

RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of Industrial Weekly

№ 06 (24) August, 2018

FSMTC of Russia

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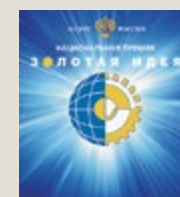
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EDITORIAL



Russia at the Forum Army-2018

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 world-wide system of safety and non-ending 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 hi-tech technology, solid after-sales 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 forum Army-2018 is showed that Russia ready to cooperate for interest of international security.

Valeriy Stolnikov

CITY OF THE FUTURE

The Rostec State Corporation presented a wide range of advanced developments for the 'city of the future' at the 9th international industrial fair, INNOPROM 2018. The State Corporation's exhibition stand demonstrated technologically advanced samples of urban transport, digital systems of the 'smart' urban infrastructure, the newest solutions in the field of healthcare and medical equipment. Rostec showcased its developments designed for transformation of the urban environment and creation of the 'smart' infrastructure in such fields as security, transport, housing and public utilities, healthcare, etc. It also include smart traffic lights developed by the Shvabe holding company that can be automatically adjusted depending on the road traffic load. The Ruselectronics holding company presented electronic components for the Angara high-speed communication network for supercomputer computations, a new system for photo- and video-recording of traffic violations.

RUSSIAN DELEGATION IN THE USA

In the United States of America, on the Day of Military Glory of Russia – Victory at Cape Gangut – the Russian Defence Ministry delegation joined by Russian representatives of the U.S.–Russia Joint Commission on POW/MIAs laid wreaths to graves of seamen of the Imperial Russian Navy in the USA. Sailors Nikolay Pavlov and Timothy Cheparinov, members of the crews of the cruiser Varyag and the battleship Retvizan, were buried in the cemetery Glenwood Memorial Gardens, near Philadelphia, where these ships were built by the order of the Russian government. The graves are dated 1900 and 1901. In late May 2018, memorial stones were installed at the graves. These are the first memorials erected by the Russian Federation for its servicemen on the Atlantic coast line of the USA.

SYSTEM NAMED CHANCE

Rostec premiered a unique design for people evacuation from high-rise buildings – an individual special-purpose parachute system called Chance. The novel solution was unveiled at the Kirzhach airfield when opening a new production complex of the Scientific Research Institute of Parachute Construction, part of Technodinamika Holding affiliated to the State Corporation. Unlike conventional parachute systems, Chance makes it possible to land a person from extremely low altitudes – as low as 30 meters (the height of a nine-storey building) and higher. Its structure includes an anchor line used to close side valves and pull canopies, three parachutes maintaining a specified landing speed, as well as a pack with harness. At the same time, the parachute opens at a required height by itself, and no special training is required for its operation.

Support from the Russian Foreign Ministry

At the conference of Russian ambassadors and permanent representatives which took place on the premises of the Russian Foreign Ministry, the Director General of JSC Rosoboronexport (part of the Rostec State Corporation) Alexander Mikheev said about military-technical cooperation and about help from Russian diplomats.

The conference was attended by representatives of the Russian Presidential Executive Office and the Government, the heads of the two houses of the Federal Assembly (Parliament), ministries and agencies involved in the implementation of Russia's foreign policy, subordinate and voluntary organizations of the Ministry of Foreign Affairs, as well as veteran diplomats.

'Today, Rosoboronexport carries out military-technical cooperation with more than 100 foreign countries, and the role of the Russian Foreign Ministry in establishing and strengthening our relations with partners cannot be overestimated. Thanks largely to support from diplomats, we have made a breakthrough to the markets in Latin America and the Middle East in the past decade, and now we are successfully returning to sub-Saharan Africa,' said Alexander Mikheev, Director General of Rosoboronexport.

Rosoboronexport is working closely with dedicated units of the Russian Foreign Ministry in the implementation of Russia's state policy in the field of military-technical cooperation in virtually all re-

gions of the world. In addition, Russian diplomats provide support to Rosoboronexport employees at more than 50 Rostec's representative offices abroad. Russia's ambassadors are involved in the promotion of military products in regional markets, marketing efforts and assist in fulfilling contracts with foreign customers.

