RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of the United Industrial Edition

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Innovation and technology from Russia for Latin America

LAAD DEFENCE & SECURITY 2019

SPECIAL PARTNERSHIP

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The best offers for Brazil and Latin America

It has become already obvious and undeniable that security is becoming increasingly important among the various values of civilization. Today, for any state, the ability to reliably and securely protect the territory, residents and values is a priority. Political situation in the world (conflicts, sanctions, threats of war and other) makes nations once again reconsider their defense possibilities. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and nonending crisis – all of this leads to an unstable and dangerous situation.

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

LAAD Defence & Security – International Defence and Security Exhibition is supported by the Brazilian Ministry of Defence, the Military Forces, the Brazilian Ministry of Justice and Brazil's Public Security's structure. The event gathers international and national companies that provide technologies, equipment and services for the Armed Forces, Special Forces, Police Forces, Homeland Security and also security managers from large companies, service concessionaires and critical infrastructure.

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

Taking part in LAAD- 2019 Russia continues the policy of open partnership with Brazil and other countries of Latin America area. Russia has a wide product line that meets all the needs of this region and ready propose the best technology and the best price offers.

Valeriy Stolnikov

COMPONENTS FOR THE INDIA SPACE CENTRE

The Ruselectronics holding company, which is part of Russian State Corporation Rostec, has supplied ferrite components to the Space Applications Centre of the Government of India. These materials will be used in super-high-frequency devices for space satellites.

Ferrite Domen Scientific Research Institute (part of the Ruselectronics holding) has delivered microwave ferrites for the space industry to the customer. They can be used under conditions of solar radiation and other interference to precisely control wave oscillations, switch energy flows from one direction to another, and partially or fully absorb the power flow. These characteristics mean that microwave ferrites can be used as components in space microwave equipment.

'India is continuing to actively increase its pace of space exploration and is spending more than $1.2 billion per year in this field. The country is already ranked fifth among the space powers and intends to strengthen this position. The first supply of ferrites for Indian civilian satellites allows us to open a new area of cooperation and gain a foothold in this fast-growing market. Thanks to the expansion of cooperation with India, in 2018, we already expect to quadruple the share of exports of ferrite products compared to last year,' says Rostec's Executive Director, Oleg Yevtushenko. Ferrite Domen Scientific Research Institute manufactures around 40% of all ferrite products in Russia.

The Space Applications Centre of the Government of India produces civilian satellites, which are used for telephone communications, radio broadcasting and satellite Internet. In addition, the organization develops optical and microwave sensors for satellites, and software for signal and image processing.

ZENIT & LEICA

Krasnogorsky Zavod, manufacturer of the Russian brand Zenit, in cooperation with Leica Camera AG, German manufacturer of premium cameras and optics, designed a new digital rangefinder camera Zenit M with a new generation lens. The Shvabe Holding, part of Rostec, has presented this product on its exhibition stand at Photokina 2018, the largest international trade fair for the photographic and imaging industries held in Cologne. One of the participants of this Russian-German project is Krasnogorsky Zavod (KMZ Zenit), one of the Russian leading designers of photographic equipment, is part of the Shvabe Holding. The Zenit M camera is technically based on the Leica M Type 240 platform, but has been modified both in terms of hardware and software.

AK-203 Production Kicks-off in India

March 3, 2019 PM of India Narendra Modi opened a plant for production of 200-series Kalashnikov assault rifles, in Corva, Uttar Pradesh. The founders of the JV Indo-Russian Rifles Private Limited for production of Kalashnikov assault rifles in India are India's Ordnance Factory Board (OFB) and Russia's Rosoboronexport and Kalashnikov Group parented by Rostec.

'The commissioning of the JV for production of the AK203 is by all means a milestone in our partnership under the Make in India initiative. The plant in Corva is one of the most advanced OFB's small arms enterprises already in operation. With production of 750 thousand pieces approved, major components for them will come mostly from India. Nobody has offered India such deep and thorough localization opportunity with a rather high production quantity involved and it is unlikely that somebody will in the near future. The capacity of the plant is sufficient to arm the personnel of all security agencies in India. Should it become necessary, the parties will be able to ratchet up the production output and upgrade the facility to manufacture future models based on Kalashnikov's unique design,' says Alexander Mikheev, Rosoboronexport's CEO.

All operations of Indo-Russian Rifles Private Limited are consistent with India's laws and regulations. Major milestones enroute to the JV include a Government-to-Government Agreement, shareholders' agreement, approval of the JV Charter, as well as registration of the enterprise in India.

The 200-series Kalashnikovs were unveiled abroad in 2019. The weapons made their debut at IDEX 2019 in the UAE and Aero India 2019 in India's Bengaluru.

The new Kalashnikov inherited all advantages of the conventional AKs, reliability, durability, and maintainability. At the same time, they are fully consistent with modern SA requirements in terms of ergonomics and compatibility with hi-tech accessories.

'India is the first country to have launched production of the 200-series of the world-famous Kalashnikov brand. We sincerely congratulate our Indian colleagues and citizens of Uttar Pradesh on this remarkable occasion, stressing a high level of trust and unquestionable strategic partnership between India and Russia in the defense and security domain,' notes Alexander Mikheev.

Modernized Marksmanship Trainer

The engineers of Rostec's Central Scientific-Research Institute of Precision Engineering (TsNIITochMash) prepared for mass production the modernized shooter training device 1U35M1 with the operating name 'Knut' (lit. Whip) for individual marksmanship training of military personnel.

The shooting trainer Knut is designed to develop steady shooting skills up to professional and to support the skill. The realism is reached through the work of all the mechanisms of the weapon and full barrel kickback which is imitated via electromagnetic impulse.

The modernized trainer teaches how to deliver fire at the range of 100 to 700 meters from various types of shooter arms: AK-74 or series 100, the Dragunov sniper rifle with the PSO-1 aim, the auto-machine-gun RPK-74 or series 200, Pecheneg and grenade-thrower RPG-7V1 with PGO-7V3 aim, RPG-26, GP-25 (GP-30). The skills and rules for practicing shooting on the trainer are similar to those applied when operating weapons of war.

The opening course on this 1U35M1 trainer is a set of 10-12 classes lasting 15 minutes a day. 'The shooting' can be carried out from the following position – prone, kneeling, and upright at static and moving targets. The training is completely adapted to the requirements of the current Russian military marksmanship courses.

The electronic targets for the trainer Knut were created with the consideration of the experience of the popular tactical shooter games like Counter Strike to provide an interface that modern enlisted men many of whom have a rich gaming experience would find most familiar.

The kickback in the modern trainer is delivered through magnet drivers and an original lever system which provides the weapon drift corresponding with that occurring while firing weapons of war.

Besides that, TsNIITochMach engineers have advanced the software and the target layout. Another option is using standard weapons. To provide that, the trainer is equipped with special detectors.

Using new materials and template solutions helped reduce the cost of the new trainer (as compared to that of the previous version) by the factor of six.

NAVAL MATERIEL FOR THE EXTERNAL MARKET

Alexander Mikheev, Director General of Rosoboronexport (part of the Rostec State Corporation), and Renat Mistakhov, Director General of the Ak Bars Shipbuilding Corporation, signed a cooperation agreement and a joint action program to promote naval materiel in the external market in 2019–2023.

'The agreement will undoubtedly strengthen Rosoboronexport's positions on proposals for naval forces. We are closely monitoring trends in the world weapons market, we are leading some of its directions, and we ourselves are making the rules of the game that competitors have to follow. The documents signed will make it possible to manufacture products that meet the needs of foreign customers as much as possible, and also provide technology transfer – a highly demanded service today – with our very responsive and reliable protection of the results of intellectual activity of the Russian developers and manufacturers,' said Alexander Mikheev.

The purpose of signing the documents is to organize effective interaction between the companies in developing, manufacturing and promoting Ak Bars Shipbuilding Corporation's military, special, civil and dual-use products and services in external markets.

'I am very pleased to consolidate cooperation with the leading exporter of Russian weapons. We see Rosoboronexport as a reliable partner with many years of experience in external economic activities. I'm sure that our joint efforts will help the Corporation meet its primary strategic goal of increasing the revenues from the current level of 38.5 billion rubles to 100 billion rubles by 2025. In addition, I wish to note the social value of the agreement for Tatarstan: today the Corporation unites 10 enterprises and organizations that employ about 10,000 people. The portfolio of foreign orders for our products supports the modernization of production, permanent employment and growth in incomes,' said Renat Mistakhov. Under the agreement signed, Rosoboronexport will consider Ak Bars as a possible participant in various military and technical cooperation projects with foreign countries, including in the course of its international naval market research. As is known, Rosoboronexport has been appointed the organizer of the joint Russian displays at international defense exhibitions abroad. In this role, the Company stands ready to provide organizational and information support to the Ak Bars Corporation.

Frameless Body for an EgyptSat-A Satellite

ORPE Technologiya named after A.G. Romashin, part of Rostec State Corporation, has manufactured the frameless body of the Egyptian EgyptSat-A spacecraft. The satellite, launched on February 21 from the Baikonur cosmodrome, is the third Russian spacecraft with a hull manufactured with this unique technology.

The Obninsk enterprise's technology is involved in manufacturing a frameless satellite body. The design features of the body allow it to accommodate thermal control panels with built-in power elements, increasing the space inside the satellite, which can be used to accommodate additional equipment. The weight of a spacecraft with a body of this type is 15% less than its frame analogs, and assembly with the required accuracy can be done in less than an hour.

'Frameless satellite manufacturing technology is the enterprise's own technical solution, implemented in cooperation with partner TAIS. It allows you to minimize labor costs and reduce assembly time, as the design and creation of the finished product takes less than three months from the receipt of the specs. Previously, the assembly process alone could take up to six months. This is a significant advantage in the implementation of large-scale projects to create orbital satellite groupings,' said Andrei Silkin, ORPE Technologiya general director.

The EgyptSat-A satellite was manufactured for the Egyptian National Agency for Remote Sensing of the Earth. It is equipped with modern optical electronics with high spatial resolution. The spacecraft can film in the visible and infrared spectra in the panchromatic (black and white) and multispectral ranges. The satellite has an improved optical-electronic system and an on-board control complex, a high-speed on-board radio link and modernized solar panels. The mass of the device is about one ton. The lifetime of the satellite in orbit is 11 years.

'Rostec and its Egyptian partners have long-standing and mutually beneficial relations in various fields. We welcome the achievements of Egypt in space exploration,' said Viktor Kladov, director for international cooperation and regional policy. 'Rostec has a wide range of competencies and extensive experience in the development of the space industry, and we are open to expanding and strengthening collaboration in this area.'

Rostec continues to implement a large-scale program for the development of civilian production under its approved Development Strategy, the main objectives of which are to increase revenue by an average of 17% in ruble terms through 2025, increase the share of civilian products in its revenue to 50%, and increase operational efficiency and yield on fast-growing global markets.

Air Traffic Control System

Rostec and the State Corporation's affiliated company AO AIS (Public company 'Aeronavigation and Information Systems') have introduced into operation an automated air traffic control system at Borg El Arab in Alexandria, Arab Republic of Egypt.

Introducing this automated complex allows to ensure higher level of flight security, increase the capacity of the airfield complex as well as improve the operational cooperation between airport services and flight control units.

'The complex engages modern technical means, operational system and applied software that fits all the international requirements and covering all the functions requested by the International Civil Aviation Organization (ICAO).

