INTERNATIONAL HELICOPTER & TECHNOLOGY GUIDE

Special analytical export project of the United Industrial Edition

№13 (44), October 2019

中國和太平洋國家的直升機創新

CHINA HELICOPTER EXPOSITION

SPECIAL PARTNERSHIP

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UNITED INDUSTRIAL EDITION

'International Helicopter & Technology Guide'
№13 (44), October 2019

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of the United Industrial Edition

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EDITORIAL

The best world helicopter technologies

China Helicopter Exposition is definitely unique. Show is gathering in Tianjin obviously the best helicopter and unmanned innovations that are intended for both China and the entire Asia-Pacific region.

Political and economic situation in the world (conflicts, sanctions, threats of war and other) makes nations once again reconsider their technologies possibilities. It has become already obvious and undeniable that security is becoming increasingly important among the various values of civilization. Today, for any state, the ability to reliably and securely protect the territory, residents and values is a priority.

One can predict raise of helicopter means market in times like this. But together with developing of technologies in order to safety, rivalry increases in order to achieve such goals as increasing profits and market share. CHINA HELICOPTER EXPOSITION 2019 presents the best world (Russian also) aerospace innovations for global market, which are the undisputed world leaders on price and quality in their segments.

These exhibition shows that it is not serious about how many helicopters and planes you have, but quality and possibilities of every single one of them is fact what leads to victory on the global market. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hitech products, solid aftersales service and proven reliability, Russia is honest and friendly partner for all countries, ready for mutual work. Taking part in CHINA HELICOPTER EXPOSITION 2019 companies from many continues the policy of open partnership for AsianPacific area.

Valeriy Stolnikov

ANSAT TO GET AUSTRIAN MEDICAL MODULES

The Russian Helicopters Holding Company (part of Rostec State Corporation) and an Austrian company Air Ambulance Technology signed a cooperation agreement. The parties agreed on joint development and Russian certification of the medical module which may be installed on Ansat helicopters.

The document was signed by Director General of Russian Helicopters Holding Company Andrey Boginsky and managing director of Air Ambulance Technology Nicole Kuntner-Hudson during the international aerospace exhibition Paris Air Show 2019.

'We are pleased to announce the start of cooperation with Air Ambulance Technology and we hope that this will be long-term and fruitful work. Creation of the new medical module which meets international standards for medical aviation will allow the holding company to expand the pool of potential customers, including European companies. We expect that installation of such equipment will help Ansat get a certificate of the European Union Aviation Safety Agency', said Director General of Russian Helicopters Andrey Boginsky after the ceremony to mark signing of the agreement.

The light multi-purpose helicopter Ansat, which has the largest cabin within its class, is actively used by the Russian air medical services. This twin-engine helicopter is compact, and it does not require a large landing area. It can also be used for passenger and VIP transport, cargo delivery and environmental monitoring. High-altitude tests of Ansat have been successfully completed, which confirmed the possibility of its operation in mountainous terrain at altitudes up to 3,500 meters. The helicopter can be operated in a temperature range between -45 and +50 degrees Celsius. The possibility of keeping the helicopter out of the hangar and low cost of operation are its significant advantages.

Rostec presented Mi-171A2 and Ka-226T

As part of its joint exposition with the Buryat Republic, Russian Helicopters Holding Company (part of Rostec State Corporation) presented its latest civilian helicopter Mi-171A2 and Ka-226T light-weight multi-purpose helicopter, which are planned to be supplied to India, at the Eastern Economic Forum in Vladivostok.

Earlier, Russian Helicopters and Global Vectra company (India) had signed a contract for the delivery of a Mi-171A2 helicopter, including an option for one more rotorcraft. The helicopter manufactured under this contract and already painted in the livery of the Indian customer was presented at the Eastern Economic Forum. Its delivery to India is scheduled for late 2019 – early 2020.

The Ka-226T helicopter presented at the Forum was a demonstration of the prospects of Russian-Indian industrial cooperation – in accordance with the 2015 intergovernmental agreement, India will be supplied 200 such helicopters, of which 140 will be assembled locally.

'At the Eastern Economic Forum, we showed our Indian colleagues Ka-226T and Mi-171A2 multi-purpose helicopters designed for them. It is worth noting that our partners were well aware of all the advantages of the products of Russian Helicopters Holding Company. In India, Soviet and Russian-made helicopters make up more than 30% of the total fleet of civilian and military rotorcraft registered in the country. Our current projects create a good basis for further development of our cooperation,' said Viktor Kladov, Rostec Director for International Cooperation and Regional Policy.

The EEF also saw the Ka-226T parts and units, which are subject to localized manufacturing in India as part of this project. Last February, Russian Helicopters Holding Company signed agreements on a number of presented units with leading Indian aircraft manufacturers who desired to participate in the project to localize the Ka-226T helicopter production.

'The contract for Mi-171A2 supply to India is a clear demonstration of the fact that our latest civilian rotorcraft is in demand abroad, it is waited for and counted on. The helicopter showcased at the Forum is ready for delivery: we will be able to transfer it to the customer as soon as the certificate for Mi-171A2 is validated in India', noted Andrey Boginsky, Director General of Russian Helicopters Holding Company. 'We also demonstrated the progress of the Russian-Indian Ka-226T project: the Ulan-Ude Aviation Plant has already mastered the manufacture of certain parts and components of the helicopter and is preparing to start its serial production. We are also gradually developing our cooperation with Indian manufacturers in terms of localization, our dialogue with some of them will be continued as part of the Forum. At the Forum, we presented the Ka-226T with folding blades: this model is suitable for operation in marine conditions and for installation on board ships. This option is a good basis for more orders for this rotorcraft.'

Among other products presented at the Forum by the Holding Company was Ka-62 medium transport and passenger helicopter manufactured by Progress AAC named after Nikolai Sazykin. The model was showcased in the Primorsky Krai (Territory) Pavilion as part of 'Streets of the Far East' exhibition. On the verge of the Forum, the Ka-62 prototype took part in the flight program of the MAKS-2019 International Aviation and Space Salon in Zhukovsky.

The Mi-171A2 helicopter is the latest representative of the Mi-8/17 helicopter family. It encapsulates the best features of world famous Mi-8 type rotorcraft. The helicopter is equipped with KBO-17 integrated onboard digital flight and navigation system ('the glass cockpit'), which makes it possible to operate the machine without an engineer on board, thereby reducing its crew to two people. The new engines and supporting system improved the helicopter's flight performance, including its cruising and maximum speed. Depending on the operator needs, Mi-171A2 helicopter can perform search and rescue missions, medical and cargo operations, fight fires or carry passengers day and night, at temperatures from -50°C to + 50°C.

Ka-226T is a twin-engine light class helicopter, designed in coaxial configuration. A unique feature of Ka-226 helicopter is its modular design; it can be assembled with standardized easily removable modules of various configurations carrying special equipment.

The Fifth Eastern Economic Forum was held from September 4 to 6, 2019. During the previous Forum edition, 220 agreements, contracts, memoranda and protocols were signed for the total amount exceeding RUB 3 trillion. The Forum was attended by 6002 delegates and 1357 media representatives from 60 countries.

RUSSIAN HELICOPTERS AT PARIS AIR SHOW 2019

Russian Helicopters Holding Company (part of Rostec State Corporation) presented the light multi-purpose Ansat helicopter equipped with the new Mku30 satellite communication system at the 53th International Paris Air Show 2019.

'The Holding Company actively develops the introduction of modern satellite communication systems for helicopters. We entered into an agreement with the MOST-satellite systems company on joint promotion of these products. The Ku-band satellite communication system was created for Ansat and integrated into its avionics. It ensures data transmission and reception at the speed up to 2 Mbps regardless helicopter's location. We plan to offer this system as an option for all civil helicopters of the Holding Company,' said Andrey Boginsky, Director General of Russian Helicopters.

The Mku30 satellite communication system allows single-point and multi-point video conferencing on board, smooth real-time transmission of selected amounts of data and high-quality video content.

At Paris Air Show 2019 held in the French capital on June 17-23, Russian Helicopters showed two Ansat helicopters – medical and VIP versions.

The light multi-purpose Ansat helicopter, which has the largest cabin within its class, is actively used by the Russian air medical services. This twin-engine helicopter has compact size and does not require a large landing area. It can also be used for normal passenger and VIP transport, cargo delivery and environmental monitoring. High-altitude tests of Ansat have been successfully completed, which confirmed the possibility of its use in mountainous terrain at altitudes up to 3,500 meters. The helicopter can be operated in a temperature range between -45 and +50 degrees of Celsius. Its significant advantage is the possibility of storage out of the hangar and low cost of operation.

The international air show in Le Bourget is one of the largest and oldest air shows in the world. It takes place every two years at the Le Bourget airport, 12 kilometers from Paris. Russia is a regular participant of the show. The first Russian aircraft presented in France was ANT-35 in 1936. In 1965, the Soviet Union showed Mi-6, Mi-8 and Mi-10 helicopters for the first time at Paris Air Show.

Certification of Mi-38

The Federal Air Transport Agency (Rosaviatsiya) has certified the civilian Mi-38 helicopter with a highly comfortable cabin. The fact that the main change to the certificate for the machine of this type was approved gives Russian Helicopters Holding Company (part of Rostec State Corporation) new opportunities in terms of Mi-38 promotion on the Russian market and abroad. Besides, Russian aviation authorities certified an eightfold increase in the resource of the light Ansat helicopter's fuselage.

'Certification of the VIP version of Mi-38 gives us new opportunities in terms of supplying this machine both in Russia and abroad. We present the first serial machine of this version at MAKS 2019 Aviation and Space Salon. It will soon have a Russian operator, and we also expect that foreign customers will be interested in it. Such a considerable increase in the period of airworthiness certification of the light multi-purpose helicopter Ansat's fuselage is a result of hard work of our engineers,' said Director General of Russian Helicopters Holding Company Andrey Boginsky.

During MAKS 2019 Aviation and Space Salon the head of Russian Helicopters received certification documents in the presence of Russian Deputy Premier Minister Yury Borisov.

The Mi-38 helicopter was given two approvals for the main change to the type certificate: for a highly comfortable cabin and an air conditioning system for cargo and passenger cabins. A change in the period of airworthiness certification of Ansat's fuselage was certified: the resource was increased from 2,000 to 16,000 hours.

The light multi-purpose helicopter Ansat, which has the largest cabin within its class, is actively used by the Russian air medical services. This twin-engine helicopter has compact size and does not require a large landing area. It can also be used for passenger and VIP transport, cargo delivery and environmental monitoring. High-altitude tests of Ansat have been successfully completed, which confirmed the possibility of its use in mountainous terrain at altitudes up to 3,500 meters. The helicopter can be operated in a temperature range between -45° and +50°. Its significant advantage is the possibility of storage out of the hangar and low cost of operation.

The multi-purpose Mi-38 occupies a niche between the middle Mi-8 and heavy Mi-26. Several changes to the design of the Mi-38 helicopter have been made: these are improved aerodynamic contours of fuselage and cowling of a propulsion unit, protection of the main rotor hub and a swashplate. For the first time in Russian helicopter industry engines are placed 'behind' the main rotor transmission instead of their traditional placement in front of it. This allowed reduction in aerodynamic resistance and noise level in a cockpit, and increased safety of the machine. The 'VIP Cabin' version of the civilian Mi-38 helicopter can accommodate up to eleven passengers. Mi-38 has new engines manufactured in Russia, an explosion-proof fuel system, and additional landing gear struts for landing on soft ground and snow.

Supplying helicopters to the Far North

Russian Helicopters Holding Company (part of Rostec State Corporation) and Polar Airlines concluded a contract for supplying seven modernized Ansat helicopters starting from 2021. The helicopters will be adapted for operation in the Far North conditions.

During the International Aviation and Space Salon MAKS-2019 held in Zhukovsky, on August 29 the parties discussed the results of developing a new design of an aircraft and signed a contract for supplying helicopters.