The official status of exclusive state-controlled special exporter provides Rosoboronexport with unique opportunities to expand long-term mutually beneficial cooperation with foreign partners, strengthen Russia's leading positions in the world arms market. Rosoboronexport always receives the necessary diplomatic support from the Russian Foreign Ministry in implementing large-scale projects aimed to enhance the defense capabilities of partner countries. This contributes to creating a climate of cooperation and good neighbourly relations with other countries.

'In a dynamic and changing industrial and political landscape, our joint task set by the nation's leadership is to enhance the impact of economic diplomacy efforts, actually help domestic businesses promote advanced



Russian developments abroad, and bring high-tech products to regional and global markets. I am sure that together we are able to accomplish it,' added Alexander Mikheev.

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

Engineering Machines to Vietnam

ChTZ-URALTRAC, a member of Uralvagonzavod Group of Rostec State Corporation, and a Vietnamese company NGA PHAT have signed a B10M.0100E bulldozer supply contract. The tractor manufacturer's dealer has won the state tender for supply of the bulldozer designed for repair and recovery of roads in mountainous villages of South Vietnam.

Tu Hong Hung, CEO of NGA PHAT, explained that local budgets do not allow the territories to independently procure the machinery, so the government helps the highland regions and covers a portion of the infrastructure investments, including the purchase of B10M.0100E. The Vietnamese party shall consider buying two more bulldozers of the same type should the operating experience of

the Chelyabinsk-manufactured earth mover be successful.

The machine will be assembled, tested, painted and prepared for dispatch to the customer as early as this August. The vehicle will be delivered non-assembled to Vietnam in a 40' shipping container. The dealer possesses the required production facilities and qualified mechanical engineers to independently assemble the bulldoz-



er on-site. It will then transfer the machine for operation and carry out its after-sales service and maintenance.

ARMY 2018

Международный военно-технический форум

№01, 21 августа 2018 года

ОФИЦИАЛЬНОЕ ЕЖЕДНЕВНОЕ ИЗДАНИЕ ФОРУМА

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«С 22 по 27 августа Министерство обороны Российской Федерации проводит Международный военно-технический форум «АРМИЯ-2018». 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 Форум...

International military-technical forum 'ARMY-2018'

August 21-26, 2018

Техника для любых задач

The Patriot Congress and Exhibition Centre with the Military and Patriotic Park of Recreation and Leisure of the Armed Forces of the Russian Federation

Official information analytical edition of the forum – newspaper show-daily 'ARMY-2018'

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.

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HOUSE OF FRIENDSHIP

Before the Tank Biathlon finals, Minister of Defence General of the Army Sergei Shoigu visited the House of Friendship at the Alabino training ground showcasing national expositions about history and culture of the participating countries. Sergei Shoigu played some music instruments of Myanmar, Uganda and Jordan. He was also treated with Chinese tea, Kyrgyz mineral water and oriental sweets. An Uzbek foldable wooden bookholder, Syrian folk craftwork items and copperware attracted Sergei Shoigu at most. Participants of the Games made national expositions about their culture and history at the House on the opening day of the Games. Concerts of national ensembles, lectures, expositions and other events took place in the House of Friendship on a daily basis.

FIRST VISIT TO ERA TECHNOPOLEIS

Specialists from more than 40 leading industry enterprises, scientific and educational organisations visited the Era military innovative technopolis to learn about its capabilities. They saw options for housing joint laboratories for researches in the interests of the Defence Ministry. During the meeting, the Main Department of the Research Activities and Technological Support of Advanced Technologies (innovative research) of the Defence Ministry with the Office of Advanced Research and Special Projects held a working meeting to discuss main vectors of scientific research, relations with enterprises and organizations, as well as logistical base. The Era shall start functioning in September 2018 to house 18 specialized laboratories at the first stage equipped with over 800 pieces of experimental and test hardware.

EUROSATORY-2018

The international Land and Air-Land Defence and Security Exhibition EUROSATORY is one of the world's largest exhibitions of land and air defence weaponry. It has been held biennially under the patronage of the Ministry of Defence of France since 1992. The year of 2018 marked the 12th time Russia has participated in EUROSATORY. FSMTC of Russia has decreed that responsibility for the organization of the Russia's joint display at the exhibition should be vested in Rosoboronexport. The exhibition's main focus is the land and air defence weaponry, as well as communications assets, computer technologies, simulators and logistics support. It has also placed special emphasis on the upgraded versions of current military equipment. Manufacturers of dual-purpose, crisis management, humanitarian aid, peacekeeping, security and counterterrorist products have enjoyed an increasingly broader representation at the exhibition in recent years.

