

# RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of the United Industrial Edition

Nº 09 (40), 2019

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.14

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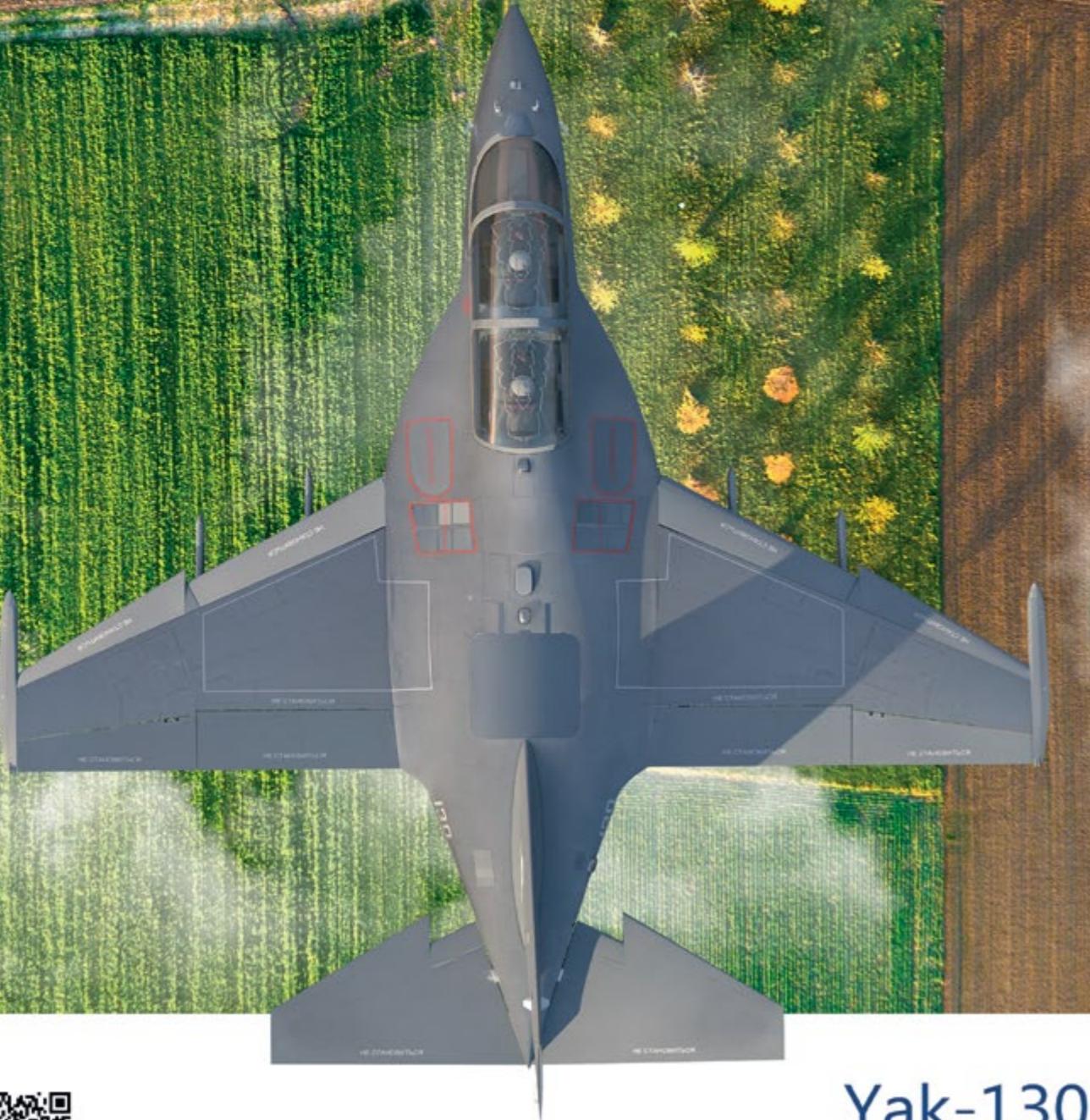
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'Russian Aviation & Military Guide'  
№ 09 (40), 2019

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## EDITORIAL



### Russia at the Forum Army2019

Political situation in the world 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 secure people's safety, rivalry among sellers of weapons and defense systems increases in order to achieve such goals as increasing profits and market share.

World experience shows that it is not about how many weapons you have, but quality and possibilities of every single one of them is what leads to victory on the battlefield. 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 technology, solid aftersales service and proven reliability of products, Russia is honest and friendly partner for all countries, ready for mutual work. And everything that is presented at the International military-technical forum ARMY2019 is showed that Russia ready to cooperate for interest of international security.

**Valeriy Stolnikov**



**NEW RUSSIAN HELICOPTER**

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

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

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

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

**Breakthrough Products Presentation**

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



'The Maritime Defence Show, ARMY

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

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

This year the visitors of the ARMY will have an opportunity to see in the 'Patriot' park a number of newly-designed products, which are of

a potentially breakthrough character for the world market, i.e. the Kalashnikov assault rifles of the newest 200th series, new generation special vehicle 'Tigr-2', the 'Viking' and 'Tor-E2' air defence missile systems, combat vehicle of a squad equipped with the 'Gibka-S' MANPADS, means to counter unmanned aerial systems, as well as new solutions in the area of electronic countermeasures.

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

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

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## RUSSIA-BELARUS COOPERATION



Rosoboronexport, Rostec's member, had been named the organizer of Russia's joint exposition at the International Military Equipment Exhibition MILEX 2019 which had taken place in Minsk, Belarus, on May 15-18. 'Russia and Belarus are strategic partners in military and technical cooperation. Since 2001, the volume of cooperation between Rosoboronexport and Belarus has exceeded \$1 bln. The scope is unbelievable covering almost every line from the supply of end products and components to joint researches and defense projects,' said Rosoboronexport's Director General Alexander Mikheev.

The company's exposition occupied 500 m<sup>2</sup> at MILEX 2019. It accommodated products of Russia's eight largest defense enterprises, including Almaz-Antey, Uralvagonzavod, and Tecmash.

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

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

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

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

## Repairing Helicopter Engines

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

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

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

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

Vietnamese experts have already received certificates of UEC-Klimov on successful familiarization with the

process of intermediate engines repair.

With their help, Russian employees successfully carried out a pilot repair of the first TV3-117VM series 02 engine for the Mi-171V helicopter, which is in service in Vietnamese civil aviation for passenger traffic.

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

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



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

## Promising MTC Projects

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

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

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

Turkey is among the key partners of Rostec and Russia. The level of bilateral relations, including in industry, is growing rapidly. At the moment, we are discussing with Turkish partners the implementation of a number of critical projects in both military-technical cooperation and civil industry fields,' said Sergey Chemezov, Director General of



the Rostec State Corporation. 'Of course, we are ready for various formats of technology cooperation, including in such high-tech areas as the aerospace, helicopter and power industries.'