Based on recommendations of Polar Airlines, Russian Helicopters developed the new design of the helicopter which provides for keeping a machine outside a hangar, a longer flight range, an ice protection system and the possibility of performing instrument flights. Polar Airlines will be a launch customer and an operator of upgraded Ansat helicopters. In accordance with the contract all aircraft will be able to carry medical modules, and these modules will be installed on three of them when the machines are supplied.

The machines will carry passengers within districts, and will also be used for providing air medical services, saving people, patrolling, eliminating emergencies and firefighting.

In 2017 and 2018 Russian Helicopters Holding Company provided Polar Airlines with five Mi-8MTV-1 helicopters whose performance and efficiency have already been proven in the conditions of the Arctic. Russian Helicopters holding company also tested Ansat helicopters at low temperatures in Yakutia. Acquisition of new aircraft is a strategic objective of Polar Airlines which is the leading regional airline in the Republic of Sakha (Yakutia). The company carries passengers on planes and helicopters on local airlines and performs various types of aerial work.

The route network of Polar Airlines which operate in the largest subject of the Russian Federation with a low population density and harsh environment and climate covers the entire republic in 163 directions. The airline's own fleet comprises 64 aircraft, including 27 Mi-8/Mi-8MTV-1 helicopters, which is 42% of the company's active fleet.

RUSSIAN HELICOPTERS PARTICIPATED IN SITDEF-2019

Russian Helicopters holding (part of Rostec State Coropration) participated in the Seventh International Exhibition of Technology for Defense and Prevention of Natural Disasters SITDEF-2019 held in the territory of the headquarters of the Peruvian Army in Lima.

'This year, we presented in Peru the main civilian line of Russian helicopters: the light Ansat, the medium Mi-171A2 and the medium heavy Mi-38.

'We were working closely with our Peruvian partners in creating a mobile service center for maintenance of the multi-purpose Mi-171Sh helicopter in close to the city of Arequipa. The holding has currently finished the first installation and commissioning stage under a contract with Rosoboronexport. Further work will continue in October, as agreed with the Peruvian side. We are planning to finish all operations this year and provide further support to our partners during the first helicopter repairs', said the Deputy Director General for Aftersales Services, Igor Chechikov.

The service center consists of three different maintenance lines: for full airframe overhaul of the Mi-171Sh, mechanical system aggregate maintenance and aviation/radio-electric equipment maintenance.

In 12 countries in North and South America, including Mexico, Venezuela, Colombia, Argentina and Chile, more than 370 helicopters, both civilian and military, manufactured in the USSR and Russia are functioning. Peru operates over 90 civilian and military Mi-8/17 helicopters produced in the USSR and Russian Federation, the highest amount on the continent.

At the exhibition, the holding's experts held discussions about the questions concerning both service maintenance and repairs of the Mi-8/17 series of helicopters operated in Peru. It was also planned to hold negotiations with both Peruvian partners and representatives of other countries on the acquisition of modern Russian civilian technology and its possible deliveries to foreign customers.

The light multi-purpose helicopter Ansat, which has the largest cabin within its class, is actively used by the Russian air medical services. This twin-engine helicopter has compact size and does not require a large landing area. It can also be used for normal passenger and VIP transport, cargo delivery and environmental monitoring. High-altitude tests of Ansat have been successfully completed, which confirmed the possibility of its use in mountainous terrain at altitudes up to 3,500 meters.

Ka-62 in the flight program

Russian Helicopters Holding Company (part of Rostec State Corporation) presented a prototype of its latest Ka-62 multi-purpose helicopter for the first time at the international aerospace show MAKS-2019. The machine was showcased at the static exposition and took part in the flight program of the air show.

The Ka-62 was involved in the fly-by of the entire line of the rotorcraft produced by Russian Helicopters Holding Company, and also performed individually in the aerobatic program of the show.

'The Ka-62 project implements a number of fundamental innovations that had not previously been used in Russian helicopter engineering. In particular, it features a non-standard rotor design, and composite materials are widely used in its structure, which increases the maneuverability, flight speed, economic efficiency and load-lifting capacity of the rotorcraft. The helicopter will occupy the niche between the light-weight Ansat, Ka-226 and medium-sized helicopters of Mi-8 type. The multi-purpose nature of the machine, its outstanding technical characteristics, and adaptability to harsh weather conditions should make the helicopter of interest both for the Russian and the international markets,' commented Anatoliy Serdyukov, Aviation Cluster Industrial Director of the Rostec State Corporation.

The machine is designed to perform a wide range of functions: cargo transportation, rescue missions and emergency medical care, observations and environmental monitoring, as well as to be used in the oil and gas industry and corporate transportation. The resistance of the helicopter to low and high temperatures makes it suitable for use in the Far North and Arctic regions, we well as in countries with a hot climate.

The helicopter is being prepared for mass production by Progress Aviation Company (Progress AAC) n.a. Nikolai Sazykin in Arsenyev. At the moment, the company has built three prototypes that are supposed to undergo a flight testing cycle.

'Participation in the flight program of one of the world's largest air shows was a great opportunity for us to demonstrate the flight qualities of this outstanding rotorcraft to potential customers and a big step forward in the Ka-62 project, which is getting closer to entering Russian and international markets day by day. We expect to receive a basic certificate for its cargo / passenger version in 2020,' stated Andrey Boginsky, Director General of Russian Helicopters Holding Company.

The helicopter, which weights up to 6.5 tons, can transport 15 passengers over distances of up to 600 km, and carry cargo inside the cabin and on an external sling.

A specific feature of Ka-62 is the use in its structure of polymer composite materials, which account for up to 60% of its weight. This increases the speed, maneuverability and load capacity of the helicopter, and also reduces its fuel consumption. Another distinctive feature of the helicopter is its single-rotor design with a multi-blade anti-torque rotor ducted into the vertical tail fin, which was used on Russian helicopters in Russia for the first time.

Ka-62 has a large passenger cabin, which makes it possible to increase both its seat pitch, and seat width. The helicopter's onboard radioelectronic equipment is entirely Russian-made, it features a cutting-edge steering unit to control general helicopter equipment of the next generation. The design of the helicopter is compliant with international safety requirements. In particular, the helicopter is able to fly and land with only one engine running. The injury protection of the pilot and passengers in the event of an emergency landing is increased due to the shock-absorbent design of its chassis and the seats.

Technologies for Arctic

Concern Radioelectronic Technologies of Rostec State Corporation began a research and development of a microwave installation of a new generation for high-quality pasteurization and disinfection of food and agricultural crops for storage and processing in the Arctic region.

Today, the state is tasked with the effective use and development of the potential of the Arctic zone of the Russian Federation. The implementation of projects in the energy, transport and other spheres in the Arctic will inevitably require the reliable functioning of life support systems, including the creation of food reserves for the population. Currently, imported food products dominate the territories of the Arctic zone. The most acute question is about fresh, biologically high-grade dairy products. Traditional pasteurization of milk even under the most severe conditions does not produce complete disinfection of the product and does not allow to obtain guaranteed quality and purity.

In order to supply biologically safe products from the southern to the northern regions, it is necessary to use effective methods of processing agricultural products. One of the promising innovations is the use

of microwave energy as one of the most relevant areas in agriculture.

Microwave processing technology has a number of positive qualities. Among its main advantages – a significant saving of time and energy. It allows to save all nutrients, vitamins and minerals in raw materials. Microwave technology can be successfully used for processing milk, bakery products, dry wines, beer, ham, soft drinks and pre-cooked products.

KA-32 HELICOPTERS FOR FIREFIGHTING

Russian Helicopters Holding Company (part of Rostec State Corporation) has delivered three Ka-32A11BC multipurpose helicopters to Turkey. The machines will be used in firefighting.

In July 2018 contracts were signed with KAAN Air (Turkey) for delivery of three Ka-32A11BC multipurpose helicopters. Currently all three were handed over to the customer. The rotorcraft were purchased primarily for firefighting purposes.

'Ka-32A11BC is the helicopter with the best technical equipment for firefighting missions', noted Andrey Boginskiy, CEO of Russian Helicopters Holding Company. 'This rotorcraft is an admitted leader in its class, and it is capable of solving a wide range of tasks. We are looking forward to further fruitful cooperation with our Turkish partners as far as delivery and after-sales support of helicopters are concerned.'

'Russia has top-tier competence in civil helicopter industry. Depending on the types of tasks and missions, we are ready to deliver a variety of helicopters to our Turkish partners', said Viktor Kladov, Director for International Cooperation and Regional Policy at Rostec. 'Right now Turkey is interested in expanding its fleet of firefighting aircraft, and Rostec intends to continue developing its cooperation with Ankara in this field. We estimate the current Turkish market for this type of helicopters as several dozens of machines.'

The Ka-32A11BC multipurpose helicopter is designed to perform complex firefighting operations, special search-and-rescue and high altitude construction operations, to transport cargo inside the fuselage and on the external sling, to log forest, transport patients and evacuate injured persons.

The co-axial scheme and absence of the tail rotor ensure compactness, high power-to-weight ratio and maneuverability, as well as exceptional controllability of the helicopter. Ka-32A11BC has a high load lifting capacity up to 5 tons of cargo on the external sling. The assigned service life of Ka-32A11BC is extended to 32,000 hours which guarantees lower operating costs.

The firefighting version of Ka-32A11BC can be equipped with various fire extinguishing systems, including Bambi Bucket and Simplex type, as well as a horizontal firefighting system. The helicopter is capable of extinguishing flames on the highest floors of high rise buildings and on oil-and-gas industrial facilities. The Ka-32A11BC has been acknowledged by experts as one of the world's best firefighting helicopters; it is a symbol of the Global Helicopter Firefighting Initiative (GHFI) – a program intended to improve the operating efficiency of specialized firefighting helicopters.

Cooperation between VR-Technologies and KrasAeroScan

During the International Aviation and Space Salon MAKS-2019, VR-Technologies – innovation design office of the Russian Helicopters Holding Company (part of Rostec State Corporation) – signed a cooperation agreement for development and serial production of VRT30 unmanned aerial system (UAS) with KrasAeroScan.

The subject of the agreement is the establishment of partnership and efficient and mutually beneficial cooperation for the development of technologies of unmanned aerial systems use in the energy, oil and gas, construction, forestry, agricultural, machine-building and utility industries of Russia. The agreement provides for the upgrade of VRT30 convertiplane for its effective operation in the climatic conditions of Eastern Siberia, the Far East and the Far North. VR-Technologies, in cooperation with KrasAeroScan, organized serial production of VRT30 UAS, as well as its warranty handling and maintenance.

'The agreement we signed during MAKS-2019 confirms the relevance of promising UAS and UAV developments for improving the quality of operations carried out with the help of drones, as well as for increasing their capacity. We welcome the cooperation with the leader of the Krasnoyarsk Krai in the field of engineering surveys carried out using UAVs so as to consolidate the expertise of two successful companies and create a product that the market definitely needs,' said Director General of VR-Technologies Alexander Okhonko following the contract signing.

'On August 28 there were 18 areas on the UAV operation market. For successful market penetration, the product, first, should have a quality payload for remote sensing of the earth and, second, be a reliable aircraft that can operate in harsh climatic conditions. Very few companies are able to create a vertical take-off and landing UAV with a desired payload that can be used in the turbulent terrain, low temperatures and sudden wind gusts. VR-Technologies has all the resources to create such a UAV. KrasAeroScan, for its part, provides operating experience and request for specific technical conditions. Working with VR-Technologies, we hope to answer all challenges of the market,' said Director General of KrasAeroScan Dmitry Chanchikov.

Under an open-ended agreement, the parties decided that it is possible to organize the experimental operation of the VRT30 convertiplane when implementing KrasAeroScan production programs. The areas of cooperation include engineering and geodetic surveying, control of cadastral land boundaries, forest fire monitoring, archaeological investigations, monitoring of infrastructure elements of different types, search and rescue, and other promising areas.