Run Tests in Mountainous Areas

Helicopters of Russia specialists have started the trials of Mi-171A2 and Ansat helicopters. Mi-171A2 will perform a series of flights in the Astrakhan region, and their results will be used to prove this model's operability at ambient temperatures up to +50°C.

The next step will be trials in Nalchik: onboard equipment will be tested in mountainous terrain. Meanwhile Ansat will be tested on Elbrus. Trial results are supposed to confirm the helicopter's operability in mountainous areas at altitudes up to 2,500 meters.

'As the Holding plans to certify Ansat and Mi-171A2 in a number of countries, at the moment it is important for us to check and document the maximum capacity of these helicopters,' said Andrey Boginsky, CEO of Helicopters of Russia.

He also noted that the results of helicopter trials will be used in presentations for potential customers. In particular, they will be demonstrated at Airshow China, an international aerospace salon to be held in Zhuhai in November 2018.



The multifunctional helicopter Mi-171A2 is the result of an in-depth overhaul of the Mi-8/17 family. More than 80 modifications were introduced to the Mi-171A2 design. The helicopter is equipped with VK-2500PS-03 engines (civilian version of engines installed on Mi-28 combat

helicopters) with a digital control system. Ansat is a light twin-engine multifunctional helicopter. According to the certificate, the helicopter design allows for its quick transformation into both cargo and passenger versions with the transportation capacity up to seven persons.

Product Range for SSJ-100 and MC-21

Technodinamika (a Rostec State Corporation affiliate) extends the product range for SSJ-100 and MC-21 advanced Russian aircraft. The statement was made by Igor Nasenkov, the Holding CEO, during the new production line opening ceremony.

Science-cum-Production company Respirator, affiliated to Technodinamika Holding, is developing smart units and fire protection systems designed for SSJ-100 aircraft. Besides, affiliated to the holding UAP Gidravlika Publ.Corp is carrying out R&D aimed at components production for MC-21 aircraft. It has already worked out relevant detailed and engineering designs, as well as the working design documentation for fire resistant flexible piping with a protective coating and for hydraulic filter modules.

Nowadays, company specialists are busy preparing for the production of prototypes to be subjected to preliminary and interdepartmental trials. According to the holding company's media relations service, commercial supplies of components are expected



to start in 2019. Most likely, the holding company will become a supplier of the fire suppression system not only for SSJ-100, but for MC-21, too.

Acting in conformity to the MC-21-dedicated programme, Technodinamika Holding has already

been chosen as the supplier of electrically-driven devices for the aircraft's fuselage cargo doors and certain parts for the advanced PD-14 engine, as well as equipment for installing and dismantling batteries found in the fuselage section.



- 70 years on the radar market
- Strong design and development capacities
- From concept to quantity production
- Warranty and post-warranty support
- Our radars operational in over 50 countries



MTC WITH VIETNAM

Rosoboronexport intends to receive a Vietnamese naval delegation during the first International Far Eastern Maritime Show. Military-technical cooperation with Vietnam is a priority for Rosoboronexport. Naval projects have been accounted for more than half of our cooperation over the past 10 years. The ships, submarines and weapons for equipping them delivered by Rosoboronexport as well as the naval infrastructure facilities built with our assistance continue to be praised by the Vietnamese side. I am sure that during the show we will also discuss new directions of cooperation with our guests,' said Alexander Mikheev, Director General of Rosoboronexport.

During its visit to Vladivostok, the Vietnamese naval delegation, together with Rosoboronexport representatives, will visit the stands of Vostochnaya Verf Shipyard and Zelenodolsk Plant Shipyard, where it will hold talks with senior officials of the companies. Russian-Vietnamese military-technical cooperation has more than a half-century of history. Today, Vietnam is among Russia's key partners in the Asia-Pacific region. Cooperation with Vietnam is carried out on all types of military equipment and weapons.

ARTILLERY IN LOCAL CONFLICTS

Rosoboronexport discussed research and production capacity of the Russian industrial facilities in development and production of projectiles for tanks, field and naval artillery, as well as their promotion to the world market. The issue came up during a meeting of the section Army Equipment of Rosoboronexport's Research Council, hosted by the Bakhirev Research Institute of Machine-Building, headquartered in Moscow.