I am convinced that this system has a great export prospective and will find great demand on international markets,' says Rostec's Executive Director Oleg Yevtushenko.

The system is manufactured by a Russian company within the structure of AO AIS and is supplied to Egypt per contract with the national provider of aeronavigational services.

EQUIPMENT TO THE TIANWAN NPP

The Roselectronics Holding of Rostec State Corporation installed the radiation-resistant television equipment to monitor nuclear fuel reloading at the Tianwan Nuclear Power Plant (China). The equipment was supplied as a part of construction of two new power units at the Nuclear Power Plant. It was the first export supply of equipment of such kind. Earlier Rostec has already supplied its solutions to the Tianwan NPP: automated workstations, industrial controllers and radiation control systems.

Special cameras may operate at a distance of 30 cm from the nuclear fuel assemblies at extremely high radiation levels (up to 1x107 rad/hour) and with a significant dose of total radiation accumulated over the entire period of operation (up to 2x108 rad). The plain equipment in similar conditions instantly gets out of order. The supplied systems consist of a television camera with a guiding device and an attachment fitting to be installed in the zone exposed to radiation, and the receiving equipment to be installed in the control room and not exposed to radiation.

The thermal imaging systems supplied to the Tianwan NPP were developed by the HVDC Power Research & Development Institute RASTR belonging to Roselectronics Holding and are a product of cooperation between several Roselectronics enterprises. Each system component is a unique technological solution contributing to the overall high quality and reliability of the equipment.

'China is our key partner in a wide variety of industries, including the nuclear energy sector', noted Viktor Kladov, the International Cooperation and Regional Policy Director at Rostec. 'Installation of the Russian systems at the strategic facility of the People's Republic of China is an indication of the highest level of relations between our countries and high confidence in the Russian equipment'.

China is one of the major trading partners of the enterprises of Roselectronics Holding. Side-by-side with the China Electronics Technology Corporation (CETC), the holding develops research and development cooperation in the field of radio electronics, including the joint development and production of multi-system high-precision navigation receivers (modules). In total, seven agreements have been signed between Rostec and Chinese state corporations covering various areas of cooperation in the field of civilian and dual-purpose technologies.

New Camera Zenit M

The new rangefinder camera jointly developed by the 'Shvabe' Holding's Krasnogorsk plant of S.A. Zverev and the German 'Leica Camera AG', was included in an exposition of domestic luxury vehicles at the Geneva International Motor Show.

A digital rangefinder camera Zenit M that was demonstrated at the 89-th Geneva Motor Show was created on basis of Leica M (Type 240) platform. The camera was an embellishment for the show-stand of AURUS, the russian brand of luxury cars and became available to guests of the exhibition for creating photographs with the AURUS SENAT Limousine L700 limo and AURUS SENAT S600 sedan. During the official visit, the Minister of Industry and Trade of the Russian Federation Denis Manturov visited the AURUS show-stand and got acquainted with the exposition.

Zenit M is the result of cooperation between two legendary brands 'Zenit' and 'Leica', the developers of Krasnogorsk plant of S.A. Zverev (KMZ) and the German manufacturer of premium cameras and optics Leica Camera AG.

The camera allows changing the photo sensitivity in the range from 100 to 6400 and enables continuous shooting at a speed of three frames per second. The model is equipped with a new generation domestic lens Zenitar 35 mm f / 1.0, which allow creating images with unique artistic characteristics that do not require additional processing.

'The joint project uniting the longstanding traditions of Russian engineering and German quality became the impetus for the rebirth of 'Zenit' photographic equipment production. Today, this well-known Russian brand with a recognized reputation is entering another segment of luxury market. The Geneva Motor Show is a new format for demonstrating the capabilities of our product', said Ivan Ozhgihin, Deputy General Director of 'Shvabe'.

The new Zenit M camera was officially presented at Photokina, the largest international exhibition in the sphere of photo industry, which took place in 2018 in Köln. The first manufactured sample of the camera was estimated by the Prime Minister of Russian Federation Dmitriy Medvedev at the KMZ production line.

Visitors to the Geneva Motor Show may acquaint themselves with the camera from the 7th to the 17th of March at the show-stand of AURUS the Russian brand of luxury cars.

Center for Russian aircraft in Peru

The maintenance and repair center for Russian-made helicopters Helicentro Peru has been launched in Lima at the facilities of the Peruvian Air Force Maintenance Service – SEMAN. Built in partnership with Russian Helicopters (part of Rostec State Corporation), the center will provide maintenance for Mi-type aircraft.

The official opening ceremony was attended by CEO of Russian Helicopters Andrey Boginsky and Chief Commander of the Peruvian Air Force Rodolfo García Esquerre.

The facility will be used by Helicentro Peru to repair Mi-17 civil helicopters operated in the region, and by Russian Helicopters to overhaul Mi-17 aircraft of the Peruvian Air Force.

'The establishment of the maintenance and repair center for Russian helicopters in Peru is of strategic importance – it will enable to provide the full range of work without taking out fuselages from the country. Although the center has just started its operation, it has already orders until 2023 – nearly 40 helicopters have been planned for repair during the next five years. In addition, the advantageous geographical location of Peru and the enterprise's production capacity would enable to accept orders from other countries of the region,' noted Andrey Boginsky, CEO of Russian Helicopters.

'Peru is the major importer of Russian-made aircraft in Latin America. This country is currently operating over 100 Russian helicopters,' said Viktor Kladov, Rostec's Director for International Cooperation and Regional Policy. 'We continue to create a unified system for managing the life cycle of our helicopters in Peru. The opening of the aircraft maintenance center is significantly enhancing our positions in Latin America that is a top-priority region for Rostec.'

RUSSIAN MEDICAL EQUIPMENT IN DUBAI

Shvabe Holding demonstrates Russian equipment for anesthesiology and neonatology at one of the largest international exhibitions in the field of medicine and health care, Arab Health 2019 in Dubai. The leading doctors from more than 150 countries become familiar with the holding's medical equipment.

On its stand, Shvabe presents an intensive care incubator IDN-03 for nursing the premature newborns weighing from 500 grams and a compatible neonatal infrared heater 'Radiant Heat-BONO'. The other products on display for the foreign doctors include the phototheraputic and anesthesia-respiratory equipment for children, along with a multifunctional inhalation anesthesia device MAIA-01. Today it is the only device made in Russia that combines artificial lungs ventilation, anesthesia and complex monitoring of the breathing mixture.

The device is manufactured on commercial scale by one of the leading enterprises of Shvabe Holding – the Ural Optical and Mechanical Plant named after E.S. Yalamov (UOMZ).

'Our exposition features a line of medical products that are successfully used by hundreds of Russian medical facilities, and are in high demand abroad. This event will help to lay a foundation for the new lasting partnerships and expand a footprint of the holding in the Middle-East marketplace', said Ivan Ozhgihin, Deputy Director General at Shvabe.

The international exhibition Arab Health has a 40-year old history. Annually it brings together the largest manufacturers of medical equipment, developers of new technologies and experts in the pharmaceutical field. It is expected that this year about 4200 companies will present their products.

Service center in Egypt

Russian Helicopters Holding Company (part of Rostec State Corporation) is completing the creation of maintenance, repair and overhaul (MRO) center for Mi-8/17 helicopters based at the facilities of Helwan Factory for Developed Industries (HFDI) in Helwan (Egypt). The Holding Company is to certify the MRO center in Egypt in 2019.

During the first stage, the center will be carrying out maintenance and overhaul of Mi-8T and Mi-17-1V helicopters operated by EAF. Future plans include mastering of a Mi-17V-5 type.

Within 2015-2018 the Holding Company fitted HFDI with the required equipment and conducted personnel training at the Aviation Training Center of Novosibirsk Aircraft Repair Plant. Moreover, basing on the audit results of the MRO center Mil Moscow Helicopter Plant has already issued a statement on the center's readiness to perform helicopter overhaul.

'One of the key objectives of JSC 'Russian Helicopters' is to organize a system of after-sales support providing first-class service throughout the complete life cycle of Russian-made rotorcraft. The holding intends to continue expanding its global network of authorized service centers. Over the past three years, in cooperation with our partners from HFDI we have performed a tremendous job establishing the MRO center for Russian-made rotorcraft at the factory's facilities. The Egyptian side is already in process of performing a pilot Mi-8T and Mi-17-1V overhaul upon the results of which we plan to proceed with certification of the center', announced Igor Chechikov, Deputy Director General for After-Sales Support of JSC 'Russian Helicopters'.

'Egypt is a long-standing and strategically important partner for Rostec. We cooperate in a wide range of areas. At the same time, helicopter industry and after-sales service of equipment are one of the key areas of our cooperation,' said Viktor Kladov, Director for international cooperation and regional policy at Rostec. 'Certification of the helicopter service center in Egypt opens up new opportunities for expanding cooperation with local partners.'

Mi-8/17 helicopters developed by Mil Moscow Helicopter Plant (part of Russian Helicopters Holding Company) are world-famous. Reliable and low-maintenance, they remain in constant demand. They are capable of medevac and humanitarian missions, cargo and passenger transportation (including VIPs). Military-transport Mi-8/17 helicopters are designed to transport service personnel and to carry cargo inside the cabin and on the external sling. These rotorcraft are employed for patrol or search-and-rescue operations and can also carry armament. Not once have they been used for combat operations in flashpoint conflicts as well as for anti-drug operations and missions against illegal armed groups.

Mi-172 to Equatorial Guinea

As part of the contract with the government of Equatorial Guinea, Russian Helicopters holding company (part of Rostec State Corporation) produced and transferred to the customer two Mi-172 helicopters manufactured at Kazan Helicopters (KVZ). The vehicles have already been sent to Central Africa.

One of the helicopters produced under the contract was delivered in the Salon VIP modification. The vehicle is designed for transportation of up to 12 passengers in greater comfort. The custom-made interior is equipped with all the necessary up-to-date hardware and uses high-quality materials. The second Mi-172 has been transferred in the passenger modification. It can transport up to 26 people in comfortable conditions.

'Equatorial Guinea is a long-time partner of Russian Helicopters. In 2006, we also delivered two Mi-172 helicopters in Salon VIP and Passenger modifications to the country. I would like to note that Russian helicopters are popular in Africa due to their advantages: reliability, easy operation, good price/quality ratio. Therefore, I am sure that this contract will not be the last one,' said the CEO of the Russian Helicopters holding company, Andrey Boginsky.

The Mi-172 is one of the Mi-17 pattern helicopters that is certified for passenger transportation and has established itself as a reliable vehicle with a high level of safety. The Mi-172 is a classical single-rotor helicopter with an antitorque rotor and a twin-engine power unit. The improved performance of the helicopter meets special requirements for passenger transportation. In addition to the passenger and VIP modifications, there are also transport, medical and evacuation, search and rescue, military and firefighting models of this vehicle. Specific features of the Mi-172 include the large power reserve of the power unit, excellent altitude characteristics, a spacious cockpit, various options of avionics, and autonomous preparation for flights and maintenance.

The Mi-8/17 pattern helicopters are designed for operation in any climatic conditions as they can be used in a wide temperature range (from -50°C to +50°C). Today, there are a total of 400 Mi-8/17 helicopters in countries on the African continent.