Cooperation that was agreed upon at MAKS Airshow involves joint work of both companies' experts on the design, manufacture, and testing of the VRT30 convertiplane, and development of scenarios for its use in the climatic conditions of Eastern Siberia, the Far East and the Far North.

Helicopter Engine for Mi-38

The aircraft engine TV7-117V developed by the St. Petersburg-based enterprise UEC Klimov of the United Engine Corporation, which was designed for Mi-38 helicopters, has successfully proved its operability.

During the tests, the engine worked in continuous and alternating icing conditions in all operating modes, at heights of up to 4000 meters, at temperatures as low as minus 30 degrees Celsius. As a result, confirmation of the possibility of efficient engine operation was obtained. This greatly expands the possibilities of operating helicopters. It is planned to obtain approval of the main modification from the Russian Air Register after completing the documents in the third quarter of 2019.

Testing the aircraft to perform operations under icing conditions is a prerequisite from the point of view of aviation regulations. Icing of an aircraft in clouds greatly affects the design characteristics which were formed by the engineering designers. The TV7-117V turboshaft engine with a free turbine is designed and mass-produced at the UEC Klimov. The constructive design, electronic systems of automatic control and monitoring with full responsibility of the FADEC type provides high power with low fuel consumption and increased flight reliability. There are no analogues in fuel efficiency and take-off power in this class of engines.

The main technical characteristics of the TV7-117V: power on take-off mode – 2800h.p. (in emergency mode – 3140 h.p.), specific fuel consumption – 205 g / h.p. per hour, dry weight – 435 kg, the assigned life span of the main parts according to the resource management system – 2110 flight cycles.

NEW RUSSIAN HELICOPTER

The VR-Technologies design bureau of the Russian Helicopters holding company (part of Rostec State Corporation) presented a model of a light multipurpose helicopter VRT500 at Fuorisalone exhibition, which was taking place during Milan Design Week from April 8 to 14. The model was demonstrated at the exposition of the ItalDesign company, which was one of the developers of the VRT500 design. This engineering company was mainly known as an automotive designer. Since it had been found in 1968, ItalDesign has been involved in the development of a wide range of concept cars and the production of automobiles, among them international giants such as Alfa Romeo, BMW, Ferrari, Lamborghini, Maserati.

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

To this date, specialists of Russian Helicopters have begun developing the working design documentation of VRT500. The release of the first production VRT500 helicopter is scheduled for the end of 2021.

The VRT500 is a lightweight single-engine helicopter with a coaxial propeller layout and a take-off weight of 1600 kg. The machine has the most spacious passenger class cabin in its class with a total passenger capacity of up to five people and is equipped with a modern complex of interactive avionics. The helicopter can reach speeds of up to 250 km/h, have a flying range of up to 860 km, and take up to 730 kg of payload on board.

Financing Progress AAC and Rostvertol

During the International Aviation and Space Salon MAKS-2019, Russian Helicopters holding company (part of Rostec State Corporation) and Novikombank signed an agreement on financing Russian helicopter factories Progress Arsenyev Aviation Company (Progress AAC) named after Nikolai Sazykin and Rostvertol.

The relevant agreements were signed by Chairperson of the Management Board of Novikombank Elena Georgieva and Director General of Russian Helicopters Holding Company Andrey Boginsky.

Funds to be received by Progress AAC in the Primorsky Territory as part of the investment project will be allocated primarily for creating conditions for manufacture of the state-of-the-art civilian helicopter Ka-62. This rotorcraft debuted in the flight program of MAKS-2019. Overall, investments will total 10 billion rubles. The same amount will be invested in helicopter production in Rostvertol in the Rostov Region.

These agreements were concluded as part of strengthening strategic partnership with Russian Helicopters. The bank has actively cooperated with the holding company since 2011, providing services related to settlements, lending, investments and finance. Novikombank's credit limit for Russian Helicopters is 54.55 billion rubles.

'I am convinced that Novikombank's support will allow the holding company to implement a project related to manufacture of the civilian multipurpose helicopter Ka-62 which is really important for our industry and for the country,' emphasized Director General of Russian Helicopters holding company Andrey Boginsky after signing the agreements.

'Novikombank is known to support the most relevant projects in aircraft engineering. We are proud to be selected as a reliable partner who is ready to offer the most effective tailored financial solutions. We hope that we will continue

to successfully develop strategic partnership with Russian Helicopters holding company which is a world leader in the helicopter industry,' said Chairperson of the Management Board of Novikombank Elena Georgieva.

Novikombank uses tools to support financing of the Ka-62 helicopter manufacture project, such as granting loans from the Industrial Development Fund at preferential interest rates. For instance, the Industrial Development Fund offers preferential terms and conditions of co-financing projects aimed at developing high-tech products, re-equipment and creation of competitive production facilities based on the best available technologies.

The new civilian multipurpose helicopter Ka-62 is created using the world's latest achievements in the aircraft industry. It meets Russian and international standards of airworthiness, international standards of reliability, safety of flights, comfort requirements, operation and repairability. Ka-62 can make flights in the widest range of climates and geographies. It can be operated on depot airfields, oil platforms, and on unprepared ground.

Supplying VRT500 to Malaysia

During the International Aviation and Space Salon MAKS-2019, VR-Technologies – innovation design office of the Russian Helicopters Holding Company (part of Rostec State Corporation) – signed dealership agreements on promotion and sales of the light multipurpose helicopter VRT500 with a Malaysian company Ludev Aviation. It is planned to start the supplies in 2023.

The Malaysian company Ludev Aviation intends to purchase five helicopters. Optional equipment and details of interior and a livery color scheme of VRT500 will be determined after the helicopter is issued a type certificate and an airworthiness certificate in accordance with the standards of the European Union Aviation Safety Agency (EASA) . In early 2019 the technical project of the VRT500 program was successfully completed, and development of design documents started. Tests of the first prototype will start in 2020.

'Europe and Asia are priority potential markets for the VRT500 helicopter. With its performance, the helicopter competes with rotorcraft of the same class used in these regions,' says VR-Technologies Director General Alexander Okhonko.

VRT500 is a light single-engine helicopter with coaxial rotors. Its takeoff weight is 1,650 kg. The aircraft has the largest passenger and cargo cabin in its class, which can accommodate up to five passengers and is equipped with a modern interactive avionics complex. The design solutions of the helicopter will allow it to reach the speed of up to 250 kph, fly up to 860 km and carry up to 730 kg of payload. The helicopter is designed in passenger, multipurpose, cargo, training, VIP and HEMS configurations.

COUNTING SAIGAS WITH THE AID OF KALASHNIKOV DRONES

The World Wildlife Fund (WWF) of Russia has summed up the results of saiga accounting in the Astrakhan region and in the Republic of Kalmykia by using ZALA AERO unmanned aerial vehicles manufactured by the Kalashnikov Concern. According to the data obtained, over 5,000 species were recorded in protected areas, which is slightly lower than expert estimates of the last few years.

Within a month after the aerial survey, experts were busy decrypting aerial photographs obtained from UAVs and their analytics. From June 19th to 26th, experts flew over three highly protected natural territories – the main locations of modern saiga habitat: the Black Lands reserve, the Mekletinsky nature reserve in the Republic of Kalmykia and the Stepnoy nature reserve in the Astrakhan region. The results of image processing showed that the recorded saiga population in the surveyed territories amounted to 5150 animals, including 573 (11%) males and 2049 (41%) saiga of the current year of birth.

'Methods previously used for accounting of saiga from vehicles gave a major error in the accounting accuracy, and using small aircraft or old UAV models for aerial surveys scared away animals, which not only complicated their accounting, but could also have a negative effect at certain stages of their life cycle. We are very pleased that the new domestic UAV models manufactured by ZALA AERO allow us to obtain accurate data on the number and distribution of saigas without exerting any negative impact on animals', said Dmitry Dobrynin, head of saiga aerial surveying.

The research results will help scientists not only monitor the dynamics of the number and age and sex structure of the saiga population of the Northwest Caspian Sea, but also optimize the conservation measures in the modern location of the species.

'We plan to carry out work in winter period using the UAVs with infrared equipment at the next stage of developing possible methods for accounting of saiga, we also analyze the possibility of using space images for these purposes,' said Valery Shmunk, director of the Russian Caucasus WWF Russia branch.

A report with detailed accounting results was sent to the Ministry of Natural Resources of Russia, the Black Lands Reserve and the Stepnoy Nature Reserve.

Mi-8AMT for Norilsk Avia

During the International Aviation and Space Salon MAKS-2019, Russian Helicopters Holding Company (part of Rostec State Corporation), Gazprombank Leasing and Norilsk Avia (part of Norilsk Nickel group) signed a contract to supply 10 multipurpose Mi-8AMT helicopters.

The helicopters are to be built at the Ulan-Ude Aviation Plant, which is part of Russian Helicopters Holding Company. The rotorcraft are scheduled for delivery in 2020-2024.

'It's the first time that we signed a lease agreement with Gazprombank Leasing, and we are very excited about it. We look forward to a long and fruitful cooperation,' noted Director General of Russian Helicopters Holding Company Andrey Boginsky. 'The first two Mi-8AMT will be delivered to Norilsk next March and will join the Norilsk Avia fleet. Mi-8AMT are great machines belonging to the famous Mi-8/17 family. They are equipped with modern avionics and are perfectly suited for operating in harsh climatic conditions of the Far North, from Taimyr tundra to the islands of the Arctic Ocean.'

'We are pleased to contribute to the development of transport infrastructure of the country and, in particular, the establishment of helicopter service in remote areas, where other forms of transportation proved to be unprofitable. I am sure that the Russian Helicopters' machines, which are well proven in the harsh operating conditions, will significantly improve the quality of passenger service,' said Alexey Belous, Deputy Chairman of the Gazprombank Management Board. 'To update the fleet, Norilsk Avia has chosen a convenient tool, that is, leasing, the use of which becomes even more profitable in combination with targeted subsidy programs of the Ministry of Industry and Trade. For Gazprombank, this transaction has become the first one at the helicopters leasing market, and we plan to continue developing this promising direction.'

'Norilsk Avia is the only helicopter company on the Taimyr Peninsula that is able to meet the region's needs in aviation services. Today the carrier operates helicopters of the Mi-8 type, which not only provide transportation for production needs of the company, but are used for rapid response to emergencies, and perform an important social function providing sanitary flights and passenger transportation of the Far North natives to remote settlements,' said Norilsk Nickel State Secretary and Vice-President Dmitry Pristanskov. 'New helicopters will allow Norilsk Avia to upgrade the existing aircraft fleet, average age of the machines in which is 32 years. For Norilsk Nickel, it is a contribution to improving transportation safety in the Far North conditions and a more robust sustainable production of all group's enterprises'.

Mi-8AMT is a modern middle-class helicopter with improved performance, created on the basis of Mi-8T. Its design falls back on a vast experience of operating Mi-8 helicopters in Russia and abroad. Mi-8AMT has a more powerful power unit, modified avionics and a number of design changes.

Mi-8AMT is fitted with TV3-117VM engines and enhanced transmission. AMS-Indicator, working with GPS and GLONASS positioning systems, provides for the helicopter's reliable navigation. The helicopter can transport up to 23 passengers and cargo weighing up to 4 tonnes inside the cargo cabin or on external sling. The capabilities of Mi-8AMT are constantly expanding due to ongoing modernization. It allows the helicopter to effectively address increasingly complex and diverse challenges in the most demanding climate and weather conditions.

Upgrading helicopters

During the International Aviation and Space Salon MAKS-2019, Mil Moscow Helicopter Plant of Russian Helicopters Holding Company (part of Rostec State Corporation) and UTair-Engineering signed a cooperation agreement to develop modified versions of Mi-8/17 helicopters and maintain airworthiness.