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

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

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

The mock-ups of the BT-3F armored personnel carrier, KAMAZ-53949 Typhoon-K vehicle, Su-35 multi-role super-maneuverable fighter and the Project 12061E Murena-E class air-cush-

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**REPAIR CENTER IN VIETNAM**

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

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

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

The Aviation Administration of the Socialist Republic of Vietnam certified the new center. Certifying the support personnel was a mandatory procedure for ensuring the operation and repair process made by the center. Vietnamese specialists familiarized themselves with all the steps concerning medium repairs of the TV3-117 engines and their different models during a technological procedure of the certification. In October 2018 UEC-Klimov and the Vietnamese company Helicopter Technical Service Company signed a distribution contract concerning service maintenance of engines. Helicopter Technical Service Company, on the territory of which the new center is located, provided service maintenance for Russian-made helicopters. It also operated as the distributor of TB3-117 and VK-2500 engines.

**New Radio Stations**

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

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

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

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

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

The developers note that the devices are compatible with all existing domestic and foreign civil systems of DMR standard professional mobile radio. The obtained certificates give the right to the equipment developer the



'Constellation' Concern (a part in 'Ruselectronics') to sell equipment in the European Union.

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

**Demonstration at the Victory Parade**

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



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

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

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

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

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

ticipants of military-technical cooperation and of manufacturing enterprises, an important element of which is the public demonstration of military equipment at parades and exhibitions.'

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

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

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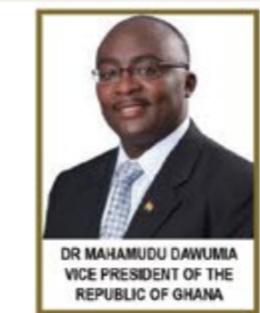
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The Ghana Navy celebrates the 60th Anniversary this year under the theme "Celebrating 60 years of Naval Excellence: Securing the Maritime Domain for National Development." The strategic meeting will focus on interagency collaboration, curbing illegal activity on the Gulf of Guinea as well as identifying the essential solutions to achieve maritime security within the region.

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**BRAINREADER NEURO INTERFACE**

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

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

Proposals from Asian companies, from Indonesia and Malaysia in particular, on distribution of BrainReader resulted from participation in the Medlab AsiaPacific & Asia Health 2019 exhibition, where the capabilities of the device generated great interest. The development of the device as part of the Rostec is the Institute of Electronic Control Machines (INEUM) named after I.S. Brook (a part of the concern 'Automation').

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

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

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

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

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

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

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

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

**Russian Helicopters in SITDEF-2019**

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

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

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

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

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

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

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



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

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

**Rostec Joined Vision Zero**

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



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

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

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

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

The International Social Security Association (ISSA) offers seven golden rules for achieving 'zero injuries':

leadership, risk management, setting clear goals, methodic work on improving occupational safety, ensuring the safety of industrial premises, improving the skills of workers and their motivation.

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

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

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

AT A NEW LEVEL

# MAKS 2019

Organizers



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**SUCCESSFUL LAUNCH****Equipment Supply**

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

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



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

The Progress MS-11 transport spacecraft docked to the Pirs module of the International Space Station at 17:22 Moscow time, thus becoming the fastest spacecraft in the history of flights to the ISS: only 3 hours and 21 minutes passed from launch to docking. Previously, the title of record holder belonged to Progress MS-09, which in July of 2018 docked with the ISS in 3 hours 40 minutes after launching from Baikonur. The Progress MS-11 ship delivered over 2.5 tons of various cargoes to the station: more than 1.4 tons of dry cargo, 900 kg of fuel, 420 kg of water in storage tanks, and also 47 kg of compressed air and oxygen in cylinders. In the packing of the cargo compartment contained scientific equipment, components for the life support system, as well as containers with food products, clothing, medicines and personal care products for crew members.

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

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

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

'Rostec State Corporation created a wide range of high-technology science-intensive products, which were in demand not only in Russia, but also abroad. The interest of the European Space Agency once again confirmed that our developments met the highest international standards. Deliveries of a new matrix for space radars were

carried out within the framework of the national project 'International cooperation and export'. In the new radar model, our production matrix will replace expensive foreign analogues. Devices with such characteristics will be used in the civilian field for the first time', said Oleg Evtushenko, executive director of the Rostec State Corporation.

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

**Shvabe Revived Telescopes**

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

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



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

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

# CONNECTING THE AEROSPACE INDUSTRY



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## ATTACK AND MULTI-PURPOSE HELICOPTERS

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

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

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

Apart from attack and utility helicopters, other types boasting high export potential included combat-transport, military transport and transport Mi-35P, Mi-35M, Mi-17V-5, Mi-171Sh, and Mi-26T2. They owed their popularity to the outstanding combat and operational performance, demonstrated in combat during anti-terrorist operations conducted by the Russian military. Combat and transport capabilities of Russian helicopters made them unique in many ways. Deployed in almost all regions of the world, they had proven to be suitable for operation in hard-to-access mountainous zones notorious for height variation and temperature fluctuation, as well as tropics and dusty environs.

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

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

## MC-21-300 certification flights

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



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

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

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

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

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

The plane was piloted by the crew of Andrey Voropayev and Roman Taskaev test pilots. According

to the crew report, the task was performed completely, the flight was in normal mode.

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

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

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

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

stop flight from Irkutsk to Ulyanovsk Vostochny airport.

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

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

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## HIGHLY MOBILE TWO-COORDINATE SURVEILLANCE AND TARGET DESIGNATION RADAR P-18-2 ('PRIMA')



Highly mobile two-coordinates surveillance and target designation meter wave band Radar P-18-2 'PRIMA' is a result of joint work of 'Nizhny Novgorod Television Plant named after V.I. Lenin' (PJSC 'NITEL') and 'Lianozovo Electromechanical Plant' (PJSC 'ALMAZ R&P Corp.' LEMZ Division).

The Radar P-18-2 'PRIMA' is intended for surveillance and target designation of aerial objects including those made by STEALTH technology, its coordinate determination in range and azimuth and direction finding of active noise jammers. The Radar is accommodated on a cross-country chassis and offers increased mobility due to arrangement of equipment, antenna – feed system and power supply source on a single transport unit.

The Radar can be operated at ambient temperature from minus forty to plus fifty degrees Celsius.

The power supply of the Radar can be provided by the built-in primary power supply sources such as power take-off generator or its own generating set as well as by industrial network.

The Radar unrolling by combat crew of two persons takes not more than five minutes including time of automatic leveling.

The Radar orientating takes place automatically with the aid of the satellite navigation systems.

The Radar employs three scan rates of 3, 6 and 12 rpm as well as mechanical sector target search (sector mode of antenna rotation). The Radar can detect and automatically track low speed and low observable unmanned aerial vehicles in the zones of local interference and airborne moisture targets.

Reliable acquisition and tracking of targets under heavy interference environment is implemented by dual-frequency probing mode.