COOPERATION WITH SOUTHERN AFRICA

Rosoboronexport took part in the Southern African Development Community (SADC) Day celebrations. 'Rosoboronexport regards the Southern African Development Community as a promising partner. It is one of the largest and most influential subregional organizations whose activities are aimed at comprehensively promoting the development of its member countries. The Community's goals and objectives largely comply with our strategy on the African continent. We are working closely with member countries of the Community in strengthening infrastructural and state security, combating terrorism and organized crime, preparing and equipping peacekeeping missions under the auspices of the Community. We are pleased to have such a strong and reliable partner in Africa,' said Rosoboronexport's Director General Alexander Mikheev.

Today, Rosoboronexport notes an upward trend in the arms market in the sub-Saharan African countries, which is due to a number of objective factors. Among them are the fight against the spread of international terrorism and Islamic radicalism, the continuing threat of maritime piracy. In addition, different units from countries in the region are actively involved in peacekeeping operations.

The Company uses a comprehensive approach to cooperation with the countries of the region, offering its partners the delivery of final products, as well as the necessary logistics support throughout their life cycle, training and the establishment of facilities for the repair and maintenance of products.

RUSSIAN LADA IN GLOBAL MARKET

LADA continues to strengthen its positions on foreign markets. It was sold 27398 cars and SKDs in 9 months of 2018 that is by 65% more vs the same period of last year. Along with that it was opened 2 new directions and 9 dealerships. Since the early year LADA cars started to be sold in two new countries – Tunisia (Tunisia) and Chile (Santiago, Punta Arenas). LADA occupies the second position in Belarus by sales results for 9 months of 2018. The brand's dealership has been actively developed here: since the early year 6 new dealerships were opened in Minsk, Gomel, Mogilev, Pinsk, Vitebsk, and Grodno, fully meeting the new standards of design and service. For 9 months of 2018, 3 new LADA dealerships were opened in Uzbekistan – in Tashkent, Dzhizak and Bukhara. By results of 9 months LADA has again occupied the first position by sales in the Republic of Kazakhstan with a market share of 22,9%. And its growth took 5.2% points vs the same period of last year.

Engine Components for MC-21

United Engine Corporation (UEC) and the All-Russian Institute of Light Alloys (VILS), both forming part of Rostec, will prolong the life of the PD-14 engine by using a new heat-resistant granulated alloy.

The new alloy has been used for making high pressure compressor discs and a turbine for the PD-14 engine created for the first Russian short and medium-haul MC-21 aircraft. According to current estimates, its implementation, along with other innovative technical solutions, will increase the life of these components of domestic engines for civil aviation from 5 to 30 thousand flight cycles.

'PD-14 is the result of the broad cooperation work of our enterprises. The innovative solutions applied in it, including new alloys, allowed to create a truly modern, powerful and highly resourced aviation engine. The first flight of the prototype MC-21 with PD-14 is scheduled for the second quarter of 2019. Deliveries of PD-14 for MC-21 will begin in 2021', said Anatoliy Serdyukov, Industrial Director of Rostec's Aviation Cluster.

In 2019 the All-Russian Institute of Light Alloys (VILS) will conduct additional research in the interests of UEC, which will allow more extensive use of this technology for engines of civil aircraft. The research includes development of new alloys and products for a new generation of PD-35 engines based on these alloys.

Rosaviatsiya said 'Yes'

Federal Air Transport Agency (Rosaviatsiya) certified the increase in take-off/landing altitude of Ansat helicopter to 3,500 m. Major change approval is issued on the basis of trials conducted in summer 2018 at Mount Elbrus. The document allows Ansat to operate in high-altitude conditions.

Before that the helicopter take-off and landing altitude was limited to 1,000 m, restricting its use in elevated areas. During certification tests Ansat successfully completed a series of take-offs and landings at altitudes up to 3,500 m, including simulation of one engine failure and autorotation mode, thus confirming its capability to operate in high-altitude conditions.

'The major change approval for increase of take-off and landing altitude of Ansat gives us new opportunities to bring in new customers from countries with such complex terrain. For example, during the South Asian Heli Tour conducted in late 2018 we saw interest from potential helicopter operators in Vietnam, Thailand, Cambodia and Malaysia. We received approximately 30 requests for delivery of Ansat helicopters, and improvement of flight performance will benefit our subsequent customer negotiations', noted Andrey Boginskiy, Director General of Russian Helicopters Holding Company.

'Ansat is one of the main strategic projects for the Corporation. Successful flight tests at the altitude of over 1000 meters have proven reliability and the highest standards of equipment efficiency,' said Industrial Director of Rostec's Aviation cluster Anatoly Serdyukov. 'We plan to continue to upgrade and improve Ansat's performance'.

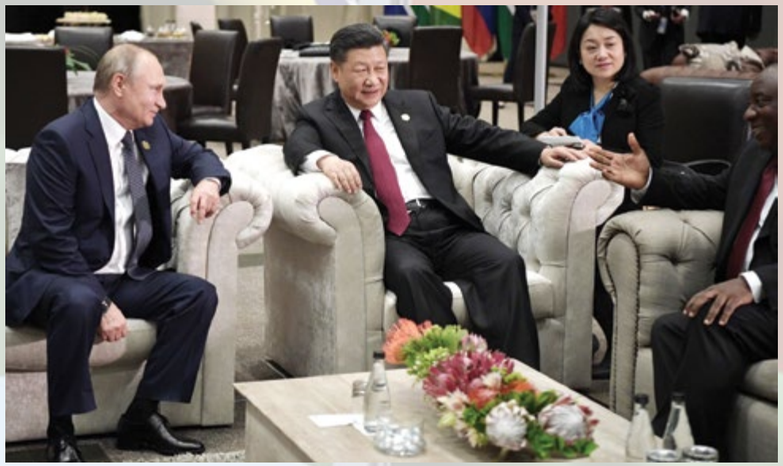
Ansat is a light twin-engine utility helicopter serially produced at Kazan Helicopters. As per the type certificate, the helicopter design makes it possible to carry out quick conversion from cargo to passenger version capable to transport up to seven people. In May 2015 a major change approval was obtained for EMS version of the helicopter. Ansat is certified for operation in ambient air temperatures from minus 45°C to plus 50°C. In July 2018 a major change approval was obtained for extension of service life of Ansat assemblies.

BRICS' PROSPECTS

Last year in Johannesburg (South Africa) there was the 10th summit BRICS, where the leaders of Brazil, Russia, India, China and South Africa consided the current situation and prospects for cooperation within BRICS in various areas, the development of BRICS and priorities of the strategic partnership. They also have discuss important current issues on the global and regional agenda, including problems of joint counteraction to modern challenges and threats. They also discussed important current issues on the global and regional agenda, including problems of joint counteraction to modern challenges and threats. The summit programme included a meeting between the BRICS leaders and invited leaders of African and other countries. Vladimir Putin was held a number of bilateral talks with the heads of state and government participated in the summit.

Summit participants discussed steps to further improve the BRICS format, promote political, security and trade cooperation, and coordinate efforts regarding regional problems, including the developments in Syria and the Middle East in general, a settlement on the Korean Peninsula and the Iranian nuclear programme.

Vladimir Putin attended a meeting of BRICS leaders with delegation heads from invited African states and chairs of international associations. Those invited included the leaders of African countries, namely, Angola, Botswana, Ethiopia, Gabon, Lesotho, Madagascar, Mauritius, Malawi, Mozambique, Namibia, Rwanda, Senegal, the Seychelles, Tanzania, Togo, Uganda, Zambia and Zimbabwe. The meeting was also attended by the heads of Argentina (the current chair of the G20), Turkey (the current chair of the Organisation of Islamic Cooperation) and Jamaica (the current chair of the Caribbean Community).



At the summit President of Russia Vladimir Putin said: 'The advantage of BRICS as a format is that it is free of all the red tape you find in many other associations like this. BRICS is an organic association of countries that have many things in common: they have many shared interests and common approaches to addressing challenges that are relevant to all of humanity, including Russia.

In fact, there is no formal leader within BRICS. All decisions are taken by consensus with full respect for the interests of all the participants in this organisation. This is one of its key advantages. Today, we also mentioned the fact that many countries are showing an interest in what BRICS is doing.

BRICS Plus and an outreach format have already been created to this effect. For now, we agreed to rely on these formats for expanding our reach and drawing into our orbit countries that share the underlying principles and values of BRICS.

So far, we have no plans to expand BRICS membership, since the existing formats have proven effective. As for our discussions and the issues we intend to address, these are issues relevant for a vast majority of countries and economies around the world. The sky is the limit for us. The same applies to politics and security.

These are the subjects we discussed and on which we have adopted decisions or coordinated positions. You may see, regarding the non-deployment of weapons in space, it boils down to security and the arms race, or rather the prevention of an arms race in this particular case.

We also talked about fighting terrorism, but is this not a vital task facing many countries? In this context, we spoke about Syria, of course, and my colleagues welcomed our idea of encouraging a more active contribution to humanitarian aid to the Syrian people, which is an absolutely natural desire.

The fourth issue we discussed concerned the industrial revolution. This is happening in Russia and the other leading and emerging economies. Why did our colleagues support our proposal on strengthening our cooperation in the humanitarian area, as well as in culture, cinema and sport? Because this is what brings us closer together and creates a natural basis for interaction between people.

The Prime Minister of India said it was a very good idea because we can organise sporting events like a mini-Olympics for the BRICS countries, a sports mini-festival that could include national sports, which are not generally known in other countries but could be interesting for our countries.

This is a natural way to bring millions of people, or even hundreds of millions or billions of people closer together, considering that the BRICS countries account for nearly half of the world's population.

Africa is one of the world's most rapidly developing regions. According to the UN, the population of this continent will reach 2.5 billion by 2050. The level of urbanisation in Africa is increasing as well: the proportion of the population living in urban areas is expected to reach 60 percent by 2050.

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Vladimir Putin

The domestic African market and consumer demand are expanding. BRICS and the African states have similar development goals in many respects. In 2015, the BRICS summit in Russia adopted the large-scale BRICS Strategy for Economic Partnership.

We need to think about involving our African partners and friends in the work of each of the areas we identified then: the economy, finance, and food security.

Russia has always given priority to the development of relations with African countries, based on long-standing traditions of friendship and mutual assistance. We have recently held a number of high-level contacts, including with many of the leaders present in this room.

Russia's trade with African states grew by more than 25 percent in 2017. Food supplies increased by 38 percent, metals – by 30, machinery and equipment – by 24 percent.

Russian businesses are interested in working with African partners in a variety of areas, including industry, agriculture, healthcare, communications, geology and mining. I will give just a few examples of Russian companies' interaction with countries represented at this forum.

I would like to note in particular that Russia plans to increase its assistance to the development of the national energy sector in African states. We are implementing promising oil and gas projects with a

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number of countries, such as Angola, Mozambique, and Gabon.

In the nuclear power industry, where Russia is a technological leader, we offer our African partners the creation of an entire industry on a turnkey basis. Agreements on cooperation in the field of atoms for peace have been signed with a number of countries in the region, while in some of them the work has acquired a practical dimension. All these projects will be of strategic importance for Africa, where, according to different estimates, as many as 600 million people still live without electricity.

A considerable part of Russian initiatives provides for localising industrial businesses in Africa, including, among other things, the construction of plants manufacturing component parts and assembly works.

The implementation of these joint projects will serve to strengthen the industrial potential, support local businesses and create new and well-paid jobs. On the whole, this will lead to an improvement in living standards and a solution of social problems in African states.

Russia has a vested interest in intensifying interaction with African regional and sub-regional organisations, primarily with the African Union as well as the Southern African Development Community.