The agreement gives UTair-Engineering an opportunity to independently carry out all the work related to upgrading helicopters such as Mi-8T/P/PS, Mi-8MTV-1, Mi-8AMT, Mi-171, Mi-171A2 and Mi-172. UTair-Engineering is the first Russian company that does not form part of Russian Helicopters Holding Company, with which such an agreement is signed.

'It is important for us to polish the system for giving permissions for modifying machines by cooperating with one of Russia's largest enterprises specializing in repair and maintenance of helicopters. Thus, in the future this will allow us to apply this procedure to other companies, due to which our engineers will be able to focus on substantially upgrading machines in serial production and designing new types of helicopters,' said Director General of Russian Helicopters Holding Company Andrey Boginsky.

'Signing this agreement is an important step for UTair-Engineering in its long-standing cooperation with Russian Helicopters. New functions will allow us to quickly modify helicopters to meet customers' needs and increase competitiveness of Russian helicopters globally,' said UTair Engineering CEO Rashid Faradzhaev.

HIGH FRIENDSHIP AND STRATEGIC PARTNERSHIP

Relations between Russia and China are currently on the rise. They demonstrate the embodiment of the best principles of partnership and justice. Both in the political and economic spheres, we observe surprising mutual understanding, interaction and perspectivity. To a large extent, the guarantor of these relations is the interaction of the leaders of the two countries, the first of all - President of the Russian Federation Vladimir Putin and President of the People's Republic of China Xi Jinping, and also Vice-Premier of the State Council of the People's Republic of China Hu Chunhua.

Politicians around the world have studied with great interest the recent meeting between Vladimir Putin and Hu Chunhua in Vladivostok. During that meeting Vladimir Putin said: 'I do not need to underscore the special nature of Russian-Chinese relations. This year, we are marking the 70th anniversary of establishing diplomatic relations. The strategic nature of our relations is confirmed by the large volume of our collaboration in the most sensitive and important areas for our countries and nations. Thanks to the efforts of President Xi Jinping, the Government of China and your Russian partners, my colleagues, we are making very good headway in the trade and economic sphere, and we have even exceeded our plans for trade.

We are working actively to strengthen international institutions and security systems, cooperating in the military sphere and actively coordinating our positions on the international scene. I would like to ask you to convey my most sincere and friendly greetings to President Xi Jinping. We are happy to welcome a large delegation of our Chinese friends in Vladivostok. I am confident that we will engage in useful and constructive work over these days.'

Hu Chunhua said after Vladimir Putin: 'First of all, I would like to thank you for this opportunity to meet with you. I would like to convey cordial greetings and the best wishes from President Xi Jinping, and I will certainly convey your greetings to him.

China and Russia are good partners and sincere friends. President Xi Jinping himself pays great attention to expanding relations with Russia and to the Eastern Economic Forum.

Last year, he personally attended this forum; this year, I arrived here for the 5th Forum on his instruction. This highlights friendly relations between our countries, as well as the Chinese side's substantial support for Russia in holding this forum.

I know that you personally and President Xi Jinping are focused on Russia's agricultural exports to China and it is good that this year we signed a cooperation agreement during his visit. Yesterday in Ussuriysk, we visited the Rusagro group of companies – particularly, its vegetable oil plant. I personally visited a soy field. We also toured storage facilities. I see great potential in our agricultural cooperation.

I would like to note that we have a big market, while Russia has significant production capacity. Therefore, our cooperation is highly promising. This morning, Deputy Prime Minister Yury Trutnev and I had very productive talks regarding cooperation between Northeast China and the Russian Far East.

We zeroed in on specific cooperation projects and, thanks to your and President Xi's attention, we are successfully advancing cooperation in this format. Some preliminary results are already there. Mr. Trutnev and I liaise closely and maintain ties. We will be carefully fulfilling your and President Xi's instructions in order to further promote cooperation between Northeast China and the Russian Far East. As concerns our trade and economic links, they are also evolving successfully. Last year, Russia-China trade exceeded $100 billion.

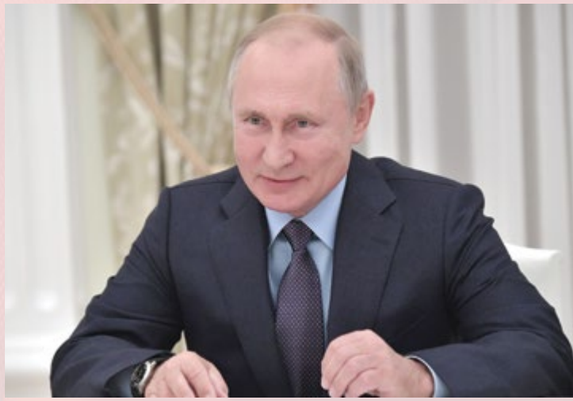
We know that you and President Xi set a new goal to reach $200 billion by 2024. Russian and Chinese ministries and agencies are working together on measures to achieve this goal. Specifically, we are working not only on developing conventional trade but also on preparing new points of growth – for example, transnational e-commerce. This requires simplifying customs procedures. We are certain that the goal you and President Xi set for us will be achieved.'

Vladimir Putin also said: 'I am very pleased that, firstly, our Chinese partners are the largest investors in the region's economy. Secondly, it is essential that we do not only talk about our common geopolitical interests (which is certainly very important) but we are taking specific steps and achieving good results. We see future prospects and stride forward with confidence. I am certain that your delegation's work here in Vladivostok will be very productive and will lead to good results.'

In early October, last year Vladimir Putin sent a message of greetings to President of the People's Republic of China Xi Jinping on the Republic's 69th anniversary, where hi said: 'Under your guidance China has achieved impressive successes. The Chinese economy is growing at high speed, as is the prosperity of your country's citizens. Plans have been approved for national economic development up to 2035 and to 2050. Beijing's prestige in the global arena is growing,' the Russian leader stressed in his message.

'I do not need to underscore the special nature of Russian-Chinese relations. This year, we are marking the 70th anniversary of establishing diplomatic relations. The strategic nature of our relations is confirmed by the large volume of our collaboration in the most sensitive and important areas for our countries and nations.'

Vladimir Putin



'Together with our Russian colleagues we will be promoting our fruitful cooperation in international affairs and step up our coordination at multilateral venues, such as the UN, SCO, and BRICS. In cooperation with the international community we will facilitate political settlement of urgent matters and hot spots and firmly uphold the goals and principles of the UN Charter. We will work together against the unilateral approach and trade protectionism, and for the creation of a new type of international relations and common destiny of humankind.'

Xi Jinping

The President praised the progress in the Russian-Chinese strategic partnership, which is on the upswing: the two nations have stepped up political dialogue, mutually advantageous cooperation in trade and the economy, science and technology, humanitarian and other areas and are coordinating efforts in resolving regional and global problems. Vladimir Putin reaffirmed his readiness for further joint work with China's President on the bilateral and international agendas.

Also in September of last year, a large meeting of the two leaders took place in Vladivostok. Vladimir Putin and Xi Jinping made press statements following their talks.

Vladimir Putin said after it: 'Allow me to begin by expressing my gratitude to President of China Xi Jinping for accepting our invitation to attend the Eastern Economic Forum in Vladivostok, for the first time as the main guest. President Xi is accompanied in Vladivostok by a large delegation, which includes senior government officials, representatives of regional governments and business leaders.

As usual, we paid special attention to trade and economic cooperation. We noted with satisfaction that bilateral trade increased by almost one third in the first six months of the year, reaching $50 billion. We have every reason to believe that by the end of the year, trade will reach a record high of $100 billion. The signing in May 2018 of the Agreement on Trade and Economic Cooperation between the EAEU and China creates additional opportunities for expanding bilateral trade flows.

Russia and China reaffirmed their interest in expanding the use of national currencies in bilateral deals, which would improve the stability of banking services during export and import transactions under the risky conditions on the global markets.

Energy is an important area of cooperation. Last year, Russia supplied 30 million tonnes of oil to China as part of intergovernmental agreements, or over 52 million tonnes when commercial deals are taken into account.

The construction of the Power of Siberia pipeline is being carried out as planned. The launch is scheduled for late 2019. Agreement has been reached on the main conditions for gas supply from the Far East. Chinese investors own a large share in the Yamal LNG project. Clients in 14 countries, including China, have received four million tonnes of liquefied natural gas from this enterprise since December 2017.

China imports a large proportion of its electricity and coal from Russia. Russian-Chinese cooperation in the peaceful atom sphere is also developing. The first stage of the Tianwan Nuclear Power Plant is already in operation. Last year, the third unit has been completed and the fourth is soon to be ready. Rosatom plans to build two more units there.

We also note the expanding cooperation in science, in the peaceful use of nuclear energy. In addition, cooperation in agriculture is developing. Exports of Russian agricultural products to China increased by more than 50 percent during the first six months of last year: for example, 656,000 tonnes of grain were exported, more than during the whole of 2017.

We continue negotiations aimed at increasing the number of the Russian regions that can export wheat to China and at simplifying mutual supplies of meat and dairy products.

We consider the strengthening of direct ties between Russian regions and Chinese provinces to be especially important. The 2018–2019 Years of Interregional Cooperation should promote this.

President Xi Jinping and I will also meet with the participants of the roundtable discussion involving heads of Russian and Chinese regions.

Much work is being done by the Intergovernmental Commission for Cooperation and Development of the Far East and Baikal Region of Russia and Northeast China. The second meeting of the commission in Dalian in August focused on the expansion of the border infrastructure and international transport corridors.

Our humanitarian ties are multifaceted. The citizens of both countries show an increasing interest in mutual tourism. I must note that a record number of Chinese fans, about 70,000, visited the FIFA World Cup in Russia.

Our cooperation in education, culture, sports, and youth exchanges is deepening.

We can see growing interaction between our countries in international organisations such as the UN, the Shanghai Cooperation Organisation, BRICS, the G20, and others. We will continue our joint efforts towards political and diplomatic settlement on the Korean Peninsula in accordance with the Russian-Chinese roadmap.

We support the steps taken by the leadership of South and North Korea to restore bilateral relations and hope that the next inter-Korean summit in Pyongyang will be effective. We consider the normalisation of relations between North Korea and the United States an important component in the overall stabilisation process on the Korean Peninsula.'

Xi Jinping said: 'This is my seventh visit to Russia as President of China but it is the first time I take part in the Eastern Economic Forum. I was in Vladivostok eight years ago. This time I see a city that looks both familiar as well as new. I am sincerely happy that the city is developing dynamically.

Today in the afternoon President Putin and I held sincere, deep and fruitful talks, discussed a wide range of matters related to bilateral rela-

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Hu Chunhua

'Russia and China reaffirmed their interest in expanding the use of national currencies in bilateral deals, which would improve the stability of banking services during export and import transactions under the risky conditions on the global markets. Energy is an important area of cooperation. Last year, Russia supplied 30 million tonnes of oil to China as part of intergovernmental agreements, or over 52 million tonnes when commercial deals are taken into account.'

Vladimir Putin

tions and the topical international agenda and reached important agreements. After this we continued our joint programme: we have a roundtable discussion with the heads of Chinese and Russian regions planned. All these events are very important and representative; they show how wide and deep our cooperation is. Tomorrow President Putin and I will take part in the 4th Eastern Economic Forum where we will discuss cooperation and development plans with countries of the region.

During the last four months President Putin and I have already had three meetings. This intensity of contacts proves the high level and special character of Russian-Chinese relations and stresses their priority in our foreign policy. Spanning over a period up until the close of the year President Putin and I have a number of other meetings scheduled which will take place at important events to continue our contacts.

The President and I agree that since the beginning of last year Russian-Chinese relations have been showing dynamic growth, have entered a new era of rapid development and are reaching a higher level. The parties reaffirmed firm mutual support in the choice of the development path that agrees with the national features of both countries as well as our security and development interests. All of this can serve as an example of what relations should be like between states and neighbour countries.

We are pleased to see that, step by step, joint efforts are turning the political advantages and strategic values of our bilateral relations into substantive results of cooperation. The bilateral trade grew to $58.3 billion during the first seven months of last year, which is 25.8 percent higher than during the same period last year.