The Radar detection range limits of aerial objects is 1 to 400 km. The Radar performance specifications are favorably distinguished by high accuracy of coordinates measurement, high resolution and high jamming immunity.

To protect combat crew the Radar is equipped with remote operator's work stations that allow remote control of the Radar at a distance of 1000 meters. P-18-2 'PRIMA' is capable to coact with modern digital Automated Control Systems, Air Defense Missile Systems and exchange data with them and that includes radio link.

To identify friend-or-foe of aerial objects, the Radar is equipped with the Secondary Radar.

The Radar possesses maximum automation at all stages of radar operation modes from the moment of unrolling /rolling up, combat performance, data output to consumer as well as high reliability and capability of survival.

/KA&MG

# FSMTC OF RUSSIA

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



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

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

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

At the same time even from the economic point of view the military purpose products' market is substantially different from other global markets such as raw

**Major areas of FSMTC of Russia activities shall be:**

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

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

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

Record and registration of foreign trade contracts;

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

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

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

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

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

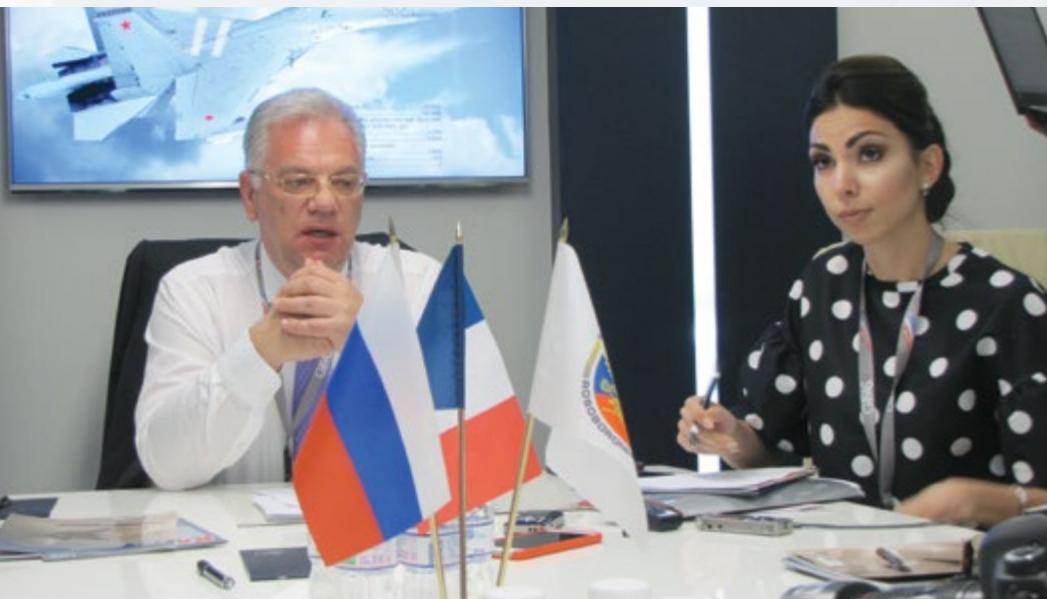
– Today the system of military-technical cooperation of Russia is built as a vertical relationship where Rosoboronexport is the only exporter of final military purpose products. Concurrently, there is also a number of entities in the field of military-technical cooperation of Russia that are authorized to provide service of the equipment previously purchased by customers, to upgrade it and to supply spare parts for this equipment. These, in particular, include such integrated



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

structures of the defense industry as the United Aircraft Corporation, the United Shipbuilding Corporation, Almaz – Antey Air and Space Defense Corporation and others. They obtained this right to service their equipment supplied to foreign customers as they represent defense industry itself, they embrace the factories that manufacture spare parts, components, etc.

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



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

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

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

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

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

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

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

– The experience of contemporary local conflicts demonstrates that the side which commands the more powerful air defences usually has an edge over the adversary. It is, therefore,



to speak with confidence about stable growth of export supplies.

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

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

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

fore, only natural for Russia, which is a world-leading manufacturer of advanced air defence systems, to be looking to capitalise on this advantage in the global arms market.

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

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

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

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



# MASTERPIECES FROM RUSSIA

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

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

**A**mong the Russian products that Rosoboronexport is actively promoting in global market can be called for example the Yak-130 combat trainer, MiG-29M multirole tactical fighter and Su-35 multirole air superiority fighter. Russian heli-

copters that catch the interest of foreign customers include the Mi-28NE, Ka-52 and Mi-35M attack helicopters, Mi-26T2 heavy transport helicopters, Ansat light multirole helicopters and Mi-17 military transport helicopters. Russia's partners in the world are also interested in such AD systems as the

Pantsir-S1 air defense missile/gun system, Igla-S man-portable air defense system, Antey-2500 air defense system and others.

Rosoboronexport also presents a number of popular military equipment designed for the armed forces and special counterterrorist and anti-corruption units. The equipment includes the VPK-233136 Tigr armored vehicle, BTR-82A and BTR-80 armored personnel vehicles, BMP-3 infantry fighting vehicles, various Kalashnikov rifles and Pecheneg Kalashnikov-designed machine-gun. Navies experts particular interest in

**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.**

the Project 14310 Mirazh, Project 12200 Sobol and Project 12150 Mangust patrol boats. Several countries show interest in the Russian equipment designed to operate in the Arctic Region, in particular, hydrographic survey vessels.

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

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

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

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

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



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

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

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 Rostec).

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

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

'Currently the Pantsir-ME air-defence missile and artillery system has no direct counterparts in the world market in the segment of shipborne 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 tac-

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

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

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

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

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

***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.***

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.

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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 cus-

tomer settlement methods. The special exporter cooperates with more than 700 Russian defense-industrial enterprises and organizations, which enables it to offer partner countries the comprehensive and cost-effective solutions for strengthening their defense capability and national security.

By concluding export contracts, Rosoboronexport supports the Russian defense industry, which is especially important under difficult conditions in the global market. High-tech products are in increased demand in the world arms market today and thus the company is interested in developing smart manufacturing in Russia. In addition, Rosoboronexport is actively involved in a number of charitable and sponsorship projects. The company provides assistance to military hospitals, military historical museums, and children's educational institutions.

Rosoboronexport supports major sporting events and various sports federations, acts as sponsor and partner of the largest industrial exhibitions and cultural events held in Russia and abroad.

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



ket 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/





# THREE BIG SHOWS

*Rosoboronexport: breakthrough products for arms market to be presented at this summer's exhibitions in Russia*

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



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

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Alexander Mikheev

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

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

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

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

tem 'Redut', different ships of Russian production, including the 'Karakurt-E' small missile ship of project 22800E.