The amount of Russian assistance to Africa exceeded one billion dollars in 2017. Russian contributions to the World Food Programme fund are constantly growing. Russia is the fifth biggest contributor to the UNIDO Industrial Development Fund.

Considerable funds are remitted to the World Health Organisation for the fight against non-infectious diseases on the African continent. Our work to combat the Ebola virus has proved highly efficient.

Russia has for years trained national professional personnel for countries of the continent. Currently, thousands of Africans are being educated in Russia. We will continue to build up cooperation in this sphere.

In conclusion, I would like to inform you that we are studying the idea of holding a Russia-Africa summit with the participation of heads of African states. This could be preceded by relevant meetings of prominent business people, experts, and public figures; I intend to discuss this with representatives of African's countries.'

/RA&MG/

PROPOSALS FROM RUSSIA

Rosoboronexport continues to develop cooperation with Latin American countries

Rosoboronexport, a member of the Rostec Corporation, presents a joint Russian exposition at the LAAD-2019 (the Latin America Aero and Defense Exhibition), is one of the most important international exhibitions in Latin America. Russian participation in this exhibition is traditionally very interesting for specialists from many countries of different continents.

As it good known, diplomatic relations between Russia and Brazil were established on October 3, 1828. The president of the Russian Federation Vladimir Putin paid a State visit to Brazil on November 21, 2004 – which became the first visit at such a level in the history of bilateral relations of the countries.

The cooperation between both countries is actively developing within the framework of the BRICS. Nowadays military-technical cooperation in the sphere of Air Forces and Air Defence between Russia and Brazil has received the most dynamic development. The present stage of cooperation is carried out within the framework of the intergovernmental Memorandum on Cooperation in the Field of Military Technologies adopted on April 9, 2002 in Moscow and intergovernmental Agreement on cooperation in the aerospace, nuclear and defence industries sighed on November 26, 2008 in Brazil.

Russia, traditional participant in the LAAD exhibition, has always enjoyed foreign professionals' utmost interest in its stands. Russian exposition usually covers the following topics: aviation and space military and civilian equipment, land, air, sea and air defense equipment and armaments and communications assets.

'Russia considers Latin America as one of the most promising regions from the perspective of military-technical cooperation. At present Rosoboronexport competes in tenders and pursues a number of options to supply aircraft equipment, helicopters and AD systems to Argentina, Brazil, Columbia, Mexico and Peru. Regional countries have also expressed their interest in military equipment used by security forces in their war on corruption, terrorism and illegal drug trafficking', – Deputy Director General Rosoboronexport Sergey Ladygin said.

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

Rosoboronexport also presents in this region a number of regionally popular military equipment designed for the armed forces and special counterterrorist and anti-corruption units. The equip-

Rosoboronexport is the only state-owned arms trade company in the Russian Federation authorized to export the full range of military and dual-purpose products, technologies and services. It is a subsidiary of the Rostec Corporation. Founded on 4 November, 2000, now Rosoboronexport is one of the leading world arms exporters to the international market. Its share in Russia's military exports exceeds 85 percent. Rosoboronexport cooperates with more than 700 enterprises and organizations in the Russian defence industrial complex. Russia maintains military technical cooperation with more than 100 countries around the world.

ment includes the VPK-233136 Tigr armored vehicle, BTR-82A and BTR-80 armored personnel vehicles, BMP-3 infantry fighting vehicles, various Kalashnikov rifles and Pecheneg Kalashnikov-designed machine-gun. Regional navies express particular interest in the Project 14310 Mirazh, Project 12200 Sobol and Project 12150 Mangust patrol boats. Several regional countries show interest in the Russian equipment designed to operate in the Arctic Region, in particular, hydrographic survey vessels.

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

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

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

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

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

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

The second famous new product from Rosoboronexport is the Pantsir-ME shipborne air-defence missile and artillery system developed and produced by the Instrument Design Bureau JSC KBP named after Academician A.Shipunov (High-Presition weapons Holding, part of Roctec).

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

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

Core areas of activities of Rosoboronexport

• Export / import of all types of conventional weapons, military and dual-use equipment and services.

• Organization of licensed production of armaments and military equipment abroad, joint R&D efforts with foreign partners.

• Maintenance and repair of earlier supplied weaponry and military equipment.

• Modernization of Russian-made weapons and military equipment.

• Training foreign specialists in Russia and customer countries in the operation and maintenance of supplied military equipment.

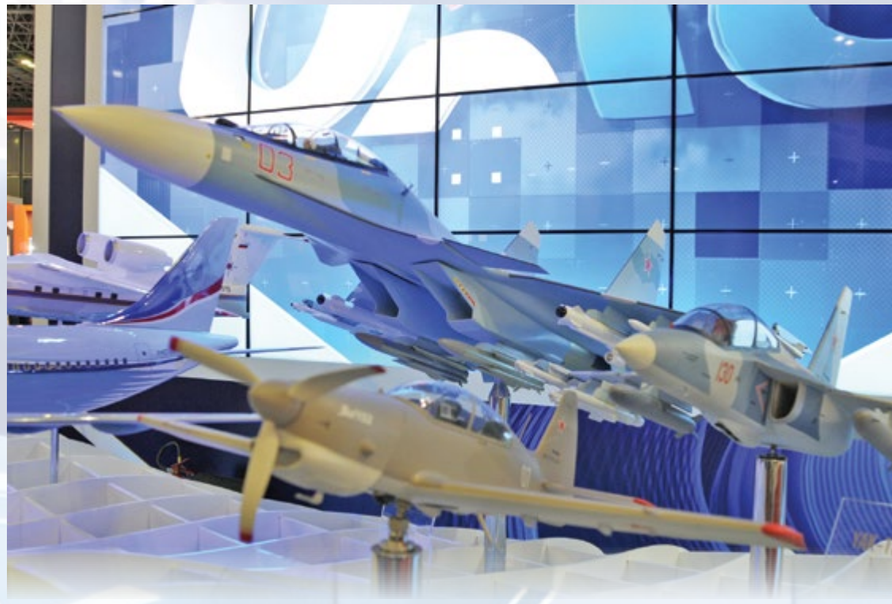
• Technical assistance in the construction of military infrastructure facilities: defense plants, airfields, depots, ranges, training centers.

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

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

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

The system includes a high-intelligent multimode adaptive radio-optical control system. All the stages of operator work – from the target acquisition to the firing – are completely automated. A combined use of the radio and opti-



cal control system provides for the all-weather and round-the-clock operability of the system. All this permits a guaranteed elimination of targets at long distances and in close proximity.

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

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

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

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

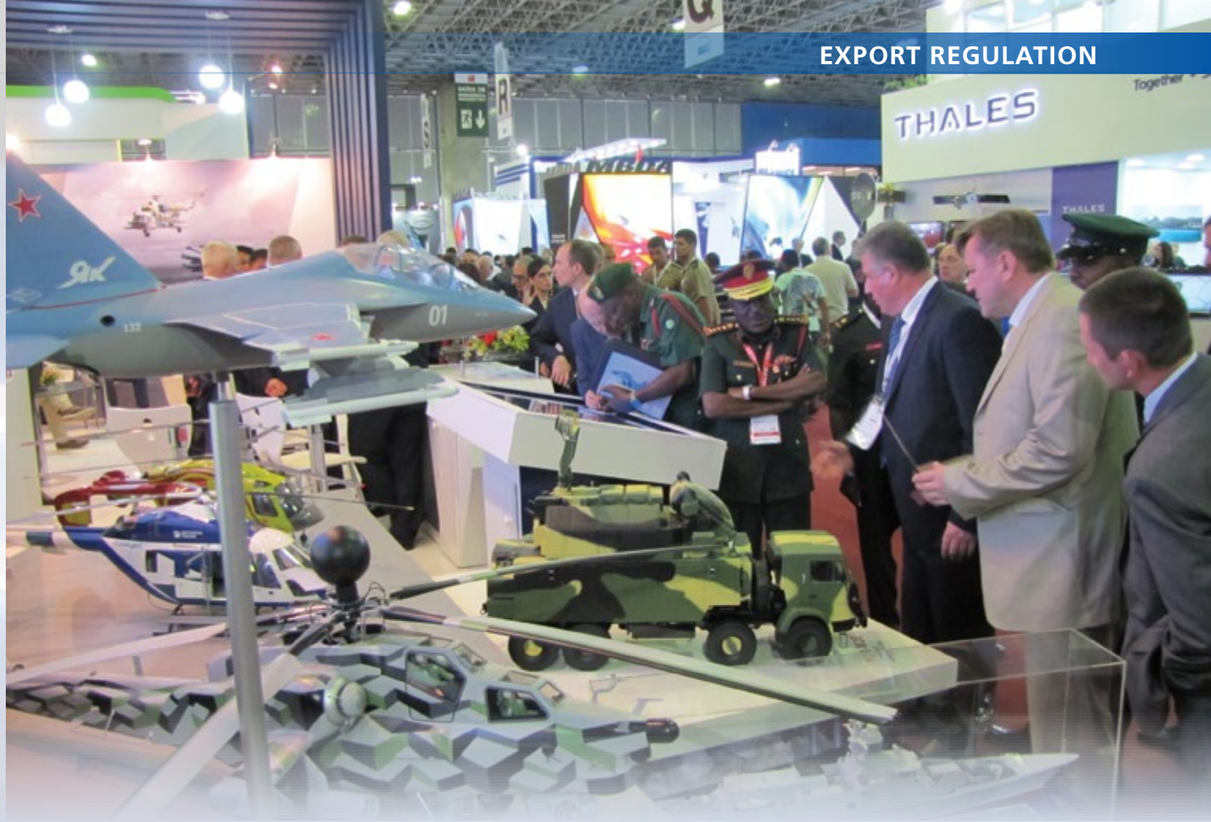
The special exporter makes painstaking efforts on a daily basis to increase Russian arms exports resulting in more than a thousand contract documents signed with foreign customers every year. Over the period of its operation in the international market, Rosoboronexport has delivered hundreds of thousands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

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

Rosoboronexport widely uses the optimal offset programs. With regard to foreign customers' interests and the opportunities of the Russian defense industrial complex to increase its exports, Rosoboronexport pays much attention both to major billion-dollar contracts and small deals worth the hundreds of thousands to several millions of dollars.

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

EXPORT REGULATION



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

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

/RA&MG/

SPLAV: New Possibilities of MRLSs

JSC 'SPLAV SPA' being a part of the 'Russian Technologies State Corporation' 'Tecmash Concern' of is the leading enterprise in development and organization of production of the Multiple Launch Rocket Systems (MRLSs) for the Army, Navy, as well as the unguided airborne armament for the Russian Aerospace Forces.

Through the years of its existence, such outstanding systems as GRAD, URAGAN, SMERCH for the Army, GRAD-M, UDAV-1M, OGON', DAMBA, RPK-8 for the Navy have been developed, dozens of unique manufacturing techniques for the rocket projectiles, the artillery shell cases of calibers from 23 to 152 mm made of various materials have been elaborated. Nowadays, our engineering developments and production techniques in the field of the rocket artillery and shell cases production are world-renowned.

Specialists of the enterprise have developed modernization programs for the GRAD and SMERCH systems, which ensured execution of the fire missions on destruction of the enemy over a distance of, correspondingly, 40 and 90 km, enhancement of capabilities of fire engagement against the typical targets, computerization of the fire preparation and delivery, upgrade of the launch vehicles.

