it would be necessary to have production technology experience in the fields of:

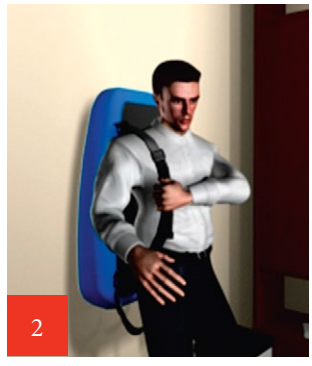
- thin coated/laminated fabric manufacturing;
- assembly from these fabrics a complex air-beam-frame air-proof inflatable structures;
- parachute canopy manufacturing;
- air-aspirator gas filling manufacturing;
- plastics (carbon) manufacturing and forming
- human field (air-borne) tests plastic forming and others.

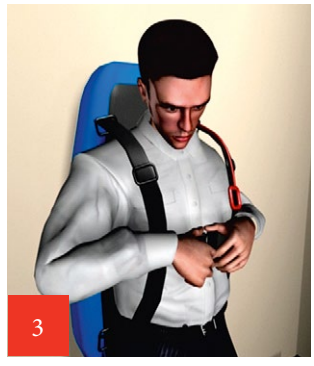
A Partner sought may be expected to undertake part of those activities or provide financing for already SRS Ltd. Company existing outsourcing manufacturing solution in Russia on a mutually beneficial basis.

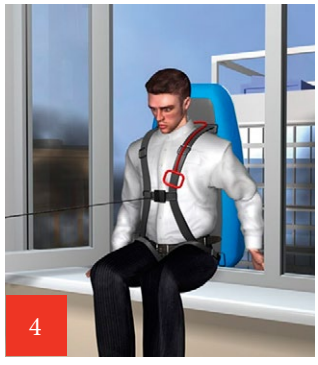
As for the SPARS® solution operation such a potential entity sought (hotels, profitable houses; skyscraper's management company; offshore platform management; airborne attractions & entertainment companies etc.) should only require a free window exit sized 1000x500 mm at the appropriate height to use Autonomous Pneumo Transformable Escape Chute and propose to its clients an additional exceptional secure service with limited warranty.

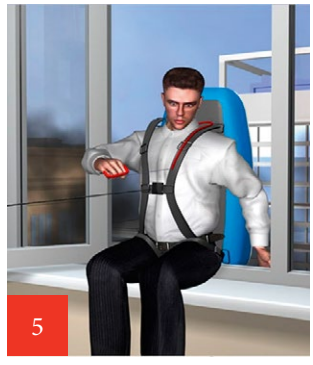
General market estimations shows there are over 7,303 finished and 2,500 under construction skyscrapers worldwide with the heights of 100÷828m, over 100,000 buildings having height of 50÷100m and more than 800 offshore platforms. Taking that analysis into account the SPARS® may have potential market capacity of up to $700-850 million annually.

Furthermore, the SPARS® estimated potential market capacity is worth over $3.5 billion in commercial sector alone. The Governments market is bigger but for accepting that new technology implementation it may require some updates of the appropriate local norms and regulations. /RA&MG/









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	Release dates	Additional distribution
'IA&TG' №01-2018	February 05th	Singapore Airshow 2018 (06-11.02.2018, Singapore)
'IA&TG' №02-2018	April 02th	FIDAE 2018 (03-08.04.2018, Chile, Santiago)
'IA&TG' №03-2018	April 23th	Eurasia Airshow 2018 (25-28.04.2018, Turkey, Antalya)
'IA&TG' №04-2018	April 25th	ILA Berlin Air Show 2018 (25-29.04.2018, Germany, Berlin)
'IA&TG' №05-2018	May 05th	Airport Expo Dubai 2018 (07-09.05.2018, UAE, Dubai)
'IA&TG' №06-2018	May 21th	KADEX-2018 (23-26.05.2018, Kazakhstan, Astana)
'IA&TG' №07-2018	July 16th	Farnborough Airshow 2018 (16-22.07.2018, UK, London)
'IA&TG' №08-2018	September	ARMY-2018 (September, Russia, Moscow)
'IA&TG' №09-2018	September 17th	Africa Aerospace and Defence 2018 (19-23.09.2018, South Africa)
'IA&TG' №10-2018	September 26th	Istambul Airshow 2018 (27-30.09.2018, Turkey, Istambul)
'IA&TG' №11-2018	November 05th	Airshow China 2018 (06-11.11.2018, Zhuhai, China)
'IA&TG' №12-2018	November 07th	Indo Aerospace 2018 (07-10.11.2018, Indonesia, Jakarta)
'IA&TG' №13-2018	November 10th	BIAS 2018 (14-16.11.2018, Bahrain, Manama)
'IA&TG' №14-2018	November 26th	Iran Air Show (November, Iran, Kish)
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