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

'For Rosoboronexport, the International Maritime Defence Show, MAKS and ARMY are an important marketing tool. We invite to them the maximum number of foreign delegations, which have a perfect opportunity to satisfy the needs of their defence and law-

enforcement agencies in the sophisticated Russian materiel, to receive as much detailed consultations as possible, related to the distinctive technical features of the weapons, as well as to the modalities and particularities of their combat use,' added Alexander Mikheev. /RA&MG/

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

Alexander Mikheev



# THE OMNI-PURPOSE TARGET TRAINING COMPLEX 'ADJUTANT'



# ADJUTANT OF HIS EXCELLENCE

**Victory in the modern combat situation is achieved through combination of the following components: use of hi-tech weapon models, consistently high level of professional knowledge and practical skills of the specialists operating these weapons, and precision and operational flexibility of decision-making in the multi-tiered command system.**

The proportion of state-of-the-art weapons is growing year over year, in line with the Russian Government's current armament update program aimed at providing the Armed Forces with the most recent models of weaponry and defense equipment. The new weapons are more technologically sophisticated, have extended circle of applications and improved time of response to emerging threats. To keep up, the combat crews operating the weaponry models need to acquire deep knowledge at the stage

of familiarization with their functions and rules of their combat application, and to maintain the achieved high level of practical training.

'Train hard, fight easy,' wrote Aleksandr Vasilyevich Suvorov, the great Russian military commander. In practical terms, this old saying is still valid. It is especially relevant, when it comes to the modern situation with the troops' combat preparation, where, along with the training of each individual crew, it is increasingly important to organize the comprehensive multi-tier system for troops management.

Therefore, to achieve maximum practical competence of military units engaged in drill and combat missions, the training conditions must very closely approximate the real battle situation. In particular, for preparation of an air defense crew, it is necessary first to bring the practical skills of each crew member to full automatism using simulators, and second, to design and offer sophisticated (combination) target layouts for training and combat with comprehensive use of various types of targets, providing their maximum resemblance to the existing

and future air assault weapons of a potential enemy.

Currently, the target fleet mostly consists of target missiles Saman-M and Strela-10M, with a small amount of Pensne target missiles and remaining Soviet targets Peniye, Kaban, and Strizh. These are all expendable, unreliable, and maneuver-restricted remakes of anti-aircraft guided missiles for obsolete air defense missile systems. Apart from poor reliability of the targets, there are substantial issues related to retrofit and maintenance of the target systems (launch units) whose current working lifespan exceeds 30-35 years.

In the coming years, the number of targets remade from old missiles will be naturally going down. With emergence of new models of short-, medium and long-range air defense systems in military service, the demand for state-of-the-art reusable targets will be annually growing. Another important consideration is that testing of the AM&SE models, primarily of the most recent and future-oriented types, requires not simply airborne targets, but the targets which could very convincingly simulate modern air assault



weapons, especially smart weapons (SW). These targets should have high maneuverability and flight speed, minimum radar cross section (RCS), the capability to form sophisticated target groups, etc.

In 2015, the administration of Izhevsk Electromechanical Plant Kupol, JSC, with the approval from Almaz – Antey Air and Space Defence Corporation, JSC, analyzed the above-mentioned considerations and made a decision to carry out a proactive research and development project aimed at creation of an omni-purpose target training complex (OTTC) capable of generating a sophisticated target layout using various simulators of state-of-the-art air assault weapons for a wide spectrum of existing and future-oriented air-defense systems. The product was indexed 9F6021 (9F6021), while the project was codenamed Adjutant, which fully reflects the purpose of this system as the main 'aide de camp' for commanders of all ranks in the matters of drilling and training the combat crews, running all types of tests for batch and prototype air-defense systems, and carrying out actual firing with sophisticated target layouts.

'For today, the OTTC 9F6021 comprises a mobile ground control station with operator workstations, three types of airborne targets, outside-mounted air situation display systems, communication systems, and the life sustenance means for the personnel. A logistics module has been developed for accommodation and transportation of equipment for launch, maintenance and refueling of the targets. All airborne targets are reusable. The launch is performed using a mechanical thrower without powder boosters or compressed air, and the touchdown is parachuted.'

The first type of airborne targets was developed on the basis of a classical layout airplane type UFV with a thrust propeller and is mainly intended for the initial training of the crews of air defense systems. These targets can only reach a maximum speed of 120 kph but have considerable duration of flight – more than four hours.

'From the first days of the project, the OTTC structural design was discussed with the specialists of the Ministry of Defence of the Russian Federation responsible for education and combat training of air defense artillery units. This discussion resulted in an original concept of the system which had to comply with most of the wide range of requirements to modern training and simulation facilities and helped avoid loss of time and effort in the period of design of the OTTC component parts. The design documentation was promptly prepared, and the pilot samples of airborne targets and the whole system were manufactured,' told Andrey Rusakov, the OTTC chief designer.

The second target type is also made on the basis of an airplane type UFV, but comprises a turbojet engine ensuring a higher speed of up to 100 m/s.

The third target type is intended for imitation of cruise missiles and gliding smart bombs at speeds up to 150-200 m/s. The target was updated, equipped with a turbojet engine, and is now capable of effecting all types of combat spatial maneuvers characteristic of UFV and cruise missiles, including preprogrammed automatic mode.

The fourth type is represented by airborne targets imitating helicopter type UFVs. The target is intended for dynamic and functional simulation of a combat helicopter, including hovering and 'bouncing' at distances up to 10 km away from the launch site.

Presently the preliminary tests of the OTTC prototype are successfully completed. The official tests of the system are scheduled for the end of the current year. Based on the results, the decision will be made concerning the time to launch the batch production and supply the Armed Forces of the Russian Federation with the first samples of this unique product that can substantially improve the training quality for the crews of state-of-the-art air defense systems.'

/RA&MG/





# GLOBAL SUCCESS

## Russian High-Precision Weapons Holding

In February of this year, the High-Precision Weapons Holding (a part of the Rostec Corporation) was celebrated the 10th anniversary of its work on the global market. Years by years Holding plays an increasingly important role on the world arms market. The holding is the Russian largest developer and manufacturer of the most modern and innovative high-precision weapons. The importance and potential of the Russian holding increase worldwide as well: On a scale of the top 100 weapons manufacturers in the world, the Stockholm International Peace Research Institute (SIPRI) rates the 'High-Precision Weapons Holding' from Russia at 39.



**A**lso every year Holding is increasing deliveries both to the Armed Forces of the Russian Federation and to the foreign market. According to an SIPRI expert, 'the Russian companies ride the ground-swell of boosts in military spending and arms export. Eleven companies from the top 100 list are Russian ones. Their income has increased by a total of 48.4%.' It also can be noted that the 'High-Precision Weapons Holding' belongs to the top 10 world's defensive rankings by an overall production and supply increase rate.

The High-Precision Weapons Holding was founded in 2009. The holding consists of a number of largest

leading defense enterprises that are well known on the world arms market. It is sufficient only to mention such brands as the Shipunov KBP Instrument Design Bureau, the Tula Arms Plant, The Tulatochmash, the Nudelman Precision Engineering Design Bureau, the Kovrov Electromechanical Plant, the V.A.Degtyaryov Plant, the VNII 'Signal' and others. Most of them are national and international leaders in their segments.