Nowadays JSC 'SPLAV SPA' offers at the international defense market upgraded GRAD and SMERCH MRLSs, including different-purpose warheads rocket projectiles with the range of fire of, correspondingly, 40 and 90 km, upgrade of the earlier delivered launch vehicles for these complexes, state-of-the-art TORNADO-G MRLS, rocket projectiles for TOS-1A MRLS, as well as the new generation of the 80mm unguided aircraft rocket armament: HE-Fragmentation penetrating warhead unguided aircraft C-80FP rocket projectile equipped with a small-type high-energy solid rocket propellant motor.

Presently the following systems are being offered for the export deliveries:

GRAD MRLS:

1. 122mm Rocket Projectiles (RPs):

- High-effect warhead 9M521 RP;
- HE-fragmentation separable warhead 9M522 RP;
- Shaped-charge fragmentation submunitions warhead 9M218 RP.

2. 2B17-1 Launch Vehicle (LV) equipped with automated laying fire and control system (ALFCS).

TORNADO-G MRLS:

1. 122mm Rocket Projectiles:

- High-effect HE-Fragmentation warhead 9M538 RP;
- High-effect separable HE-Fragmentation warhead 9M539 RP;
- Shaped-charge fragmentation submunitions warhead 9M541 RP.

2B17M launch vehicle equipped with ALFCS and ground launch preparation and firing equipment.

TOS-1A Heavy Flame Throwing System:

- 220mm extended range MO.1.01.04M unguided RP.

SMERCH MRLS:

1. 300mm RPs:

- Fragmentations submunitions warhead 9M525 RP;
- HE-Fragmentation separable warhead 9M528 RP;
- Fuel-air explosive warhead 9M529 RP;
- Shaped-charge fragmentation submunitions warhead 9M531 RP;
- Sensor-fuzed submunitions warhead 9M533 RP.

2. 9A52-2 LV (on MAZ chassis), 9A52-2T LV (on Tatra chassis) 9A52-4 LV (lightweight six-round launcher mounted on elongated KAMAZ chassis) equipped with ALFCS.

3. 9T234-2, 9T234-2T, 9T234-4 Transporter-Loaders.

4. 9F819 Arsenal Equipment.

5. 9F827 Training Aids.

6. 9F840 Training Set.

7. MP32M1Unified Command and Staff Vehicle.

8. 1B44 Radio Direction-Finding and Meteorological Complex.

The enterprise carries out foreign trade activities in respect of the military purpose products (MPPs) in terms of delivery of the spare parts, aggregates, assemblies, devices, component parts, special, training, and auxiliary equipment, technical documentation for the earlier delivered MPPs, activities involving inspection, extension of the operational life, technical servicing, repair (including upgrade implying research, development, and design works), and other activities ensuring comprehensive maintenance service of the earlier delivered MPPs, as well as trade training of the foreign specialists in carrying out of the above works.

The specialists of the enterprise have developed upgrade algorithm for the organic rocket projectiles for GRAD, GRAD-1 and PRIMA MRLSs ensuring increase in the maximum range of fire of up to 40 km, as well as the repair documentation for overhaul of the expired specified service life URAGAN MRLS 9M27F and 9M27K rocket projectiles with determining of their guaranteed shelf life of 10 years after repair.

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MAIN PHOTO

'PANTSIR-S1'

AIR DEFENSE MISSILE-GUN SYSTEM

The system is designed for air defense of small military and administrative-industrial objects and areas against aircrafts, helicopters, cruise missiles and high-precision weapons, guided air bombs and unmanned aerial vehicles as well as for reinforcement of AD groups during repulse of massive air strikes and ensuring of engagement of lightly-armored targets.

IDEX-2019

Russian military innovations for UAE, Gulf states and other Asian countries

The International Defence Exhibition and Conference in Abu Dabi (IDEX) is one of the most strategically important and biggest tri-service defence exhibition in the world. In this year IDEX-2019 and NAVDEX-2019 were demonstrated the latest technology across land, sea and air sectors of defence. These two exhibitions become a unique platform to establish and strengthen relationships with government departments, businesses and armed forces throughout the Gulf region and MENA's states. The IDEX exhibition has been held since 1993 and is now rightly regarded as one of the most representative international platforms for showcasing weapons and security technologies. Russia has always been and continues to be its active participant.

IDEX-2019 was held under the patronage of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, President of the UAE and Supreme Commander of the UAE Armed Forces and is organised by the IDEX LLC in association and with the full support of the UAE Armed Forces. IDEX and NAVDEX took place at the Abu Dhabi National Exhibition Centre (ADNEC), and occupied all of the 100% of the state-of-the-art exhibition centre, utilising 133,000 sqm of event space. More than 1500 companies took part in the exhibition.

Big success was in NAVDEX-2019, the main topic of it was Maritime Security Area. This was very interesting for local and international exhibitors who specialize in naval, maritime and coastal security technology, equipment and crafts. Located on the dock edge, NAVDEX-2019 also showed, on-water exhibits, daily demonstrations and visiting navy vessels.

The other part of IDEX-2019 was Defence Conferences, the official conference of IDEX, was analytic platform to meet away from the bustle of the exhibition halls with key decision makers from the government, military and defence industry, giving you the opportunity to discuss the biggest challenges the industry is facing and indentify the potential solutions.

Organised by ADNEC in collaboration with the Ministry of Defence and UAE Armed Forces, the two exhibitions showcased the latest defence developments featuring technology trends from the Fourth Industrial Revolution and artificial intelligence and the vital role of these technologies in advancing the defence sector and its relevant industries. Themed 'Defence for Security and Safety', the event also highlighted the leading initiatives in achieving digital transformation in line with the country's Artificial Intelligence Strategy aimed at enhancing government's performance. Humaid Matar Al Dhaheri, Group CEO of ADNEC has confirmed that the edition of IDEX and NAVDEX 2019 proved once again its leading position as a global platform to showcase the latest leading developments in security and defence, in line with the global technological trends such as the Fourth Industrial Revolution.

Russia is traditionally one of the largest participants in the defense exhibition in Abu Dhabi. At the IDEX-2019 International Defense Exhibition Rosoboronexport, a subsidiary of the

Vladislav Kazak,
CEO, NPO Angstrem:

'This was not our first IDEX exhibition. We present our key products, including our pride which is a sixth-generation portable radio station made for export. This year our exposition included a novelty: a portable sixth-generation programmable radio station, whose characteristics make it unique both in Russia and internationally. The station has a frequency hopping sequence of up to 20,000 hops per second, making it virtually impossible to intercept the signal or feed false information. The station provides absolute reliability of communications guaranteed against any jamming or malicious interference. Our products are well known in the world as some of the best examples in their class. We ran an analysis of the exhibits on display at IDEX 2019 and arrived at the conclusion that NPO Angstrem has a number of technology advantages over the competition. Our technology solutions are already drawing the interest of international industry leaders and experts, which is a cause of pride for us.'

Alexander Smirnov,
managing director, NPO Splav:

'The IDEX-2019 show, hosted in Abu Dhabi on 17-21 February 2019, was one of the largest and most prominent international arms exhibitions. NPO Splav, a Techmash Concern company, showcased an impressive array of defence products in the framework of Rostec Corporation's cluster of conventional weapons, munitions and special chemistry. The company's exposition featured a capability presentation of the new-generation Tornado-G multiple-launch rocket system.

The presentation was supported by the NettleBox 3D holographic visualization rig, which allowed for a highly detailed demonstration of the Tornado-G's competitive vehicle and munitions. NettleBox represents a significant new milestone in promoting Russian weapon systems at international exhibitions. It will help NPO Splav to increase commercial return on participation in trade events and maintain its status as a business that utilizes hi-tech solutions in all aspects of its operations.'

Rostec State Corporation, is organizing a demonstration of modern and most demanded Russian weapons

Russia is traditionally one of the largest participants in the defense exhibition in Abu Dhabi. At the IDEX-2019 International Defense Exhibition Rosoboronexport, a subsidiary of the Rostec State Corporation, was organizing a demonstration of modern and most demanded Russian weapons.

'The Middle East and North Africa (MENA) countries are extremely important markets for us where we implement a lot of projects both in civilian areas and in the field of military-technical cooperation, said Sergey Chemezov, Director General of the Rostec State Corporation. More than 50 Russian defense enterprises will demonstrate their innovations at IDEX 2019. In total, about a thousand items will be exhibited, and we'll show a number of pieces of military hardware for the first time.'

'Each time, Rosoboronexport shows the latest additions to its export catalog here, and this year will be no exception. In the framework of a single Russian display, organized by the company, we will present our foreign partners with more than 200 advanced pieces of weaponry for all services of armed forces. I am sure that IDEX 2019 will traditionally open new horizons in the Arab East, the key region for our company, which accounted for almost half of our deliveries in 2018,' said Rosoboronexport Director General Alexander Mikheev.

For the first time, Rosoboronexport and NPO High Precision Systems were organized in Abu Dabi demonstration of the Pantsir-ME naval air defense missile/gun system at an exhibition held abroad. The system has been designed and manufactured by the KBP Instrument Design Bureau named after Academician A. Shipunov.

The newest Kalashnikov AK-200 series assault rifles (AK200, AK203, AK204 and AK205) was displayed for the first time at Kalashnikov Concern's stand. Rosoboronexport held presentations of these rifles in the course of negotiations with foreign customers on the supply of small arms.

Also the company held two presentations of advanced products, 'Russian-made Air Defense Systems' and 'Small Arms, Special Weapons and Close Combat Weapons;', during which its specialists told about new and the most popular products. In addition Rosoboronexport held a presentation of the commercial and industrial potential of the Republic Tatarstan, which produces a lot of weapons and military equipment for export.

Other advanced novelties from Rosoboronexport's catalog were also showcased at IDEX-2019: BMD-4M airborne combat vehicle, BTR-MDM airborne multipurpose armored personnel carrier (APC), BT-3F amphibious tracked APC, Viking SAM system and Pantrir-S1M air defense missile/gun system, Karakurt-E and Sarsar small ships, components of the Ratnik combat gear's protection system and the 6B52 combat gear system. The latest ammunition for artillery, including rocket artillery, were also on display at the company's stand.

Foreign customers showed keen interest in products that have been tested in real combat conditions during the anti-terrorist operation in Syria. Such models have already become the undisputed leaders in their segments of the world arms

Andrey Alexeyev,
Deputy Director Technical Training Equipment Department, RPA RusBITech:

'At IDEX-2019, our company exhibited innovative developments related to military training and commander's decision support at various levels of planning and warfare command.

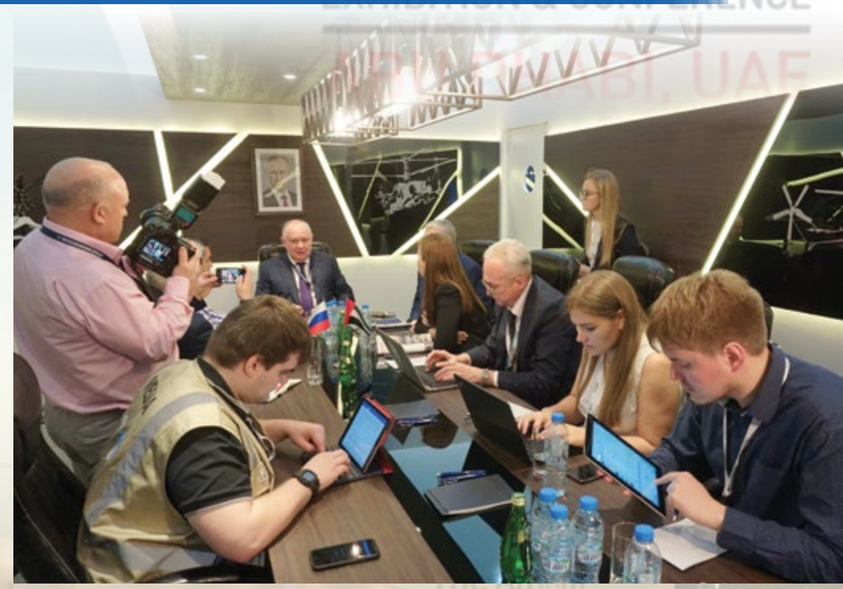
Our IT technologies include the Spektr-7E software/hardware intended for headquarters and officer training, joint combat training through warfare modelling, and integration of training assets into a single virtual battlefield. We also offer the TESE-E electronic small arms training simulator and the KPO-E shooting-range targeting system.