Our trade is making progress. Both sides are actively working on the rapprochement of the projects One Belt, One Road and the EAEU, promoting large strategic projects in the energy sector, aviation, space and transport links and also developing our cooperation in new spheres, such as finance, agriculture, and e-commerce. Cooperation is impressive both in quantity and quality, it's being filled with new content and its borders are expanding.

We are developing our cultural and humanitarian cooperation. The ties between citizens of our countries are becoming increasingly closer. Records are being broken one after another when it comes to the number of student exchanges and tourists. We are particularly pleased to note the strengthening of the mutual understanding and friendship among young people.

The Ocean Russian Children's Centre in Vladivostok is the best example of love and friendship and demonstrates the true feelings of our young people. I am sure that this will build up the inexhaustible strength of friendship between China and Russia.

This and next years are years of interregional cooperation between China and Russia. A number of major events are being held in this connection. The regional cooperation mechanism in the formats Northeast of China – Russia's Far East and the Yangtze Volga rivers is developing. Contacts and cooperation between other regions of our countries are also growing.

President Putin and I reaffirm our active support for comprehensive interregional cooperation and the establishment of twin ties between cities, provinces and regions, and all-round interregional cooperation for promoting friendship of our nations. I am sure that tomorrow's Eastern Economic Forum will give a fresh impetus to the deepening of interregional cooperation in the Far East as well as other areas.

As permanent members of the UN Security Council and leading countries in the developing markets, China and Russia bear enormous responsibility for the maintenance of peace and stability together with the promotion of the development and prosperity all over the world.

We have similar or identical positions on international matters, broad common interests and firm foundations for cooperation. China-Russia cooperation in maintaining equality, justice, peace and stability throughout the entire world is gaining ever more importance against a backdrop of growing instability and unpredictability on a global scale.

Together with our Russian colleagues we will be promoting our fruitful cooperation in international affairs and step up our coordination at multilateral venues, such as the UN, SCO, and BRICS. In cooperation with the international community we will facilitate political settlement of urgent matters and hot spots and firmly uphold the goals and principles of the UN Charter. We will work together against the unilateral approach and trade protectionism, and for the creation of a new type of international relations and common destiny of humankind.' /IHATG/

EXPORT OF THE BEST

From July 31st to August 2nd, a large meeting which was attended by more than 150 participants was held in Rostec with representatives of the State Corporation in foreign countries. Heads of Rostec and a number of holdings, industrial directors, heads of departments of the central office spoke at the meeting. Work with representatives was carried out in the divisions of the Corporation and Rosoboronexport for the purposes of analysis of the 2018 results and setting objectives for the near future. More on the results of the year of the export, plans and capabilities of Rostec in the world – in our material.

Export Beats Records

In 2018, Rosoboronexport delivered products overseas for a record amount of 13.7 billion dollars, the largest for its entire period of existence. A solid portfolio of foreign orders for the Russian military equipment reached the figure of 55 billion dollars. We managed to achieve these indicators in the conditions of an utmost difficult foreign policy situation, the most powerful sanction pressure on the Russian defense industry complex, on the State Corporation and its organizations, as well as unfair competition. The final figures for the supply of Russian military products and an impressive portfolio of orders demonstrate that the efforts of competitors did not lead to significant results. Work of local level representatives of Rostec was of great importance in achieving record results.

'Last year's record results are not the reason to rest on our laurels. There are quite enough problems in the sphere of Russian military-technical cooperation. Firstly, it is settlements with partners. The sanctions caused damage in this regard, although this issue can be resolved, including by converting contracts into national currencies. Secondly, the difficult geopolitical situation does not allow us to count on a sharp increase in military-technical cooperation in the near future', noted on the current situation Sergey Chemezov, General Director of Rostec.

Today, Rostec representatives around the world are doing a great job of finding new markets, but this is a long and laborious process. A possible solution here could be to increase the share of exports of civilian products and technologies from Rostec.

Transition to Civilian Tracks

The State Corporation's development strategy until year 2025 sets ambitious goals of increasing the share of civilian products in total revenue up to 50 percent. This indicator amounted to slightly more than 30 percent according to the results of 2018. Significant increase of the civilian products production which are in demand both in the Russian and foreign markets is to be made in the next five years. Rostec representative offices in foreign countries have an important informational and analytical role in solving this problem.

Their task is to provide the Corporation and its organizations with the required information, data on potential partners and recommendations for entering new markets. It is due to the close and productive cooperation with Rostec representative offices that Corporation organizations will be able to form an effective sales system and competently build service processes for their civilian products. Extensive experience in cooperation with foreign structures through the MTC will help Rostec representatives organize the promotion of Russian civilian products.

The work of representative offices in the most technologically advanced countries of the world has its own peculiarities. It should be aimed primarily at attracting technology and investment in Rostec organizations. It is planned to pay more attention to the promising Asian direction in this matter: India, China, South Korea, Singapore and other countries. Unfortunately, due to the sanctions imposed, cooperation with Western companies in the field of technology transfer and joint Research and Advance Development seems extremely difficult. 'They lose their business opportunities, money and the voluminous Russian market at the same time', added Sergey Chemezov. – But this is the choice of the political leadership of Western countries. I think that is short-sighted.'

Peaceful Products for the Whole World

If Russian weapons are traditionally in high demand all over the world, then in the 'civilian' sphere we have to work more actively. Rostec is a unique conglomerate of defense industry enterprises with great opportunities for diversification of production. The corporation can offer the world community a wide range of civilian products.

For example, the Russian Helicopters holding company introduces new models of civilian helicopters for various purposes on the market. The multi-purpose Ansat and Mi-171A2 vehicles made a demonstration tour in countries of the Southeast Asia in 2018, which resulted in the signing of a number of contracts. The civilian sector of the domestic helicopter industry is actively developing, and the excellent reputation of our military vehicles helps to promote the civilian ones abroad. A lot of work is being done on after-sales service and repair of helicopter equipment on the spot. Such a corresponding center was opened in Peru last year, it is planned to open centers in other countries. The organization of a support system for the entire life cycle of Rostec products abroad is one of the promising areas of the Corporation's development.

The Shvabe holding company offers comprehensive lighting projects Svetly Gorod (Bright city) for the cities, which have been successfully implemented for several years in the regions of Russia. In addition, Shvabe and other Rostec enterprises in cooperation carry out the construction and equipping of medical centers, including the production of modern neonatal equipment. Today, Schwabe medical equipment is supplied to 95 countries.

Another example of the civilian products that can adequately represent the State Corporation in the world are telecommunication equipment and robotics of the Roselectronika holding. The most striking civil project of the holding, implemented in 2018, was the construction of information and telecommunications infrastructure for the Football World Cup. The solutions of Roselectronics ensured the unprecedented quality of television broadcasts and uninterrupted communication for viewers from 220 countries.

KAMAZ heavy load trucks and specialized machinery are also actively exported. The auto giant shipped just over 4 thousand cars and assembly sets of parts in 2018 only. KAMAZ was recognized as the Best Russian Exporter 14 times. PJSC AvtoVAZ does not fall behind KAMAZ and: the export of a passenger car manufacturer in 2018 increased by 57percent compared to the previous year and amounted to about 38 thousand cars. Lada branded cars are sold in 34 countries.

The Rostec strategy is determined up to the year 2025 and involves solving the problem of the State Corporation reaching the level of global players. The development is focused on the production of smart civilian products and their promotion in fast-growing world markets, as traditional markets have already reached maturity. And here the role of Rostec representatives in foreign countries is significant. Using their knowledge, experience and connections, they promote new Russian products for the market, find out the needs of local businesses and government agencies, formulate product requirements and, importantly, service. The development of the export capabilities of the Corporation is mostly in their hands. /IH&TG/

AEROSILA

ONE OF THE MOST EXPERIENCED COMPANIES IN THE WORLD

AEROSILA is a public company with modern research facilities and its own production plant. Established in 1939 as a design bureau for the development air propellers, the company has grown into a multi-profile manufacturer of aviation components with more than 60 years of production:

- auxiliary power units (APU) and other small size gas turbine engines
- air propellers and propfans
- lifting and propulsion mechanisms for hovercrafts
- power converters for supersonic aircraft
- inflowing/exhaust fans and jet axial fans

APUs & SMALL SIZE GAS TURBINE ENGINES (up to 1700 hp)

AEROSILA produces a family of new generation gas turbine engines that are used in APUs for the new, advanced and modernized aircraft, helicopters, ships, hovercrafts and other vehicles, as well as in a wide range of other applications

The APUs are equipped with a Digital Engine Control system (FADEC) and meet up-to-date requirements for dimension, weight, specific performance, noise level, emissions release, launch and operation altitudes, fuel economy and maintainability

Our research and development is focused on:

- advanced small size gas turbine engines
- base gas generators for small size main engines
- on-board power units with increased electrical power bleed for implementation in "electric" aircraft, helicopters, ships, hovercrafts and other vehicles of the future

AIR PROPELLERS, PROPFANS & HYDROMECHANICAL GOVERNORS

- Capacity ranging from 15 to 30,000 hp
- Aerodynamic efficiency of up to 0.9

The implementation of a multi-blade concept with light composite blades and the use of an electronic control loop in the propellers' automatic control system give the following advantages:

- Smaller dimensions & weight
- Increased reliability and service life
- Matching the durability of a repaired blade to the standards of a new one
- Expanded set of control functions & diagnostics
- Phase-synchronization for better reduction of the noise level

LIFTING & PROPULSION MECHANISMS for HOVERCRAFT & WIG AIRCRAFT

Lift fans create an air cushion under the ship

Air propellers provide direct & reverse thrust enabling high speed, maneuverability, efficient landing and the ship's movement on land

INFLOWING / EXHAUST FANS, JET AXIAL FANS

Highly effective variable pitch fans for tunnels and underground premises

AEROSILA FEATURES

- A full cycle of new product development from scientific research to the pilot stage with comprehensive testing and technical support
- Modern technology to facilitate full-scale production and wide production cooperation
- Individual mutually beneficial approach to partners and clients
- Cooperation with the leading scientific centers and design bureaus
- Highly professional staff
- Continuous quality improvement for developing and modernizing products/services

As a high-level integrator **AEROSILA** coordinates creative efforts on developing the materials, control systems, fuel devices, starting and ignition systems, heat exchangers, sensors and other aggregates; it also formulates the prospective requirements and sets long-term objectives

On CUSTOMER' DEMAND AEROSILA provides:

- Adaptation of the serial products to the customer's requirements
- Design and development of new products
- Localization of manufacture under license agreements
- Technical audits

QUALITY & RELIABILITY proven by users around the world

EFFICIENT USE guaranteed by

- **MANY YEARS of EXPERIENCE in DESIGN & DEVELOPMENT**
- **MODERN TECHNOLOGICAL FACILITIES**
- **ISO 9001:2015, EN 9100:2016** quality management system
- **GLOBAL TECHNICAL SUPPORT** network

MEETING CUSTOMER REQUIREMENTS IS OUR PRIORITY

AEROSILA

DESIGN • MANUFACTURE • TECHNICAL AUDIT

- APUs and SMALL SIZE GAS TURBINE ENGINES
- PROPELLERs / PROPFANs
- LIFTING & PROPULSION MECHANISMs
- TUNNEL FANs

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NEW RUSSIAN AURUS AT MAKS 2019

MSB-2 helicopter

CHINA HELICOPTER EXPOSITION 2019

MOTOR SICH JSC is specializing in designing, manufacture and aftersale support of aircraft gas-turbine engines, industrial gas-turbine drives and gas-turbine power generating sets with these drives. Currently, the Company also actively creates helicopter-building industry in Ukraine.