The products of the holding's companies are well known on all continents and much sought after on international arms markets. Interest in the products of the 'High-Precision Weapons Holding' grows due to the objective situation.

The exports of the holding are based on warfare systems well known on the international market such as Pantsir-S1, Palma, Kornet-E/EM, Konkurs, Metis-M1, Igla-S, Arkan, Verba, Shmel, Kapustnik, and others as well as on training systems, armored vehicles upgrade, and so on.

The holding's products are well known and much sought after on the markets in the Middle East, the Gulf, Northern Africa, Latin America, India, Central and Southern Africa. The holding is constantly expanding the geography of its exports. This is due to product line extension, development of new models and upgrade of products in demand as well as well thought-out service policy.

The holding invests much into the development of promising



*The holding's products are well known and much sought after on the markets in the Middle East, the Gulf, Northern Africa, Latin America, India, Central and Southern Africa. The holding is constantly expanding the geography of its exports. This is due to product line extension, development of new models and upgrade of products in demand as well as well thought-out service policy.*

designs of weapons and military equipment, enhances and augments its development and production potential, and invests in the development of models of tomorrow.

It is evident that the demand for high-precision weapons only increases around the world. They do not miss. They are mobile, fast, maintenance-friendly, reliable, and the most modern.





**High-Precision Weapons Holding' belongs to the top 10 world's defensive rankings by an overall production and supply increase rate. The holding invests much into the development of promising designs of weapons and military equipment, enhances and augments its development and production potential, and invests in the development of models of tomorrow.**

The newest technological solutions are used. 20 years ago, the proportion of high-precision weapons used in local conflicts amounted to up to 7%. In recent years, this share has increased by up to 90-95%. The most designs of the 'High-Precision Weapons Holding' are the best in the world and determine the technological vectors of development in their segments.

There is no doubt that the main task of the 'High-Precision Weapons Holding' is to strengthen the defense capability of Russia and to supply the Russian Army with the most modern and the most reliable high-precision weapons. Within the scope of the contract, the holding regularly transmits to the Russian Ministry of Defense the corresponding quantity of planned weapons. Due to the holding, the Russian Army is armed with the best weapons in the world. At the same time, it is important that the holding itself also supplies the same weapon to the world market, where it enjoys consistent success.

Middle East states are always been and remains the most important strategic partner of the High-Precision Weapons Holding. The participation of the holding's enterprises in IDEX-2019 is an important stage of friendly and mutually beneficial cooperation in defence area.

/RA&MG/



# HIGH-PRECISION WEAPONS



JSC 'High Precision Weapons' the leading Russian designer and manufacturer of wide variety state-of-the-art military and special equipment, including but not limited to land systems, small arms, air close and short range defense systems, is now opening new business opportunities for partners.

Moscow-based and ranked among top 50 global producers of military equipment by SIPRI chart, JSC 'High Precision Weapons' is legally authorized since November 2016 to provide full spectrum of maintenance and overhaul, modernization and upgrade works and services worldwide.



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# SIBER: wide competences – one brand

## *Integrated security solutions*

JSC SIBER, holding company of Rostec State Corporation, is a fast-developing and successful enterprise. Currently SIBER is one of the most influential and respectable players at the Russian security market, thanks to the competences combined under one brand name.

### Reliable protection of strategic enterprises

**S**IBER's expertise in the field of physical security is based on the professional experience of JSC RT-Guard. Being a part of

SIBER holding company, RT-Guard has accomplished a challenging mission to develop a reliable security system at Rostec's companies. Today the company is entrusted with securing critically important state-owned production facilities of Rostec Corporation, including strategic enterprises such as Russian

Helicopters, UralVagonZavod, Techmash, High Precision Systems, Technodinamika, United Engine Corporation, Shvabe, Kalashnikov Concern, and PJSC United Aircraft Corporation.

### Fire safety and security services

SIBER is rapidly developing new areas of activity, expanding its footprint in the Russian market related to security and protection services. In addition to in-house security, which ensures integrated protection of Rostec facilities, SIBER provides comprehensive fire protection services.

In-house fire-fighting units and fire safety departments prevent and suppress fire at protected enterprises.

SIBER is also successfully developing RTO-Guard, a network of private security companies authorized to render security services to non-Rostec companies.

### Russian-Chinese joint venture Hao Guard LLC

Establishing of Russian-Chinese joint venture Hao Guard LLC in 2016 became one of the key milestones in SIBER's history. With Hao Guard, Russia obtained the task-oriented official security company to be entrusted by Chinese businessmen as Hao Guard's co-founder is a Chinese company – Huawei Security, and Hao Guard represents the Rostec – brand well-known in China.

**Companies throughout the Russian Federation – from Kaliningrad to Vladivostok, use the professional services of the organizations belonging to the SIBER holding company.**

### International projects

International cooperation is one of important business lines the holding company is focused on. Due to successful cooperation with foreign companies, SIBER is able to implement foreign partners' experience and latest developments as well as to offer a wide range of services abroad, involving its foreign partners, who have the required infrastructure and competences in security and safeguarding. Among SIBER's partners are the leading international companies from China (Huawei Security, DeWeGroup and China Cityguard Security), India (Checkmate), Singapore (AETOS and ST Electronics), South Africa (Business Opportunity and Risk Assessment), Austria (Bodyguard & Security Association) and France (AMARANTE International). SIBER has signed a number of agreements aimed at implementing joint projects related to physical security, cargo escorting, training and consulting services.

For instance, SIBER has signed a memorandum with AETOS to join efforts for establishing Rostec State Corporation Situation Center, which will be situated on the territory of the Rostec City (to be constructed on the site of the former Tushino airfield) and will become an integral part of the innovative State Corporation infrastructure. Its main function is to develop and support management decisions based on detailed monitoring and forecasting of possible emergency scenarios at the Rostec entities. A modern Situation Center will provide around-the-clock security of people and entities, as well as guarantee immediate response in case of emergency.

### Training and sports shooting complex

Another large-scale and promising project is the construction of a training and sports shooting complex on the territory of the Vladivostok Free Port (an area that enjoys special regime of customs, tax and administrative regulation). In September 2018, SIBER holding company, Chinese DeWe Group, Autonomous Nonprofit Organization Far East Investment and Export Agency and



### SIBER TODAY

Today, SIBER unites six companies: managing company JSC SIBER, in-house security company JSC RT-Guard, in-house fire protection company JSC RT-Fire Protection, network of private security organizations RTO-Guard Ltd., Scientific-engineering Center for Technical Security Equipment LLC and Russian-Chinese joint venture Hao Guard LLC, which provides security services for the property and cargo of Chinese companies operating in the Russian Federation.