One of our most prominent developments is the Spektr-7E software/hardware system, which we keep upgrading. The product cuts headquarters and officer training times to prepare personnel for combat in any region, and allows for the training of joint army, navy and air force groups.

The system offers a broad range of training and warfare simulation scenarios, allowing personnel to model and train through different options and select the one that would help achieve the combat objective with the minimum losses and costs. Our product has a number of objective advantages over international equivalents. It provides more realistic simulation, has a longer service life, offers higher operating speeds, features a simpler and convenient interface, and is more attractive commercially. One of the system's important features is that it utilises actual terrain maps and can present the combat situation in both three-dimensional and two-dimensional formats.

The Spektr-7E can be used as a technology platform for combat training centres based on the latest Life, Virtual, Construction (LVC) concept, which ensures maximum simulation of actual warfare scenarios.

IDEX is a colossal exhibition platform representative of all the leading international industry players. It is obvious that RPA RusBITech is acting correctly and in keeping with the global trends; we are on a par with the latest technologies and developments, and often are ahead of the competition.'



Nikolay Semenenko,
Managing Director, Mechanical Engineering Research Institute named after V.V. Bahirev:

'At the IDEX 2019 exhibition in Abu Dhabi, our institute presented a wide spectrum of ammunition for armour, field artillery and naval artillery applications ranging between 76 mm and 152 mm. Middle Eastern countries are historically interested in such munitions. The exhibition was stolen by the efficient 100-mm Basnya high-explosive fragmentation projectile, which can be used in conjunction with the BMP-3 infantry fighting vehicle. Basnya is of interest in the region because a number of Arab countries operate Russian-made IFVs. The institute is prepared to both provide MRO services for products already sold and localize production in countries that order them. At the UAE exhibition, the institute presented a cluster munition that deploys around 40 submunitions at a certain point and covers an impressive area, including any equipment.

We are observing a growing interest in our products, seeing as the global situation is growing ever more complicated and armoured vehicles remain the backbone or ground troops. Virtually all the munitions designed by Mechanical Engineering Research Institute named after V.V. Bahirev are reliable, highly efficient and adapted to the existing and future combat technologies, making them universal.

We are equally respectful to all markets, including Middle Asia and North Africa. We are prepared to work on all the existing markets and in virtually all the existing regions, and we are invariably treated with respect. Professionals are well aware that Russia makes the best munitions in the world.'

market: Su-35 and MiG-29M fighters, Mi-28NE and Ka-52 attack helicopters, T-90S MBT, BMPT fire support fighting vehicle, Kornet-EM ATGM system, S-400 Triumf anti-aircraft missile system, the Repellent anti-UAV electronic warfare system, as well as ships and submarines equipped with the Kalibr integrated missile systems. Rosoboronexport met and hold negotiations with government officials, senior military officers and business representatives from the Middle East and North Africa countries.

The UralVagonZavod Research and Production Corporation presented a number of its products at IDEX-2019, particularly the T-90MS main battle tank. The Russian name of the vehicle is Proryv (Breakthrough), implying that this is not just another upgrade of the T-90 tank but also a truly new tank. It has greater accuracy of fire, a new highly automated digital fire control system, new digital communications, navigation and interaction equipment, and a more powerful engine. The vehicle has enhanced protection in all projections. Its modular design allows for building up capability in further upgrade efforts.

The company also presented the AU-220M unified automated unmanned 57-mm artillery module, whose all-new cannon has an enhanced firing accuracy and can be controlled remotely. The public also demonstrated a heightened interest in the upgraded TOS-1A Solntsepyok heavy flamethrower, which features an advanced engine and explosive reactive armour. The flamethrower has a new launcher, and the loading vehicle has a new crane. The TOS-1A combines great cross-country ability, mobility and effectiveness against enemy troops personnel in open terrain and in shelters.

As part of the IDEX 2019 international exhibition, the Tecmash Concern of State Corporation Rostec has presented unique video footage of the Tornado-G multiple rocket launch system in action.

The combat vehicle is equipped with an automated guidance and fire control system, as well as preparation and launch equipment. Without leaving the cockpit, it is possible to enter flight mission data remotely into the detonators and launch the

Alexand Krasovitskiy
Director General, Military Industrial Company

'Military Industrial Company brought to IDEX 2019 a VIP-configured example of the Tigr armoured vehicle co-created with Bogema Auto. The version outwardly differs from the baseline in the quality of body painting and polishing, and also in the presence of door footboards. The interior offers a high level of comfort, convenience and safety. It incorporates elements made of fine wood, genuine leather and suede. The vehicle is outfitted with an advanced multimedia system. The armoured body and window glass offer NATO STANAG 4569 level 2 ballistic protection.

Our equipment intended for Russian government agencies and for export undergo official tests involving specialised organisations of the Russian Defence Ministry and other national security services. UralVagonZavod supports uninterrupted operation and combat readiness of its products through out their service life. We are constantly improving our after-sales support system and expanding the range of repair operations available. Our export products are covered by maintenance warranty for the entire duration of the period stated in the contract. We train local specialist to maintain and repair our vehicles. If required, we deploy teams of highly qualified maintenance personnel to the customer's country.'

Dmitry Bruskov,
Director General, KSF Peredovaya Tekstilschitsa:

'At the Abu Dhabi exhibition we presented our traditional products, which are widely used in different types of rescue and personal protection equipment from parachutes to bulletproof vests and helmets. The Persian Gulf market is extremely competitive, but our produce is generally more advantageous, first of all thanks to the stronger threads we use. Our products offer better ballistic protection, lower weight and smaller size, as corroborated by the history of their operation in the region. Our IDEX-2019 exposition was visited by numerous international delegations. Our potential customers are naturally interested not only in purchasing our products but also in the possibility of organising local production. We are prepared for such talks, but one should realise that their outcome will largely depend on political and economic considerations. In addition, protection equipment is normally marketed as part of bigger systems. Also, we export all our products with our good business partner Rosoboronexport.'

Georgy Antsev,
General Director – Chief Designer, Morinsis-Agat Concern:

'At IDEX-2019, our exposition primarily focused on the demonstration of competencies in the creation of integrated information management systems and distributed surveillance systems (including for underwater operations), computational warfare modelling, particularly in the littoral zone, etc. We presented our solutions related to integrated systems intended for the automated management of ships and onboard weaponry, and also solutions related to radio detection and ranging, hydroacoustics, coastal protection and other applications that may interest foreign customers. We were also promoting the Bal coastal missile system, which has proved its high effectiveness in service with the Russian Navy and with foreign clients. Overall, we offer a whole new level of integrated solutions aimed at bringing together the existing systems for maximum protection of coastal lines.

This is a highly competitive market, but our concern is certainly a leading player. Our developments are consistently among the best products available.

Not only do we offer optimal IT solutions integrating all the network resources, we are also prepared to deliver terminal devices for the purpose of providing comprehensive reliable protection systems for sea-surface ships, submarines, boats, aircraft, etc. In other words, we are ready to provide turnkey solutions for our customers and act as the chief system integrator, seeing as we have successful prior experience solving complex problems, as corroborated by the concern's unique competences.'

projectiles. The launch package on the Tornado-G combat vehicle consists of forty tubes. The system was developed in a 122-mm caliber, which allows the use of rocket projectiles from both the Tornado-G and the Grad systems.

Also for the first time, Tecmash has presented abroad one of the munitions developed for the Tornado-G – a 122-mm unguided missile with a detachable high-explosive warhead with fragmentation increased-efficiency (index 9M539). It was developed at the NPO SPLAV base and is intended to destroy open and sheltered manpower, unarmored vehicles, command posts and other targets. A missile can effectively hit targets behind folds of the terrain (backward slopes, ravines, etc.) and in mountains.

'The firing range of this projectile is from 5 to 20 kilometers. The temperature range of combat use is from –50 °C to + 50 °C. The damage efficiency is, on average, six times higher than that of the uncontrolled 9M22U high-explosive fragmentation projectile (standard projectile) of the Grad system,' said CEO of Tecmash Vladimir Lepin.

'Tornado-G is a follow-up to the renowned Grad system that has been used by armed forces of many countries for more than 50 years and has proven its reliability and faultless operation. As compared to its predecessor, Tornado-G is five times faster and has a higher damaging capacity,' noted Sergey Abramov, Industrial Director of the Armament Cluster of the Rostec State Corporation.

At the defense exhibition, Tecmash has also showed the world community the AZ-TSR-47 increased-efficiency turbo-jet projectile, designed to protect surface ships from weapons equipped with radar guidance systems, for the first time. The main objective of this munition is to create radar interference in a given area. When moving, the projectile releases a false radar target in the form of a cloud of dipole reflectors, thereby misinforming enemy detection systems or diverting an attacking rocket to the false target. The projectile has increased efficiency in comparison with known analogs due to the rapid formation and large area of dispersion of false radar targets. The munition is launched from the shipboard ZIF-121 launcher of the PK-2 shipboard complex.

In addition, the RPG-30 anti-tank grenade with disposable grenade launcher, which has no analogs in the world, has been presented at the Tecmash stand. The RPG-30, developed at the NPO Bazalt, can strike modern and advanced tanks, including those equipped with attached dynamic protection and an active defense system, as well as other armored and unarmored targets.

In total, at the IDEX-2019 exhibition, Tecmash presented over a hundred samples of military products from seven of its leading enterprises: NPO Splav, NPO Bazalt, NPO Pribor, NIMI V.V. Bakhirev, the Plastmass plant, NZIV and NPO Poisk. The area of the exhibit was more than 120 square meters. /RA&MG/

Yuri Nabokov,
Director General, Scientific production association Pribor (NPO Pribor):

'At IDEX-2019, NPO Pribor was primarily exhibiting its traditional product line, including new-generation 30-mm munitions for aerial cannon, ship-based anti-aircraft missile/gun systems, armoured vehicles and infantry units. We also presented our close-combat products and the Balkan grenade launcher, which turned heads as a jewel of the Russian exposition. Our munitions historically enjoy high and sustained demand in the region; our products have long been known in the local market and have proved themselves excellently.

We are also seeing a great deal of interest in our work to increase the effectiveness of munitions through improving their reliability, seeing as we have virtually hit the combat power ceiling with the existing materials and technologies. Incidentally, NPO Pribor significantly surpasses its international competition when it comes to the reliability of its products, and Russian-made munitions offer a much more advantageous price-to-quality ratio.'