Vyacheslav A. Boguslayev, President, Motor Sich JSC

Our company has long-term relations with China aviation industry. 65 years ago, the M-11FR piston engine developed by design bureau of plant No. 478 (now Motor Sich JSC) lifted the CJ-5 (PT5) trainer aircraft into the sky. It was the first aircraft created in the People's Republic of China.

At present, more than 1200 gas-turbine engines produced by MOTOR SICH JSC are operated in China in different types of airplanes and helicopters. In order to ensure prompt settlement of issues related to cooperation with companies and organizations in the People's Republic of China, MOTOR SICH has opened its representative office in Beijing in 2003.

The list of our series-produced and being developed engines for different cargo and passenger aircraft includes turboprop and turboprop-fan engines featuring power from 400 to 14000 h.p., as well as turbofan engines featuring thrust from 400 to 23400 kgf.

IVCHENKO-PROGRESS State Enterprise and MOTOR SICH JSC are developing the D-436-148FM engine for the An-178 cargo aircraft with load-carrying capacity from 16 to 18 tons. This aircraft is intended to replace the veteran An-12 aircraft. The D-436-148FM is a new version of the D-436-148 engine with take-off thrust up to 7900 kgf and maximum contingency thrust of 8790 kgf due to application of more efficient engine components.

In order to increase efficiency, reduce emission and noise levels, the Company has developed the D-18T series 3M engine for the An-124-100 aircraft that is the biggest ramp-type cargo aircraft in the world.

For 90 years, MOTOR SICH JSC specializes in designing and production of engines for trainer and combat trainer aircraft. More than three thousand Czech L-39 and China's K-8 powered by MOTOR SICH gas-turbine engines are operated in 45 countries of the world.

Continuing this tradition, MOTOR SICH cooperates with IVCHENKO-PROGRESS in the development of the AI-322 family of engines and serially produces them.

The AI-322 (without afterburner) and the AI-322F (with afterburner) engines are intended for the L-15A subsonic basic and advanced training aircraft and for the L-15B supersonic aircraft produced by Hongdu Aviation Industrial (Group) Corporation (HAIC).

For the further improvement of performance characteristics and efficiency of helicopters that are operated in high-mountainous areas of the countries with hot climate, MOTOR SICH JSC has developed the TV3-117VMA-SBM1V engine. The engine power settings may be optimised for operation on different types of helicopters.

In order to increase the customer appeal and competiveness of the Ka-32 helicopters, MOTOR SICH has developed the TV3-117VMA-SBM1V-02K version of the TV3-117VMA-SBM1V engine, which power specifications are adapted to this helicopter.

The TV3-117VMA-SBM1V series 4 and 4E engines (with air or electrical starting systems) are new versions of the TV3-117VMA-SBM1V engine. They are intended for re-engining of the Mi-8T helicopters in order to improve their performance.

The TV3-117VMA-SBM1V series 5 engine is a new project. This engine is developed in cooperation with IVCHENKO-PROGRESS SE. The engine has takeoff power of 2800 h.p. and OEI 2.5 minute power of 3200 h.p. Two versions are planned: turboshaft engine for helicopters with takeoff weight from 15 to 16 tons (e.g. for the Mi-38 helicopter), and turboprop engine (TV3-117VMA-SBM2) for the An-140T cargo aircraft.

MOTOR SICH develops, manufactures and overhauls helicopter gearboxes. The Company has mastered overhaul of the VR-8A, VR-14 and VR-24 main gearboxes for the Mi-8, Mi-17 and Mi-24 helicopters.

Together with IVCHENKO-PROGRESS, MOTOR SICH develops the VR-17MS main gearbox, which is a new version of the VR-14 gearbox for the Mi-17 helicopters with take-off weight increased up to 14 tons.

The VR-14MS gearbox is created based on the VR-24 gearbox. It is intended for the Mi-8MT (MTV) helicopters and may be used for upgrading the Mi-8T helicopters. All of this allows MOTOR SICH to overhaul the Mi-8, Mi-17 and Mi-24 helicopters and to upgrade them at the same time.

MOTOR SICH and IVCHENKO-PROGRESS actively develop small-size turboshaft and turboprop engines of the AI-450 family. The basic engine was initially developed for the Ka-226 helicopter.

The AI-450M engine is intended for re-engining of the Mi-2 helicopters, as well as for installation on other single and twin-engine helicopters.

MOTOR SICH and IVCHENKO-PROGRESS also work on the AI-450C and AI-450C-2 turboprop versions of the engines with takeoff power of 495 and 750 h.p. correspondingly. These engines are intended for general purpose aircraft and trainer aircraft.

Now MOTOR SICH develops the MS-500V turboshaft engines of new generation. These engines are intended for different helicopters with take-off weight from 3.5 to 6 tons. The MS-500V engine with take-off power of 630 h.p. and the MS-500V-01 engine with take-off power of 810 h.p. have got Type Certificates of the IAC Aviation Register.

MOTOR SICH develops the MS-500V-02 and the MS-500V-03 version of the engine with take-off power of 1100 h.p. (with forward and rear power offtake shaft correspondingly).

At the same time, the Company develops the MS-500V-C family of turboprop engines. These engines are intended for L-7(CJ-7), Y-12, AC-500, N-5B and other China's airplanes.

Designers of IVCHENKO-PROGRESS SE together with MOTOR SICH JSC have developed a new version of the D-136 engine. The new engine was designated as AI-136T-2. It has electronic-digital automatic control system and maximum take-off power of 10000 h.p. that is maintained up to t_{amb}=40°C. 2.5-minute power of 12200 h.p. is introduced. The AI-136T-2 engine is intended for the Mi-26T2 helicopter and may be used to power new types of heavy helicopters, including China's HLH helicopter.

MOTOR SICH JSC has created a scientific and technical base for designing, manufacture, testing and certification of helicopters.

TV3-117VMA-SBM1V Series 4E engine

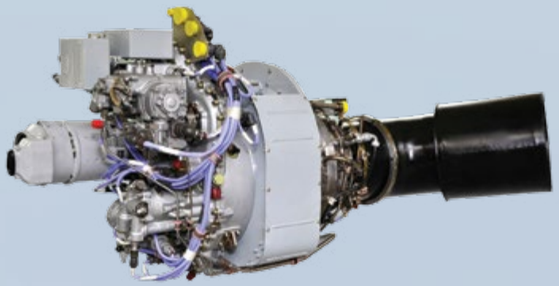
MOTOR SICH helicopter production facilities include modern machining and assembly workshops, paint removal and application section, Flight-Test Complex, Simulator Center for training of flight crews in all types of helicopters produced by the Company.

Flight-Test Complex has a multipurpose test bench intended for optimization and ground testing of airframe components and helicopter systems.

The Mi-8MSB medium multipurpose helicopter with maximum take-off weight of 12000 kg is the first implemented project under MOTOR SICH Helicopter Program. The helicopter is equipped with a powerplant consisting of two TV3-117VMA-SBM1V series 4E gas-turbine engines with electrical starting.

The Mi-8MSB has a large and functional cargo-and-passenger compartment of 2.34 x 1.8 m cross section and 12.5 m^2 area, that is much larger than the respective characteristics of the US and European competitors of the same class.

Mi-8MSB helicopter



AI-450M engine

As compared with the Mi-8T helicopter (the most popular version of the Mi-8/17 helicopter), the Mi-8MSB helicopter has the following advantages:

- service ceiling is increased by 62 % (it is 7300 m);
- specific fuel consumption is reduced by 14 %. That is why flight range is extended up to 1210 km (with two additional tanks);
- time between overhauls and total service life of the engines is significantly extended. Therefore, operation costs are reduced;
- stable power is maintained in the whole operational altitude and temperature range.

The Mi-8MSB helicopter has already proved itself as an optimal solution for high-mountain regions. Outstanding altitude performance of the TV3-117VMA-SBM1V series 4E engines allows the Operator to use helicopter bases at the altitude of up to 4200 meters.

The Mi-8MSB helicopter is distinguished from similar helicopters by simplicity of maintenance, repairability and reliability. The helicopter design makes it possible to install a wide range of specialized equipment for various missions. The helicopter is equipped with advanced navigational complex complying with EASA and ICAO requirements.

Development and manufacture of light helicopters is another line of MOTOR SICH Helicopter Program. The Mi-2MSB helicopter has become the first certified light helicopter that was developed by MOTOR SICH JSC. Main design change involves replacement of obsolete GTD-350 engines with modern AI-450M-B engines developed by IVCHENKO-PROGRESS and manufactured by MOTOR SICH.

The Mi-2MSB multipurpose helicopter differs from other light helicopters by a spacious cargo-and-passenger compartment and twin-engine power plant. As compared with the Mi-2 helicopter, power of each engine is increased from 400 to 430 h.p. In spite of the fact that the Mi-2MSB helicopter is a light helicopter, its transport capabilities are rather high. 8 passengers may seat in the helicopter cabin (excluding the pilot). Thus, its seating capacity exceeds capacity of more expensive similar foreign helicopters.

The Mi-2MSB helicopter is powered by the AI-450M-B engines featuring takeoff power of 430 h.p.

One of the key advantages of the upgraded helicopter is its altitude performance, that is why it is very popular in mountainous countries.

Another advantage of the helicopter is as follows: it may be stored without hangar. Almost all similar helicopters do no have such feature.

The dual-control helicopter version may be used for training of pilots. The helicopter has one more advantage for training purposes: its design is similar to heavier helicopters of the Mi-8 type. The Mi-2 helicopters successfully participate in helicopter championships. Excellent aerobatic features of these helicopters are well-known. Re-engining significantly increases capabilities of the helicopter as a participant of aviation competitions.

The Mi-2MSB helicopter may be equipped with medevac equipment. The helicopter can be equipped with a search floodlight, a winch for fast lifting of 2 persons, and with other mission equipment.

The MSB-2 is a light multipurpose helicopter partially unified with the Mi-2MSB helicopter. This helicopter has more powerful AI-450M-P engines (465 h.p. each) and new transmission based on the VR-442 main gearbox. The helicopter main features are as follows:

- spacious cargo-and-passenger compartment;
- external layout of fuel tanks;
- automatically driven rear door of the cargo-and-passenger compartment;
- modern avionics;
- perfect aerodynamics.

At present, MOTOR SICH performs ground testing of the first prototype and prepares it for flight testing and static testing of the helicopter airframe.

MSB-2 helicopter

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RUSSIA WILL BE THE STAR OF EURASIA AIRSHOW 2020

Eurasia Airshow 2020 will be held at Antalya International Airport on 22-26 April 2020. The aim of the event is to develop an extremely substantial business volume in commercial and military aviation industries. Furthermore, it is the only aerospace trade show to include flight demonstrations in Turkey.

It is important to underline that Eurasia Airshow has fully targeted the Eurasian market in terms of participants and achieved success in this regard. The Eurasia Airshow 2018 was attended by visitors from 67 countries, from Russia to Qatar, from Iran to UK, from Ukraine to Poland. Worldwide leading companies such as Boeing, Rolls-Royce, Sukhoi, UAC, Antonov, BAE Systems, Rostec, Saab, Qatar Airways, Thales, Honeywell, GE Aviation, Pratt Whitney, Dassault Systems, Goodrich, IRKUT have participated in the Eurasia Airshow 2018. And Turkish Local Industry has been successfully represented by Turkish Airlines, Turkish Aerospace, Aselsan, Havelsan, Alp Havacılık etc. In total 343 companies has contributed.

The Chairman of Capital Exhibition who organize the Eurasia Airshow Hakan Kurt said: 'We had an very succesful edition of Eurasia Airshow in 2018. Also Russian companies got really good deals. Especially for this year. Russia will be the star of the Eurasia Airshow 2020. Depends on the S-400 air defence systems deal and the upcoming fighter deal there will be very efficient deals on the ground (According to the S-400 air defence systems deal and the upcoming fighter deal we can say that there will be very efficient deals settled on the ground)'. Kurt continued: 'Eurasia Airshow will have more innovation, decision maker, delegation and business for their participants'.