Combining a wide range of services in the field of security, each of these companies successfully operates in its specific area, including: physical security, cargo escorting, fire safety, maintenance of engineering and security equipment and fire safety systems, etc.

- Over 15 000 qualified employees
- More than 400 companies under reliable protection

LLC 'Primorskiy Ring' travel and leisure cluster signed an agreement on the creation of a joint venture 'Shooting complex DW'. The total investment in the project will be about \$10 million.

Professional training for private security agencies, departmental security personnel and security units, as well as training and sporting events on bullet and practical shooting will be organized on the basis of the complex. In the future the complex will become a platform for the promotion of military-technical sports and the development of military tourism, in particular, with the participation of tourists from the PRC.

In the process of training, it is planned to use small arms pro-

duced by enterprises of Rostec State Corporation (Concern 'Kalashnikov', 'High-Precision Weapons Holding', JSC 'Tulsky Oruzheiny zavod'). /RA&MG/



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SIBER is participating in the international military-technical forum «ARMY-2019». Pavilion C, Booth 3F6-1.



# FIRE CONTROL

## Russian automated systems

For several decades VNII 'Signal', a part of the High-Precision Weapons Holding (Corporation Rostec), has been a Russian leading enterprise involved in development and production of automated fire control systems dedicated to artillery units as well as automated fire control systems dedicated to self-propelled guns and MLRS vehicles.

### 'Mashina-M' and 'Kapustnik-B'

**A**utomated fire control system 'Mashina-M' is used for automated control of operations and both Russian and foreign self-propelled artillery battalion (squadron) fire.

'Mashina-M' system includes two types of control vehicles which are command and observation vehicles 1V15-3 (1V14-3) and command and control vehicles 1V16-8 (1V13-3).

1V15-3 (1V14-3) can be used as follows:

- artillery reconnaissance command station;

- artillery battalion (squadron) command and observation post;
- forward observation post;
- battalion artillery squadron command post.

1V16-8 (1V13-3) can be used as squadron and battalion fire control stations.

Automated fire control system 'Kapustnik-B' is designed to control towed gun squadrons (battalions), mortar units and multiple launch rocket systems.

'Kapustnik-B' includes two types of vehicles which are command and observation vehicles 1V152 and command and control vehicles 1V153.

### Automated control

'Mashina-M' and 'Kapustnik-B' systems can be used as follows:

- for performing automated control of fire and maneuver of an artillery battalion consisting of up to 4 squadrons and up to 8 guns during preparation and combat;
- as a part of fire reconnaissance system with guns (vehicles) dispersed at fire positions and while performing counterfire maneuver in real-time manner;
- in case of individual command posts failure in high threat conditions.

'Mashina-M' and 'Kapustnik-B' systems can be effectively used to prepare, control operations and fire led by battalion (squadron) in automated mode including the following tasks:

- reconnaissance, registration fire, observation of combat area and scoring;
- laser illumination when guided munitions are used;
- finding position and directing guns (vehicles) scattered at fire positions;
- finding position and directing command and observation stations;
- positioning control vehicles on the move and during travel;



The best tactical effectiveness of 'Mashina-M' and 'Kapustnik-B' systems is achieved when controlling guns (MLRS vehicles) equipped with automated fire control systems being end links of control loop. In this case a continuous automated fire control can be ensured from the moment a target is detected with command and observation station equipment and by command and control team, to the moment firing data is automatically transmitted to automated fire control system and all guns (MLRS vehicles) are simultaneously guided on targets in automated mode.



**Main characteristics and operational capabilities, 1V12-3 'Mashina-M' and 1V126 'Kapustnik-B'**

Automation level	Comprehensive automation of preparation and fire and combat activities control procedures including calculating firing data for each gun taking into account its position
1. Fire and maneuver control: - Battalion - Squadron	up to 4 squadrons up to 8 guns
2. Battalion (squadron) ready to fire time on the move, min	4
3. Data calculation time for impromptu task, sec	40
4. Flash spotting range, km: - day - night	10 2.5
5. Range of communication, km	20
6. Finding initial bearing grid angle of vehicle's center line with mean error, angular resolution	2.0
7. Vehicle position mean error, m	10

- ensuring communications and data exchange via radio and wire channels equipped or not equipped with coded automatic communication between control vehicles, mobile command and observation posts, as well as communication with commanding artillery officers, operational commanders (headquarters), weapons and technical reconnaissance equipment;
- integration of reconnaissance and fire adjustment;
- control of unit's movements;
- battery deployment on the run with weapons free positioned;
- measurement of weather data at fire positions;
- measurement of cloud base altitude;
- NBC reconnaissance;
- performing command and control at mobile command stations and observation posts;
- ensuring protection against unauthorized access to information stored at data base and used at command posts.

The vehicles are fitted with modular equipment based on standard hardware.

Thanks to modular design the command posts can meet customers' requirements and all equipment and units can be easily replaced.

#### Tactical effectiveness of automated fire control systems

The required battalion fire timeliness is achieved with preparation period reduced 1.5-2 times as compared to available counterparts.

Thanks to modern gunnery equipment and new solution algorithms fire accuracy has been increased 25-30%.

Surprise of fire is ensured with coded (concealed) control of fire at all stages from preparation to end of mission.

Fire density has been increased 30-40% due to hardware and software used at fire control systems and guns for conducting simultaneous fire at different trajectories.

The quality of decisions made during planning and fire preparation has been increased 20 -30% thanks to support and decision making system as well 3D mapping.

New engagement modes help increase fire efficiency 15 -20%.

Thanks to new generation high precision guided projectiles kill probability is 0.98 – 0.99.

The use of modern unmanned flying vehicles (UFVs) and unmanned reconnaissance systems ensure high fidelity and timeliness of target detection. Besides, UFVs help conduct observed target fire at any distance with 1.5-2 times reduced ammo consumption.

The best tactical effectiveness of 'Mashina-M' and 'Kapustnik-B' systems is achieved when controlling guns (MLRS vehicles) equipped with automated fire control systems being end links of control loop. In this case a continuous automated fire control can be ensured from the moment a target is detected with command and observation station equipment and by command and control team, to the moment firing data is automatically transmitted

to automated fire control system and all guns (MLRS vehicles) are simultaneously guided on targets in automated mode.

#### Artillery small automated control systems

Modern engagements including joint operations by coalition task force require alternative approach to automated control systems being used by artillery units. There is a necessity of reducing physical parameters, increasing agility and maneuverability of command stations, decreasing range of equipment, simplifying procedures, reducing officers' training time and significant reduction of systems' cost. Besides, systems performance should ensure performing nearly every task to control artillery units. It is especially important for fire control systems dedicated to weapons nor equipped with automation facilities (mortars, towed guns and MLRS).