Dmitry Zhidkov,
Deputy Director General for Armed Services Procurement, Military Technical Cooperation and Interaction with the State Authorities, Shvabe Holding:

'This was the second IDEX exhibition for Shvabe Holding. We presented a broad array of defence products and components for armament and military equipment. These included a tank commander's panoramic surveillance device, a short-wave infra-red (SWIR) camera, and other products. IDEX 2019 was the first international debut of our new ULTRA ultraviolet camera, one of the most effective devices for locating insulation faults in power generation, as well as for a laser-based instrument landing system, the SOLT-25 targeting system and the Irbis-K tank thermal sight. IDEX is the largest and most authoritative such exhibition in the region; our optical devices and optoelectronic systems are in high demand across in many countries of the region, so we are very much hopeful about this market.'

AERO INDIA 2019

Russia presented classic and innovative developments and proposals

AERO INDIA Exhibition which is organised from 1966 every two years has already carved a niche for itself globally as one of the premier aerospace exhibition. More then 60,000 business visitors and 1,000,000 general visitors attended AERO INDIA 2019, which was held from February 20 to 24 at the Yelahanka Air Base in Bangalore, India. Russian participation in AERO INDIA 2019 was sufficiently vivid and convincing, showing the further successful development of Russian-Indian relations in the field of aviation, aerospace and security.

Rosoboronexport, a subsidiary of the Rostec State Corporation, was showcasing the best products from the Russian defense industry at the AERO INDIA 2019 International Aerospace Exhibition.

'Russia is implementing major and ambitious high-tech manufacturing projects with India, which are regularly discussed by the Heads of both States at summit meetings. Our cooperation is fully in line with the Government of India's Make in India policy. In fact, Russia was the first country to support the program. More than two hundred Su-30MKI aircraft have already been assembled in India in cooperation with the HAL Corporation under a contract with Rosoboronexport. We'll soon start manufacturing Ka-226T helicopters in India at Indo-Russian Helicopters Limited, a Russian-Indian joint venture established in 2017. We are also actively cooperating on products for other services of armed forces. I am sure Aero India 2019 will open up new horizons for cooperation with Indian partners,' said Rosoboronexport Director General Alexander Mikheev.

Rosoboronexport was the organizer of the joint Russian display at the exhibition and encompassing products from 11 domestic defense enterprises and holding companies. In total, the company was exhibiting more than 200 pieces of defense hardware at its stands.

Of the products were displayed at AERO INDIA 2019, the newest Russian aircraft like the MiG-35 multifunctional front-line fighter, the Su-35 multi-role super-maneuverable fighter, the Il-78MK-90A tanker, the Il-76MD-90A(E) military transport aircraft, as well as the Yak-130 trainer (combat trainer) are of particular interest throughout the world and in the Asia-Pacific region.

In addition, according to Rosoboronexport, the Ka-226T day/night light utility helicopter, including its ship-based version, the Ka-31 radar picket helicopter, the Ka-27PS deck-based search-and-rescue helicopter and the Ka-52 scout/attack helicopter are promising in the region.

Air defense assets like the Pantsir-S1 self-propelled anti-aircraft gun and missile (SPAAGM) system, the Tor-M2E and Buk-M2E SAM systems and Igla-S MANPADS should be of equally great interest to foreign customers during the exhibition. in addition, it is expected that representatives of the security agencies of the Asia-Pacific countries will draw special attention to counter-terrorism solutions, security systems for high-value installations and airfields, as well as Russian-made EW assets and counter-UAV systems.

'Rosoboronexport appreciates the good partnership relations with its Indian customers. Last year, Russia and India took yet another set of significant steps towards each other by signing contracts for the supply of Russian military equipment and its production at national Indian enterprises, thus bringing the company's order book in India to $10 billion. We are not going to stop here and are ready to step up cooperation, including in the framework of the 'Make in India' program,' added Alexander Mikheev.

Within the AERO INDIA 2019 the delegation of JSC Rosoboronexport conducted a series of productive negotiations and consultations with the Indian partners on military and technical cooperation, which resulted in signing a number of contractual documents.

On the very first day of the show the Russian national exhibit was visited by Minister of Industry and Trade of the Russian Federation Denis Manturov and Minister of Defence of the Republic of India Nirmala Sitharaman, which contributed to the collective success of the Russian delegation's work at Aero India 2019 as well as underscored a special high profile of the Russian-Indian mil-tech cooperation.

'Russia is ready to offer to India not only the state-of-the-art military equipment, but also the technologies of production, i.e. the expertise, which we can share with each other in the framework of a wide industrial part-

Sergey Kulakov,
Head of delegation at AERO INDIA 2019, 'Almaz – Antey' Air and Space Defence Corporation':

'AERO INDIA 2019 proved a fairly dynamic exhibition, with representatives of dozens of international companies visiting our stand. They were interested both in our products and in possible cooperation. We also held fruitful and constructive talks with Indian partners, whom we have been working with for many years.

Almaz-Antey was exhibiting products which are particularly in demand in the region; we are in delivery talks with some of them – I mean primarily long-range systems. We also demonstrated upgraded versions of some systems already in service with the Indian Armed Forces. Our exposition included the S-400 Triumf, S-300VM Antey-2500, S-300 PMU2 Favorit and Buk-M2E SAM systems, as well as different modifications of the Tor system, including the Tor-M2E and Tor-M2K. Also presented were autonomous combat modules of the Tor-M2KM system and the Adjutant aerial target system.

Our exposition in Bangalore also included civilian products, such as the DMRL-3 Doppler weather radar and the ROSC-1 radar-optical perimeter security and anti-UAV system.'

Anatoliy Punchuk,
Deputy Director, Federal Service of Military-Technical Cooperation of Russia:

'Russia and India share a 60-year-plus history of dynamic defence cooperation, which is a cornerstone of the strategic special relationship between the two countries. We can boast both solid results and good prospects. India in 2018 was among the top three of Russia's leading defence partners with a portfolio of orders for Russian military products exceeding $10 billion. The combined total of our contracts with that country exceeded $12 billion over the past five years.

We appreciate it that our Indian partners are not succumbing to the Western sanction pressure, which is being used as a component of unfair competition aimed at driving Russia out of its traditional markets. India openly states that Russia remains its strategic partner, including in arms supplies. The Indian government is well aware of the fact that Russia offers it a special relationship, which implies, inter alia, technology partnership, equal innovative cooperation on shipbuilding, aerospace engineering, armoured vehicles, etc. None of our competitors offers, or is even capable of offering such a level of openness and interaction.

Russia and India enjoy long-standing relations of trust and true partnership. The contracts signed late last year demonstrate that our defence dialogue continues successfully. We have a number of promising projects to set up joint production ventures in India, which prove the high level of mutual trust between our countries.'

nership in line with the Make in India policy. The potential for the development of cooperation in this area is huge, and we are focused on its full achievement,' said Rosoboronexport's Director General Alexander Mikheev.

The main themes of the meetings with the leadership of the Ministry of Defence, Air Force and Navy, held in Bangalore, were the promising projects on the supplies and production in India of various types of the Russian military equipment, primarily within the implementation of the Make in India state programme, and on the after-sale services, maintenance and modernization. In particular, the parties went on with pro-active consultations on the project, which implies production of Ka-226T helicopters at the Russian-Indian joint venture Indo-Russian Helicopters Limited, for which purpose the Russian Helicopters Holding signed a number of appropriate memoranda with the Indian partners.

The Russian exhibition stands, represented by such leaders of the industry as the Public Joint Stock Company United Aircraft Corporation, JSC United Engine Corporation, JSC Russian Helicopters, JSC Almaz-Antey Corporation, JSC 'SPC 'Techmash', JSC Shvabe and others, familiarized Indian participants and visitors with hundreds of Russia's defence products, ranging from planes and helicopters to air defence systems.

Apart from that, the static demonstration, arranged by the organizers, hosted full-scale specimen of the sophisticated Russian-made aircraft, which are in the inventory of the Indian Armed Forces, i.e. Su-30MKI and MiG-29UPG warplanes and Mi-17V-5 helicopters. Those specimen, piloted by Indian airmen, took part in the opening ceremony of the air show and the programme of demonstration flights, while a team of Indian female parachute jumpers performed the first in the Aero India history female jump from the height of 1,5 km (5000 feet), to where they were delivered by a Russian-made Mi-17 helicopter. 'Willing horses of the Indian Air Force and its backbone,' that's what the local Indian newspapers in Bangalore called the Russian aviation equipment.

In general, the wok of the Russian delegation at AERO INDIA 2019 proved that Russia and India may be rightly proud of the highest level of friendly and trusted relations, which also spread on such a sensitive sphere as defence and security. With this in mind, the most obvious confirmation of a wide-scale character of the bilateral partnership is the portfolio of India's orders for the Russian military equipment, which equals to 10 billion US dollars.

Praveen Pathak
General Manager, Market Promotion and Export, BrahMos Aerospace:

'The BrahMos missile is an exemplary result of Russian-Indian defence cooperation. The missile is undoubtedly among the best in the world; it features a high level of universality in that it can be launched by a variety of ground, sea-surface and aerial platforms. At AERO INDIA 2019, we presented an upgraded BrahMos-NG missile for the Sukhoi Su-30MKI fighter; each aircraft can carry up to five such missiles. This enhances the Russian-Indian fighter's combat effectiveness. BrahMos-NG can be carried by the MiG-29, submarines and other platforms. We are convinced that this BraMos iteration will have a bright future. We expect to launch production of the new missiles within two or three years.'

Russian Helicopters Holding Company (part of State Corporation Rostec) took part in the AERO INDIA 2019 and showcased the shipborne version of Ka-226T helicopter as well as the vast range of civil-purpose helicopters. This year, the key exhibit at the Holding Company's booth was the mock-up model of a light shipborne Ka-226T helicopter. The naval version of Ka-226T features blade folding system of main rotor. Also, the helicopter boasts the state-of-the-art avionics suite, its components and systems are fit for operation under aggressive conditions of marine environment. Owing to its small dimensions, the helicopter can be deployed on ships and low-displacement vessels. Ship-based Ka-226T helicopter may be used to perform search and rescue, as well as transport missions day and night in standard and adverse weather conditions.

'No doubt, India is our strategic partner and at this show we are planning to discuss one of our key projects: the localization of production of Ka-226T in this country. Moreover, in view of the voiced interest in procuring light utility ship-based rotorcraft we shall put an increased focus on presenting the capabilities of naval version of Ka-226T. The helicopters in such configuration are being delivered to the Russian special-task aviation and already have a favorable track record. This rotorcraft may become a logical continuation of the current cooperation we are building within the scope of the 'Make in India' program', noted Andrey Boginskiy, Director General of Russian Helicopters Holding Company.

The Holding Company also showcased the mock-ups of Ansat and Mi-171A2 rotorcraft and conduct a set of negotiations on the prospective deliveries of these helicopters. India is to become one of the first foreign operators of Mi-171A2: currently the Holding Company is finalizing joint TC validation activities with the Indian authorities. The first Mi-171A2

Oleg Golubev,
Assistant Director General, Director of the Information and Analysis Centre, Izhevsk Electromechanical Plant Kupol:

'AERO INDIA 2019 once again proved the popularity of our key product, which is the family of Tor SAM systems. Our product's modular design allows for installing it on virtually any platform as requested by the customer, from trucks and trailers to naval ships and stationary positions. Of no lesser popularity is our all-new product, the Adjutant target system. The targets used in conjunction with the Adjutant allow for quality training with virtually all the existing SAM systems, including target practice emulating the most probable enemy targets. The system has an unrestricted upgrade potential: additional target types can be promptly added by modifying the profiles of the existing targets. The Adjutant can also be used in testing any types of SAM systems.