Key Figures	Numbers
Countries	67
Company	343
Trade Visitor	27000
Public Visitor	106000
Trade Volume	$15 Billion
Delegation	163
Aircraft on static	81
Flight Demonstration	104
Accredited Media	253
Exhibition Area	410 000 sqm

Source: Eurasia Airshow 2018 Final Report

/IH&TG/

NEW CAPABILITIES OF THE WELL-KNOWN GIANT

We cannot even imagine a helicopter more suitable for operation in wide open spaces of the Celestial where there are many difficult-of-access regions. Application of the helicopter engineering is connected mostly with the necessity of prompt delivery of firemen, rescuers, hardware and software to the emergency site, as well as evacuation of injured or aggrieved persons. It is possible due to not only the helicopter flight speed but its capability to reach the required place when roads are missing or there are many traffic jams or road blocks.

The cost of such works is vastly larger than during ground transport vehicle, but often the helicopter is the only possible mean for fire-fighting and recovery from accidents and disasters.

The Mi-26TC is manufactured by Rostvertol PJSC which is a part of Russian Helicopters Holding Company, this aircraft is an unequaled in terms of its lifting capability and it is the only one in the world which is capable to transport 20 tons of cargo on external load sling or inside the cargo compartment.

The most important sphere of application of the Mi-26 type helicopters, both in Russia and in China, has become their use as highly-efficient fire-fighter of forest, industrial, and urban fires. A unique VSU-15 water-discharging device was designed for the helicopter, capable to carry 15 t of water taken from water reservoirs next to fire seats from hovering mode.

Totally four Mi-26TC helicopters are being operated in China. Three Mi-26TCs are operated by China Flying Dragon General Aviation Co. Ltd., one more helicopter is in QingDao Helicopter Co. Ltd. fleet. All the four Mi-26TCs are successfully on the duty of the Forestry Department of China and annually take part in forest fires extinguishing.

When we are talking about liquidation of emergency situation consequences it is difficult to overestimate the operation of such a big and reliable helicopter as the Mi-26TC. Apart from fire-fighting missions in China the Mi-26s have got perfect reputation in earthquake-relief operations; the terrible earthquakes resulted in a complete destruction of settlements.

In spite the fact that Mi-26(TC) helicopters still have no equals in the world in terms of lifting and transport capabilities in order to meet the increasing market requirements, the helicopter designers set sights on its upgrading even a decade ago.

The upgrading of the basic version was mainly directed at introduction of the latest digital radio and electronic equipment which allows to reduce the flying crew from four to two persons (when external sling is used – from five to three persons). This increase the flight reliability and safety, enhances the helicopter stability and controllability as well as hover accuracy which is especially important when performing external sling operations.

Flight and navigation complex consisting of electronic indication system with five MFI-10-7V color multifunctional displays featuring screen size of 6x8 inches and button framing (along with this some

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THE BEST TECHNOLOGIES

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traditional electromechanical instruments on crew's instrument panel has been reduced to minimum, they are meant for backup only), control panels, two airborne computers, modern inertial and satellite navigation systems and digital integrated flight system have become the basis of radio and electronic equipment of the upgraded the Mi-26T2. Besides modern communication system and effective airborne monitoring system have been integrated into the avionics of Mi-26T2 helicopter.

Due to the new radio and electronic equipment the Mi-26T2 flights can be performed at any time in simple and adverse weather conditions including flights over the water areas and possibility of automatic en-route flights, interception on the desired point and approach to landing as well as intermediate approach and return to regular or alternate aerodrome. Another advantage of the upgraded aircraft is reduced time required for flight planning, and decreased load on crew in flight specifically due to automatic monitoring of operational parameters of the airborne systems.

The Mi-26T2, like the basic model, can be used during transportation of bulky cargos and vehicles totally weighing up to 20 tons in cargo cabin or on external sling. When the helicopter is used for transportation of passengers it can carry up to 82 persons accommodated on seats in the cargo cabin. Further when it is used as an ambulance, up to 60 patients or injured persons can be carried. By means of this helicopter it is possible to carry out construction and installation work of different complexity degree, fire-fighting, quick fuel delivery with possible autonomous refueling of various vehicles on ground and to accomplish other missions.

The first prototype of Mi-26T2 helicopter was prepared at Rostvertol PJSC based on one of the aircraft manufactured earlier and started its test flights in early 2011. The first serially-produced aircraft took off in Rostov-on-Don in December 2014 and after the acceptance tests and training of flight crew and maintenance team already in June 2015 it was supplied to the Customer.

The well-known helicopters featuring new capabilities may become a godsend for the Chinese operators. However, the certification issue is still open and it is required to conduct certification tests as it was in the case of Mi-26TC helicopter. /IHATG/

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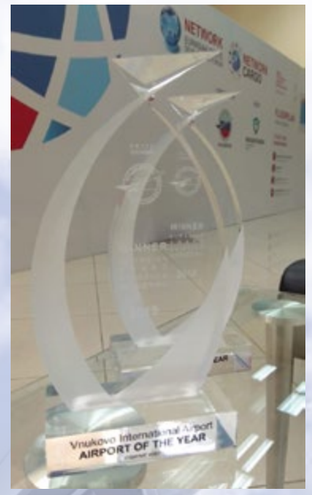
VNUKOVO BAGS PRESTIGIOUS EURASIAN AWARD

Vnukovo International Airport won the 2019 Eurasian Award in Aviation Marketing as the airport of the year serving over 10 million passengers annually. The awards ceremony was held as part of the Second Network Passenger Route Development Forum. Vnukovo was also recognised as the best airport based on an independent passenger vote held by the forum organisers.



Founded by the Centre for Strategic Development in Civil Aviation, the Eurasian Award recognises the best Eurasian air carriers, airports and associated aviation enterprises for achievements in marketing and commerce. The awardees are selected through objective evaluation of a set of measurable criteria.

This is not the first time Vnukovo has received a prestigious award. Also in 2019, for the second year running, it won the International Airport award as part of the Air Gates of Russia ceremony held during the Sixth NAIS National Aviation Infrastructure Show. Last year, Vnukovo got the Air Gates of Russia prize as the best international airport serving over 10 million passengers annually. In 2019, the nomination won was for serving more than 15 passengers per year. /IH&TG/

VIP-CONFIGURED MI-38 CERTIFIED

Russia's Federal Air Transport Agency (Rosaviatsiya) at MAKS 2019 awarded Mil Moscow Helicopter Plant with the approval of the VIP-configured, air-conditioned variant of the Mil Mi-38 helicopter.

Russian Helicopters and Rosaviatsiya had spent over a year securing the approval. The process included bench and flight tests, which corroborated the modification's meeting the Russian aviation requirements.

The VIP-equipped Mi-38 with an air-conditioning system commands the most spacious cabin in the segment globally, providing the highest possible level of comfort for passengers and meeting the strictest bizav requirements. The helicopter is powered by a twin Klimov TV7-117V powerplant.

The Mi-38 is intended as a passenger and freight transport, and can also be used for VIP transportation. It is certified for a broad range of climates, including maritime, tropical and cold-weather operations.

The aircraft surpasses existing equivalents in terms of passenger capacity, freight capacity and performance. /IH&TG/

ACJ319 FROM AIRBUS CORPORATE JETS

Airbus Corporate Jets (ACJ) is showing an ACJ319 at RUBAE 2019, giving visitors the opportunity to see for themselves the benefits of the widest and tallest cabin of any business jet. Around 200 Airbus corporate jets are in service worldwide, flying on every continent, including Antarctica.

The aircraft is operated by MJet on VVIP charter flights, and features a spacious lounge and conference/dining areas, plus a bedroom with ensuite bathroom and shower. The aircraft is designed for comfortable accommodation of 19 passengers.

'Our continued investment in creating the best in-flight experience means that we are now delivering a great cabin that has the even better range and economy of the ACJ319neo and ACJ320neo, which feature new engines and Sharklets,' says ACJ President Benoit Defforge.

The ACJ319neo flies eight passengers 15 hours or 6,750 nm/12,500 km, while the ACJ320neo transport 25 passengers 13 hours or 6,000 nm/11,100 km.

Offering unequalled comfort, space and freedom of movement, which can be experienced for about the same cost as flying in competing business-jets, the ACJ320 Family is also a proven investment, holding its value better over time.

The ACJ320 Family also delivers features promised by new-generation business jets – such as enhanced-protection fly-by-wire controls, cost-saving centralised maintenance and weight-saving carbonfibre.

With some 15,000 orders from airlines and corporate jet customers around the world, the A320 Family is the leader in its class, with a track-record of delivering capable and efficient transport around the globe.

Airbus supports more than 500 customers and operators through a worldwide network of field service, spares and training centres, complemented by services tailored to the needs of private-jet operators. /IH&TG/

WORLD PREMIERE BY DASSAULT AVIATION

Dassault Aviation showcases its Falcon 8X flagship and super versatile Falcon 900LX trijets. Company also is exhibiting a full-scale mockup of its new Falcon 6X ultra-widebody twinjet which is on track for certification and initial deliveries in 2022.

The 1,98 m (6 ft 6 in) high, 2,58 m (8 ft 6 in) wide, 5,500 nm (10,186 km) Falcon 6X will be the most spacious, modern and versatile twin in its class and will draw on many of the advanced features of the 8X, including an ultra-quiet cabin and unrivalled airport capabilities.

'The enhanced safety and robustness, ETOPS-free operation and unparalleled short-field capabilities offered by our large-body trijets are proven advantages that are highly appreciated in Russia and neighboring countries,' said Gilles Gautier, Vice President, Falcon Sales for Dassault Aviation. 'We also anticipate a warm reception among Russian customers for our new Falcon 6X, which will feature the highest and widest cabin in the industry.'

Russia and the surrounding region are emerging as one of the strongest markets for the ultra-long-range Falcon 8X. The 6,450 nm (11,945 km) trijet can fly from Moscow to Los Angeles, Cape Town, Darwin or Rio de Janeiro nonstop and land at restricted airports such as Gstaad and Lugano in Switzerland and Saint-Tropez La Mole in France — short fields that are typically inaccessible to other large business jets. The 8X also has the unique flexibility of its predecessor, the Falcon 7X trijet, a long time best seller that remains in high demand in the Russian market.

The Falcon 8X features a cabin 1.88 m (6 ft 2 in) high, 2.34 m (7 ft 8 in) wide and 13 m

(42 ft 8 in) long and offers customers one of the most innovative selection of cabin layouts on the market, including a shower option and a large forward VIP lounge with a certified crew rest area for very long flights.

The 8X's industry-leading Digital Flight Control System offers exceptionally smooth flying comfort and the aircraft is the quietest of any business jet.

The Falcon 900LX, on show at Vnukovo, features a redesigned cabin, optimized sound proofing and the latest cabin entertainment systems. The new features are designed to permit the 900LX to remain the industry benchmark for reliability, versatility and fuel economy in the 4,750 nm (8,800 km) segment for years to come.

Both the 8X and the Falcon 900LX are available with the latest state-of-the-art options, including Dassault's new FalconConnect inflight high-speed connectivity service and its revolutionary FalconEye Combined Vision System, the first head-up display in the industry to combine synthetic and enhanced vision capabilities.

In addition to ensuring superior situational awareness in all operating conditions, day and night, FalconEye makes it possible to reduce landing minimums in low-visibility landing conditions, providing a substantial operational benefit. Falcon 8X, 900LX and 2000LXS aircraft equipped with FalconEye were recently approved for low-visibility approaches with 100 foot minimums – an industry first.

Dassault's investment in product development has been accompanied this year by a surge of investment in product support aimed at expanding its factory owned maintenance, repair and overhaul network and ensuring worldwide spare parts availability. The company recently purchased the MRO activities of ExecuJet, TAG Aviation and RUAG and opened a new state-of-the-art spares distribution center near Charles de Gaulle Airport that will boost parts service in Europe, Africa, the Middle East and Asia.