Research Institute 'Signal' is now engaged in developing small man-portable (vehicle-carried) fire control systems to control guns, mortars and MLRSs. Small automated fire con-



- capability of being used with wide range of communication, reconnaissance, navigation, weather and ballistic support equipment made in Russia and abroad;
- simplified procedure and reduced squadron-dedicated officers' training time (6-8 hours);
- short deployment time (no longer than 1-2 minutes);
- uninterrupted units control in case of any command station failure and up the chain control;
- significantly reduced time to prepare fire task (system response time is 10-15 sec);
- simplified maintenance and repair procedures including field environment.

/RA&MG/

**Research Institute 'Signal' is now engaged in developing small man-portable (vehicle-carried) fire control systems to control guns, mortars and MLRSs. Small automated fire control systems include individual standardized packages, communication, reconnaissance, navigation, weather and ballistic support equipment.**

trol systems include individual standardized packages, communication, reconnaissance, navigation, weather and ballistic support equipment.

As a result of creating small portable automated fire control system tactical effectiveness of guns, mortars and MLRSs has been improved due to the following points:

- system low cost without sacrificing main tactical performance and high degree of harmonization of equipment;
- use of small systems to control any artillery unit both equipped and not equipped with automation hardware;





## 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.**

**T**he 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.

**B**razil 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

/RA&MG



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 multi-purpose 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.





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](http://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.

**T**he 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 SPARS® device provides a secure individual escape of untrained person or valuable 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

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 valuable 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 anthropomorphic (bionic-like) instrumentation station has been developed and created by the SRS Ltd., which has no equals in Russia.

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

New SPARS® escape solution provides the following advantages:

1. Alternative (a 'last resort') escape mean for ordinary person in case of emergency in the high-rise structure;
2. Secure rescue of untrained personnel (18÷70 years old) from high elevations from 5 till 1000m (no practical means available starting from 50 m height);
3. Off-line capability of the system provides mobility that helps to find optimal self-escape way of out from emergency situation;
4. Smooth automated ejection from the emergency object after manual initialization of the system;
5. Guaranteed deploy of the canopy with 3÷5 m loss of height irrespective of air flow speed pressure;
6. Protection from dangerous external factors (fire, hits, smoke) during descent;

7. Safe landing on any underlying surface in urban terrain;
8. Reusable and does not sink.

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

### The SPARS® General Specifications

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

#### Actual Landing Impact Loads:

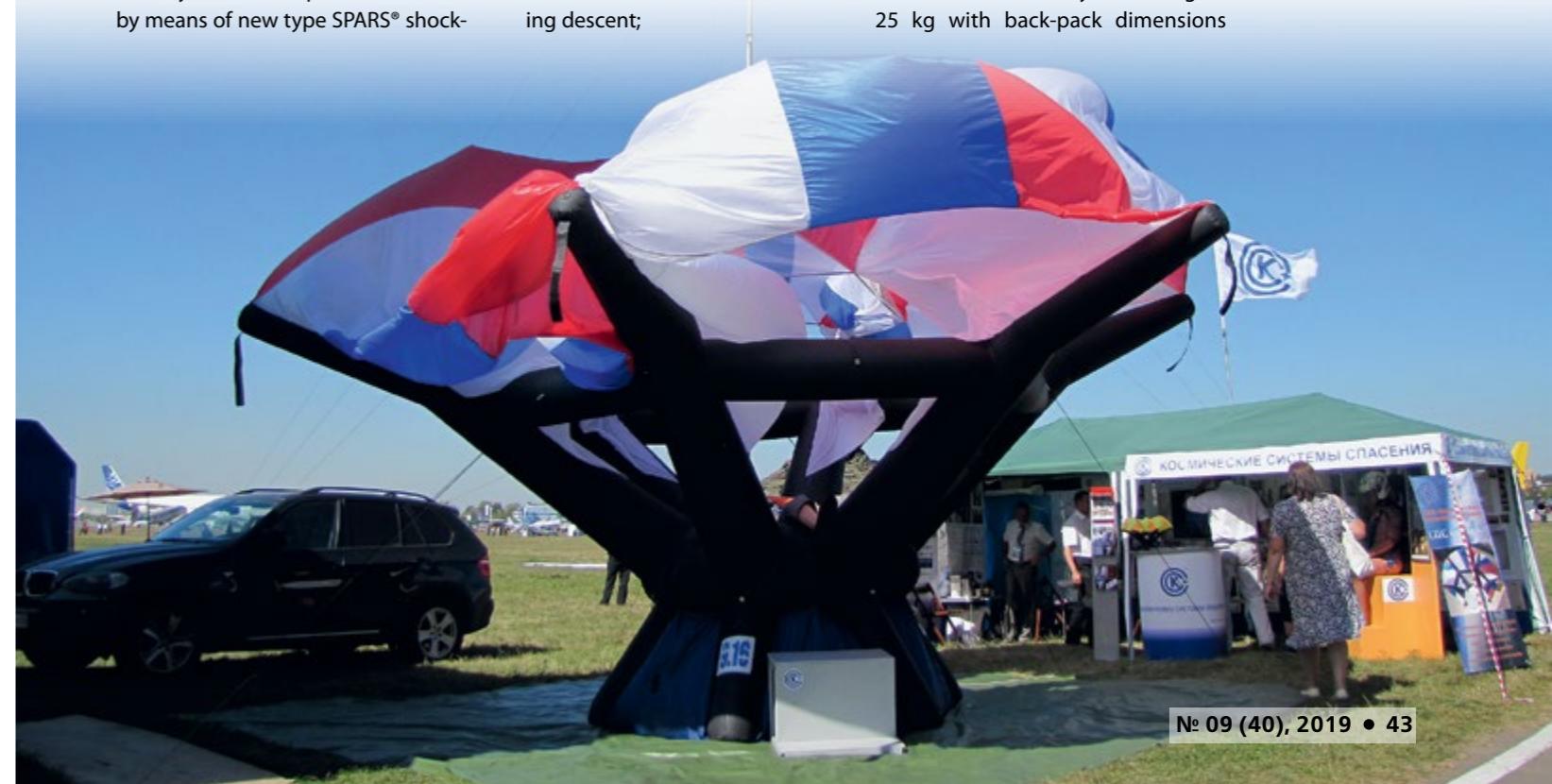
##### Acceleration directions:

'chest-to-back' – up to 8÷10 g  
'side-to-side', 'head-to-pelvis' – up to ± 6 g

**Acceleration Exposition Time** – less than 0.5 s

**Acceleration Growth Velocity** – less than 500 1/s

**User's age** – 18÷70 years





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

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

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. Intellectual Property Rights on SPARS® and its 'know-hows' have been completely protected within Russia (9 Patents, 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

essary 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:

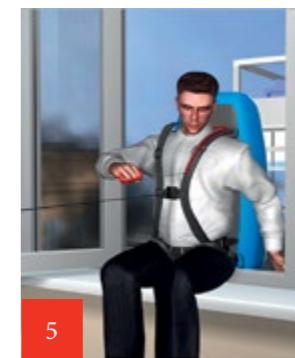
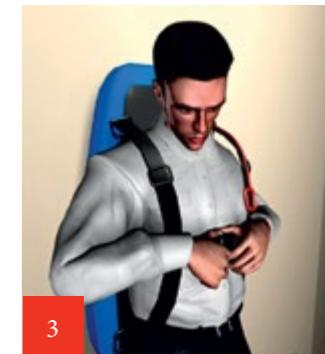
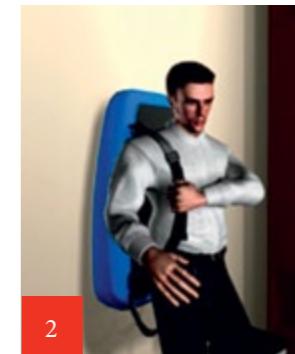
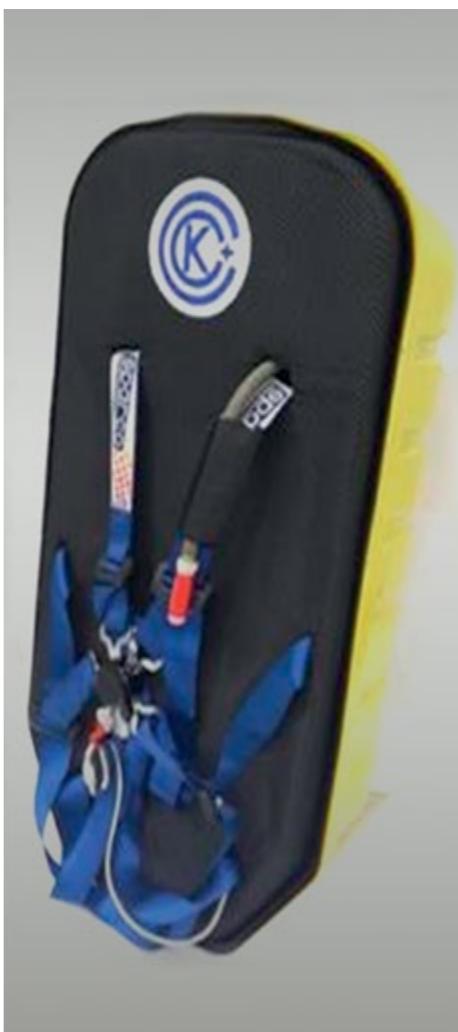
- thin coated/laminated fabric manufacturing;
- assembly from these fabrics a complex air-beam-frame air-proof inflatable structures;
- parachute canopy manufacturing;
- air-aspirator gas filling manufacturing;
- plastics (carbon) manufacturing and forming
- human field (air-borne) tests plastic forming 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; skyscraper's management company; offshore platform management; airborne attractions & entertainment companies etc.) should only require a free window exit sized 1000x500 mm at the appropriate height to use Autonomous Pneumo Transformable Escape Chute and propose to its clients an additional exceptional secure service with limited warranty.

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

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



## 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. Synergy 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.*

/RA&MG/



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**MILITARY EQUIPMENT****AT FAMEX**

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

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

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

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

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

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

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

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

**Monitoring the State of Runway Strips**

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



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

'Mass production of the complex is scheduled to start on the fourth quarter of 2019. The equipment enables respond-

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

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

**VK-2500 in China**

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



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

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

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

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In 2019

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'RA&MG' №01 (32)	February 12th	<b>G</b> INDEX 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	Special analytical export project of the United Industrial Edition <b>LIMA 2019</b> (26-30.03.2019, Malaysia, Langkawi) № 09 (40), 2019
'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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ОФИЦИАЛЬНОЕ ЕЖЕДНЕВНОЕ ИЗДАНИЕ ФОРУМА

№01, 25 июня 2019 года

# Главный форум

Инновационный союз ОПК России  
и Вооруженных сил РФ



С 22 по 27 августа Министерство обороны Российской Федерации проводит Международный военно-технический форум «Армия-2019». Это третье по счету масштабное мероприятие, в котором примут участие крупные отечественные и зарубежные предприятия оборонно-промышленного комплекса, ведущие конструкторские бюро и научно-исследовательские институты.

Основные мероприятия Форума пройдут в Конгрессно-выставочном центре «Патриот». Общая площадь экспозиции в павильонах и на открытых площадках превысит 300 тыс. кв. м. Динамические показы ходовых, летных и огневых возможностей вооружения, военной и специальной техники состоятся на аэродроме Кубинка, полигоне Алабино, а также в военных округах и на Северном флоте.

Научно-деловая программа пройдет в формате пленарных заседаний, конференций, круглых столов и брифингов, что позволит обсудить актуальные вопросы обороны и безопасности, дальнейшие направления совершенствования способов производства продукции военного назначения.

Тысячи посетителей смогут ознакомиться с последними достижениями в области высоких технологий и перспективными разработками, которые реализуются в военной сфере.

Сегодня

III Международный военно-технический форум (МВТФ) «Армия-2017», который открылся сегодня, 25 июня 2019 года, в городе Кубинка, Московской области. Конгрессно-выставочный центр «Патриот» на территории военного городка Кубинка, расположенного в южной части Московской области, является крупнейшим военно-техническим мероприятием в мире.

## International military-technical forum 'ARMY-2019'

June 25-30, 2019

Сегодня ООО «Военно-промышленная компания» и другие компании из различных отраслей промышленности и одни из крупнейших в мире производителей вооружений и военной техники в сфере вооружения и военного снаряжения поставляют на выставку более 1000 единиц военной техники и машин для боевых действий. На выставке представлены более 1000 единиц военной техники и машин для боевых действий.

Official information analytical edition of the forum – newspaper show-daily 'ARMY-2019'

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

Reports on the work of the Forum, the most important current business and presentations, the representation of participants, their exposition and programs.



[www.promweekly.ru/army2019.php](http://www.promweekly.ru/army2019.php)

[www.rusarmyexpo.ru/exhibiting/advertising\\_services](http://www.rusarmyexpo.ru/exhibiting/advertising_services)

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# ADJUTANT

VERSATILE TRAINING TARGET SYSTEM 9F6021E



MISSILE-TYPE AIR TARGET  
WITH TURBOJET ENGINE



AIRPLANE-TYPE AIR TARGET  
WITH PROPELLER ENGINE



AIRPLANE-TYPE AIR TARGET  
WITH TURBOJET ENGINE



HELICOPTER-TYPE  
AIR TARGET

## SETTING

Versatile training target system (VTTS) 9F6021E is a multipurpose target system designed to create a complex air situation:

- when an air defence missile system is checked and tested during combat, training and demonstration firings at a dedicated firing range and training center;
- when a combat crew is trained to operate a short and middle range air defence system regardless of the deployment location;
- when components of an air defence system are to be adjusted and checked at a continuous deployment location of an air defense unit;
- when components of an air defence system are to be adjusted and checked during repair and upgrade within a maintenance center at a foreign customer's place.