AERO INDIA continues as a leading arms exhibition in the region, it never stops evolving… Its air-defence segment keeps growing, and Russia dominates that segment by right. Russia also has its own projects to offer in the domain of anti-UAV solutions, which has been gaining popularity over the past several years.'

shall be handed over to the Indian customer in 2019.

Besides, the visitors of AERO INDIA could see the mock-up model of a utility Mi-38 helicopter. This is one of the most computerized civil helicopters in the world: The flight control and navigation suite enables automated enroute flight, landing, hovering and stabilization in any flight mode. The integrated on-board equipment suite IBKO-38 installed on Mi-38 supplies the crew with information of sufficient quality and quantity to guarantee top flight safety. Due to the implemented technical solutions Mi-38 surpasses other helicopters in its class in terms of load-/passenger-carrying capacity and major flight performance. Mi-38 is intended for operation in a wide range of climatic conditions including maritime, tropical and cold climates.

In addition to presenting its products, Russian Helicopters focused on discussing after-sales support of rotorcraft operated by the foreign customers. The new format of ASS offered by the Holding Company is aimed at structuring strategic relations with an operator and implies execution of long-term no-bid agreements and transition to life cycle support contracts.

At AERO INDIA 2019 Russian Helicopters Holding also organized the conference of potential suppliers of components for Ka-226T helicopter made in India with more than 30 Indian industrial enterprises as participants. Identifying the chain of local suppliers is a part of the project of setting up the production of Ka-226T helicopter in India.

In frame of the airshow Russian Helicopters and a number of Indian companies signed Memorandums of Understanding. The parties agreed to consider setting up the production of a number of Ka-226T helicopter assemblies and components in India. The MOUs were signed with the following companies Elcom, Valdel Advanced Technologies, Dynamatic Technologies, Integrated Helicopter Services and Bharat Forge, covering assemblies such as fuselage, blades, radiostation and landing gear.

'We have launched a new stage of Ka-226T project: identifying the chain of manufacturers among the Indian companies. I am positive that the agreements reached today will result in a long-term mutually beneficial cooperation at a later stage when the production of Ka-226T is transferred to the customer's territory', noted Andrey Boginskiy, Director General of Russian Helicopters Holding Company following the signing.

'The program of localization of production of Ka-226T helicopter in India is a key project within the scope of the 'Make in India' program. The contract provides for the delivery of 60 Ka-226T assembled in Russia and the production of 140 units in the territory of the partner country. That said, the project opens up ample opportunities: I am sure that the rotorcraft assembled in India will be in high demand in this country as well as in the third markets. In particular, we intend to take part in a bid for the delivery of 111 Naval Utility Helicopters for the Indian Navy. The selection of Ka-226T will allow India to reduce expenditures for transportation, maintenance, personnel training due to the localization of production in its own territory', highlights Victor Kladov, Director for international cooperation and regional policy at State Corporation Rostec.

'We are facing an ambitious task because the world has so far not seen such projects of transferring leading-edge rotorcraft production. To set up the production of Ka-226T helicopter, its assemblies and components, is not possible without the reliable Indian partners and future suppliers having a sufficient number of technological competences and work experience in the aviation sphere. The objective of current interaction between Russian and Indian industrial enterprises is to present the background information on the project, a joint discussion of technical issues and finding further ways of cooperation', stated Andrey Boginskiy, Director General of JSC 'Russian Helicopters'.

Light utility helicopter Ka-226T features coaxial main rotor system, maximum take-off weight of 3.6 tons and is capable of transporting up to 1 ton of payload. The main distinctive feature of the helicopter is its modular design. Ka-226T can be easily fitted with a transport cabin enabling the transportation of up to 6 people, or with modules carrying special equipment. Flight performance of Ka-226T helicopter, its environmental friendliness, cost effectiveness, state-of-the-art avionics suite and additional flight safety solutions make this helicopter one of the best in its class.

In 2015, Russia and India signed an agreement on cooperation in the sphere of helicopter manufacturing. According to the agreement the Indian Armed Forces will take delivery of 200 Ka-226T; at least 140 out of that number are to be produced in the territory of India under the program 'Make in India'. In May 2017, Russian Helicopters, Rosoboronexport and Hindustan Aeronautics Limited founded a joint venture that deals with localization issues.

/RA&MG/

Aleksei Mokhnatkin,
Deputy General Director, RC Module:

'At Aero India 2019, our company exhibited a broad range of its microelectronic developments intended both for aerospace and for the broader commercial market. These include video-stream and imagery processors, in particular specialised processors intended for deep convolutional neural networks, which are based on the in-house NeuroMatrix architecture.

In India, we primarily offer our off-the-shelf hardware/software solutions, including those for centralised control of UAVs, missiles, fixed- and rotary-wing aircraft. RC Module already has a number of contracts with Indian customers. On some of the projects, our Indian partners are involved in the production process. We are actively promoting our products globally, including to Southeast Asia and Europe. We frequently engage foreign partners in joint developments; these include work on a radiation-hardened processor, hardware and software for commercial satellites, and a medical module based on a neuroprocessor.

Our competitive advantages include proven high reliability and unique in-house designs. Each of our specialised products features its own unique characteristics which make it globally competitive. Our processors often beat conventional CPUs at imagery and video-streat processing and at interaction with neural networks, including in the terms of power consumption.'

Igor Ryapin,
Deputy General Director Commercial, Rubin Aviation Corporation:

'Rubin's chief objective in participating in AERO INDIA 2019 was to showcase our products and probe for possible cooperation on the market. The Indian market is indeed very much interested in our entire product range, from wheels, brakes and friction materials through metal ceramics, bimetals, carbons and composites to plunger pumps and generator drives. Furthermore, such products are already used in Soviet- and Russian-made aircraft operated in India. Now that our company has embraced new technology, we are prepared to introduce the regional market to our new capabilities. These include the development and manufacture, to customer specifications, of complex articles for any mechanical engineering sectors. Our company has the requisite design, testing and production resources for tackling problems of any complexity, including with regard to precision machining. Rubin is prepared to handle the entire production cycles, from the design stage to certification. We are also prepared to flex our position with regard to the customer's requirements and legislation. One important nuance is that we are working for the future.'

Oxana Zagorodnaya,
First Deputy General Director, Russian Aviation Co:

'Our company has been presented on the Indian market for over 20 years. We supply Indian customers with parts and components for civil aircraft and, via Rosoboronexport, for military aviation equipment. India is very important to us, it is our primary foreign customer. We have attended Aero India since 2005, the exhibition serves as an important platform for expanding our business opportunities on the international aerospace market. Russian Aviation Co has an in-house production line for standardised components. We also have nearly 30-year experience exporting parts and maintenance equipment for Russian- and Soviet-made aircraft. We operate under direct long-term agreements with leading Russian and CIS manufacturing and repair facilities. Our products are supplied to over 20 countries in Southeast Asia, Africa, the Middle East, Latin America and Eastern Europe.'

OFFICIAL COMMENTARY

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

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

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

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

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

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

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

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

NOW TO BE CERTIFIED IN BRAZIL

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

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

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

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

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

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

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

DEMONSTRATION TOUR

Russian Helicopters presented Ansat and Mi-171A2

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sergey Kulik

SECURE RESCUE AT ANY HEIGHT

Unique autonomous rescue parachuting back-pack system for emergency escape

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

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

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

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

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

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

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

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

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

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

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

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

New SPARS® escape solution provides the following advantages:

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

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

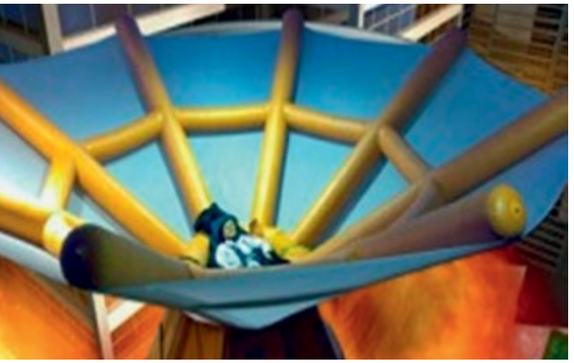
'side-to-side', 'head-to-pelvis' – up to ± 6 g

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.

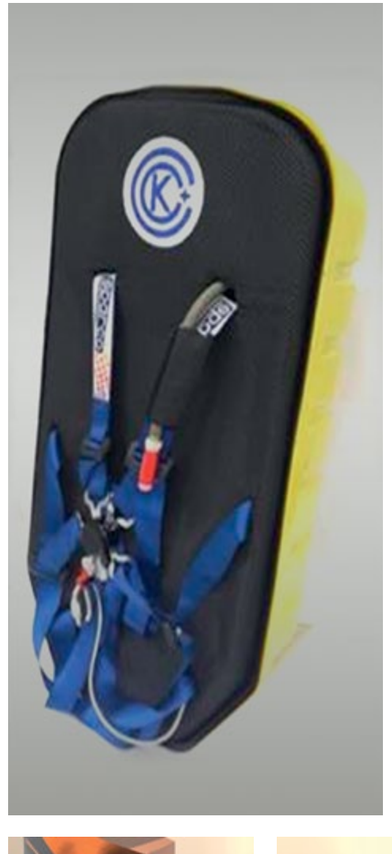
Furthermore, the SPARS® estimated potential market capacity is worth over $3.5 billion in commercial sector alone. The Governments market is bigger but for accepting that new technology implementation it may require some updates of the appropriate local norms and regulations.

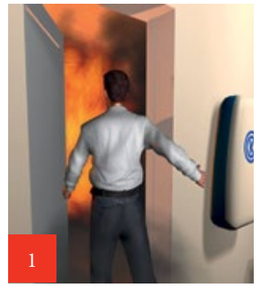
/RA&MG/

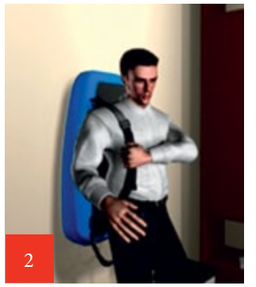
There are following innovations in the proposed SPARS® technology:

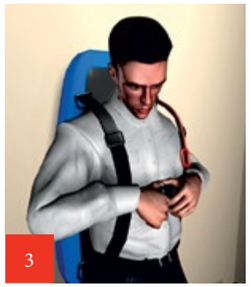
1. A brand new free parachuting technology (means and escape method) was created for emergency escape from heights higher than 50 m where practical methods for safe evacuation of a person are not available on the market.
2. Sinergy solution based on specially designed and produced from film-laminated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

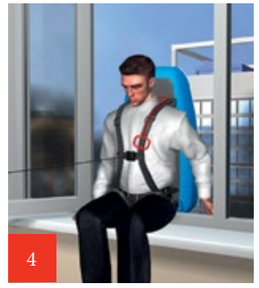
The Special National Standard (GOST) for shock acceleration limits for untrained human using new type of lodgment Rescue Parachuting Systems was issued.
The Crash test dummy Hybrid-III 50% percentile was instrumented, calibrated with the help of centrifuge, certified and used as anthropomorphic instrument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

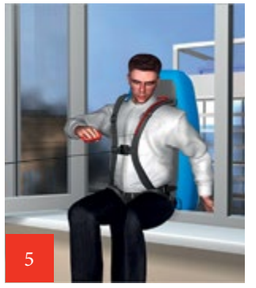












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In 2019

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

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