These and other ongoing efforts and investments were recently recognized by two customer surveys conducted by Professional Pilot and Aviation International News (AIN), whose readers voted Dassault Aviation the top service provider in the business jet sector for 2019. It is the first time Dassault has finished first in each of these leading surveys.

Operators cited spares availability, cost of parts and speed of AOG service as the major motivating factors behind their decision.

Dassault has also significantly reinforced and expanded the regional service network serving Russia and the CIS. Recent moves include setting up a new stock of spare parts at Vnukovo-3, near the Dassault Falcon Service satellite service center.

The company's comprehensive suite of AOG services, FalconResponse, is proving an additional boon to customers in Russia. Operators from the region benefit from Falcon Airborne Support missions flown in a Falcon 900 that can handle AOG situations and, if necessary, provide alternative lift — another industry first.

Dassault Aviation is a leading aerospace company with a presence in over 90 countries across five continents. It produces the Rafale fighter jet as well as the complete line of Falcons. The company employs a workforce of over 11,000 and has assembly and production plants in both France and the United States and service facilities around the globe. Since the rollout of the first Falcon 20 in 1963, over 2,500 Falcon jets have been delivered. Dassault offers a range of six business jets from the twin-engine 3,350 nm large-cabin Falcon 2000S to its flagship, the tri-engine 6,450 nm ultra-long range Falcon 8X and the new ultra-widebody cabin Falcon 6X.

Dassault Falcon Jet Corp., is a wholly owned U.S. subsidiary of Dassault Aviation, France. Dassault Falcon Jet markets and supports the Falcon family of business jets throughout North America and South America. /IH&TG/

THE UNIQUE TRANSACTION

VTS Jets, a Russian provider of MRO services for business aviation, has purchased the Moscow Vnukovo-based maintenance operation of Jet Aviation, a leading global business aviation services company based in Basel, Switzerland. The maintenance operation is located in the Vnukovo-3 Business Aviation Center. The transaction, which can be called unique for the Russian aircraft maintenance market, was signed on Monday, September 9, 2019.

Andrey Akopov, General Director of VTS Jets says that VTS Jets acquires the legal entity known as Jet Aviation Vnukovo LLC as part of the deal, upon closing. VTS Jets is taking over management of the staff of the company, that is about 30 people now, as well as all available equipment. The amount of the transaction is not disclosed by the top manager.

In Vnukovo-3, Jet Aviation Vnukovo is a maintenance provider for business jets. The company has the approvals of Russian, European and American aviation authorities, as well as the regulators of Aruba, Bermuda and the Cayman Islands. The company is authorized for works on Bombardier, Gulfstream, Embraer, Dassault Falcon and Hawker business jets.

VTS Jets are interested in the approvals and certificates available to Jet Aviation Vnukovo. The company will receive a new name – 'Jetport Technics', but will remain as an independent legal entity, i.e. will be a subsidiary of VTS Jets.

'Jet Aviation Moscow Vnukovo comes to us in its working condition, and will not cease its production activities when the owner changes,' said Andrey Akopov. 'Coupled with the resources of VTS Jets, we intend to further develop maintenance offerings for private jets'. Jet Aviation President, David Paddock said, 'After exploring a range of options, we decided to sell our Moscow Vnukovo operations to VTS Jets, a local maintenance service provider based at the Vnukovo-3 airport. It is always a difficult decision to sell an asset and say goodbye to partners and colleagues, but we strongly believe this is the best way forward, enabling continuity for both our customers and employees. We hope to work together again in the future and will continue to welcome and support Russian customers at other facilities throughout our network.' /IH&TG/

MC-21: BETTING ON TECHNICAL SUPERIORITY

New jetliner from Irkut Corporation undergoes testing

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

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

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

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

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

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

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

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

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

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

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

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

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

/IH&TG/

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.

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

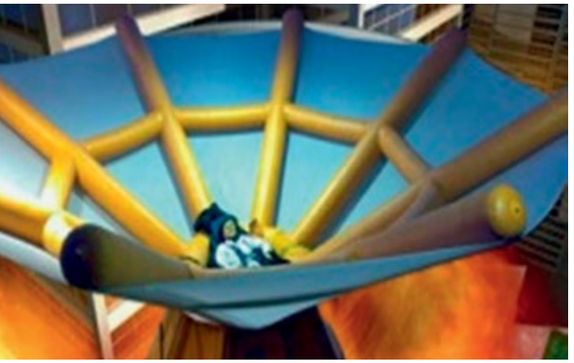
'side-to-side' , 'head-to-pelvis' – up to ± 6 g

Acceleration Exposition Time – less than 0.5 s

Acceleration Growth Velocity – less than 500 1/s

User's age – 18÷70 years

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



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 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; sky-scraper's management company; offshore platform management; air-borne 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.

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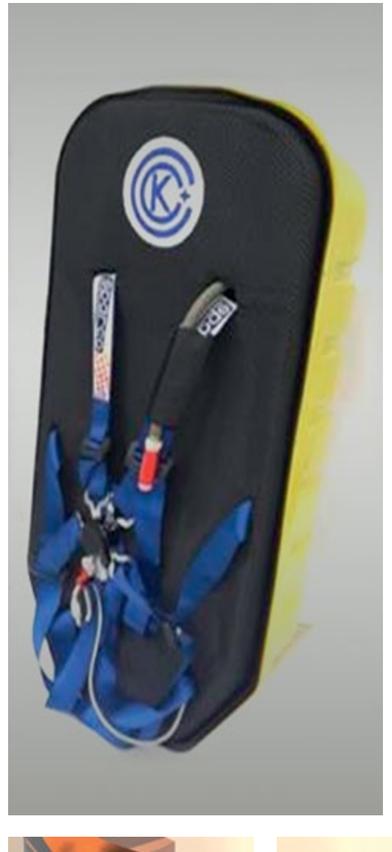

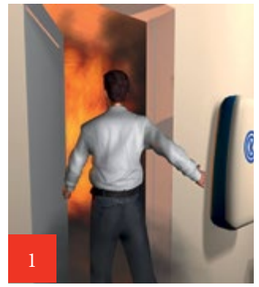

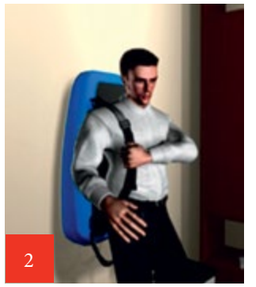

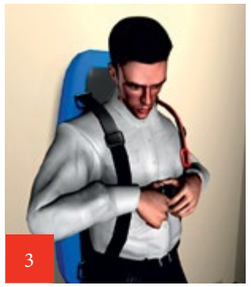

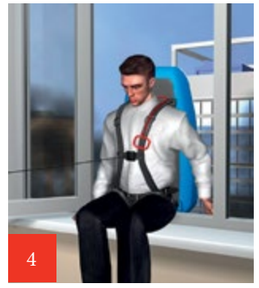

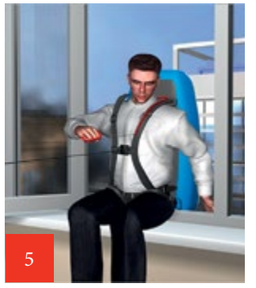

There are following innovations in the proposed SPARS® technology:

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.

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INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES

In 2019

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'RA&MG' №11 (42)	August 27th	**MAKS-2019** (27.08-01.09.2019, Russia, Moscow)
'RA&MG' №12 (43)	September 16th	**AVIATION EXPO CHINA 2019** (18-20.09.2019, China, Beijing)
'RA&MG' №13 (44)	October 01th	**CHINA HELICOPTER EXPO 2019** (10-13.10.2019, China, Tianjin) **SEOUL ADEX 2019** (15-20.10.2019, Korea, Seoul)
'RA&MG' №14 (45)	September 23th	**DSE Vietnam** (02-04.10.2019, Vietnam, Hanoi)
'RA&MG' №15 (46)	October 28th	**BIDEC 2019** (28-30.10.2019, Bahrain, Manama)
'RA&MG' №16 (47)	November 02th	**Defense & Security 2019** (04-07.11.2019, Thailand, Bangkok)
'RA&MG' №17 (48)	November 16th	**Dubai Airshow 2019** (17-21.11.2019, UAE, Dubai)
'RA&MG' №18 (49)	December 08th	**Gulf Defense & Aerospace 2019** (10-12.12.2019, Kuwait, Al Kuwait)

In 2020

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'RA&MG' №01 (50)	January 20th	**DEFEXPO INDIA 2020** (05-08.02.2020, India)
'RA&MG' №02 (51)	January 30th	**SINGAPORE AIRSHOW 2020** (11-16.02.2020, Singapore)
'RA&MG' №03 (52)	February 20th	**IADE Tunisia 2020** (04-08.03.2020, Tunisia, Ariana)
'RA&MG' №04 (53)	February 20th	**VIDSE 2020** (04-06.03.2020, Vietnam, Hanoi)
'RA&MG' №05 (54)	March 01th	**DIMDEX 2020** (16-18.03.2020, Qatar, Doha)
'RA&MG' №06 (55)	March 10th	**ArmHiTec 2020** (26-28.03.2020, Armenia, Yerevan)
'RA&MG' №07 (56)	March 15th	**FIDAE 2020** (31.03-05.04.2020, Chile, Santiago)
'RA&MG' №08 (57)	March 15th	**SOFEX 2020** (31.03-02.04.2020, Jordan, Amman)
'RA&MG' №09 (58)	April 05th	**DSA 2020** (20-23.04.2020, Malaysia, K.Lumpur)
'RA&MG' №10 (59)	April 08th	**Eurasia Airshow 2020** (22-26.04.2020, Turkey, Antalya)
'RA&MG' №11 (60)	April 25th	**ILA Berlin Air Show 2020** (13-17.05.2020, Germany, Berlin)
'RA&MG' №12 (61)	May 10th	**HELIRUSSIA 2020** (21-23.05.2020, Russia, Moscow)
'RA&MG' №13 (62)	May 12th	**KADEX-2020** (28-31.05.2020, Kazakhstan, Astana)
'RA&MG' №14 (63)	May 20th	**EUROSATORY-2020** (08-12.06.2020, France, Paris)
'RA&MG' №15 (64)	July 05th	**FARNBOROUGH Airshow 2020** (20-24.07.2020, Great Britain, London)
'RA&MG' №16 (65)	August 10th	**ARMY-2020** (25-30.08.2020, Russia, Moscow)
'RA&MG' №17 (66)	August 20th	**GIDROAVIASALON 2020** (September 2020, Russia, Gelendzhik)
'RA&MG' №18 (67)	August 30th	**ADEX 2020** (08-10.09.2020, Azerbaijan, Baku)
'RA&MG' №19 (68)	September 01th	**Africa Aerospace and Defence 2020** (16-20.09.2020, South Africa, Pretoria)
'RA&MG' №20 (69)	September 10th	**ADAS 2020** (23-25.09.2020, Philippines, Manila)
'RA&MG' №21 (70)	September 15th	**Istanbul Airshow 2020** (24-27.09.2020, Turkey, Istanbul)
'RA&MG' №22 (71)	October 05th	**EURONAVAL 2020** (20-23.10.2020, France, Paris)
'RA&MG' №23 (72)	October 20th	**INDO DEFENCE 2020** (04-07.11.2020, Indonesia, Jakarta)
'RA&MG' №24 (73)	October 25th	**Airshow China 2020** (10-15.11.2020, Zhuhai, China)
'RA&MG' №25 (74)	November 02th	**BIAS 2020** (18-20.11.2020, Bahrain, Manama)
'RA&MG' №26 (75)	November 10th	**IDEAS 2020** (24-27.11.2020, Pakistan, Karachi)
'RA&MG' №27 (76)	November 25th	**EDEX 2020** (07-10.12.2020, Egypt, Cairo)
'RA&MG' №28 (77)	November 30th	**Expo Naval 2020** (December 2020, Chile, Valparaiso)


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