An analysis of modern conflicts suggests that Artillery will play a bigger part in the foreseeable future and the trend will remain positive ever since. Most countries still consider the branch as the major fire asset, not affected by weather, light conditions and environment.

If anti-terrorist operations waged in the Middle East are any pointer, then one has to take into account that artillery has to shoulder 50-60 percent of fire missions in ground operations. Literally all operations begin and end with the enemy being engaged with artillery fire. However, Russian specialists insist that changing nature and substance of modern military and special operations require specific amendments to the development and production of projectiles. For Russia to maintain the lead on the world market, as well as keep and further proliferate export of projectiles, the council named several tracks for development of artillery and tank ammunition.

Newest Tor-E2 SAM System

JSC Rosoboronexport, part of the Rostec State Corporation, has started promoting the newest Tor-E2 SAM system developed and produced by the Almaz-Antey Air and Space Defense Concern.

The Tor-E2 is a long-awaited novelty in the segment of short-range air defenses. It's no wonder that many foreign customers from different regions of the world are taking a keen interest in it. The SAM system has retained the best qualities inherent in the Tor family and become an even more formidable weapon against any current air threats. With its unique capabilities and performance, the system is superior to most of its counterparts in the world market. It is second to none in mobility and survivability. Rosoboronexport is prepared to consider applications from its partners for the supply of these systems,' said Alexander Mikheev, Director General of Rosoboronexport.

The system is used to provide air defense for army units in all types of combat and on the march, as well as to protect military and other critical facilities from attacks by manned and unmanned aerial vehicles.

The Tor-E2 can engage airplanes, helicopters, cruise, anti-radar and other guided missiles. In addition, it effectively destroys the attacking precision guided munitions, such as glide and guided air bombs, as well as UAVs within its engagement envelope. The system is capable of operating in intense jamming and counter-fire environments, in any weather, day or night.

Unlike most of its foreign counterparts, the Tor-E2 combat vehicle is an independent, mobile, all-terrain fighting unit that provides detection and identification of air targets on the march and at the halt, target lock-on and engagement at the halt, from a short stop and on the move.

A high level of automation and unique algorithms of the SAM system minimize crew involvement in the engagement process.

A battery of the four-channel Tor-E2 SAM systems, consisting of four combat vehicles, can simultaneously engage up to 16 targets flying from any direction at a range of at least 15 km and an altitude of up to 12 km. Each vehicle carries 16 missiles, twice as many as the previous version of the Tor system.

The Tor-E2 is a unique weapon. One combat vehicle incorporates everything necessary for anti-air warfare, from target detection to destruction. The system far exceeds its counterparts in combat survivability: to knock out a Tor battery, you need to destroy all of its combat vehicles. For most of its counterparts, disabling a command post or a battery radar would be sufficient for that.

In addition, the two Tor-E2 combat vehicles can operate in the 'link' mode, which enables them to exchange information about the air situation at differ-



ent altitude ranges and coordinate joint engagement operations. In this mode, one of the combat vehicles, acting from an ambush, receives information from the other one and does not reveal itself until the launch of the missile.

The possibility of integrating the Tor-E2 SAM system into any existing air defense system available to the customer, including that compatible with NATO standards, considerably expands its export potential. To this end, a command post can be attached to a battery of four Tor-E2 combat vehicles to control and coordinate the Tor combat vehicles and interact with the customer's air defense control system.

'Rosoboronexport is ready to provide exhaustive information on the Tor-E2 SAM system at the upcoming Army 2018 International Military Technical Forum. In addition, at this venue, we expect much attention from our foreign guests to other new air defense weapons promoted by the Company – the Viking SAM system and the Gibka-S MANPADS squad combat vehicle,' added Alexander Mikheev.

First Stage of Aerodynamic Tests

The first stage of the aerodynamic tests of the light-weight multi-purpose VRT500 helicopter has been completed at the facilities of the Central Aerohydrodynamic Institute (TsAGI). The aircraft is a new development by VR-Technologies Design Bureau of Russian Helicopters Holding belonging to Rostec State Corporation.

The new helicopter's 1:4 scale model was tested in the institute in-house free-spinning wind tunnel. During the tests, the drag of the model body and its most critical components – fuselage, nacelle, rotor mast and tail group was evaluated.

VRT500 is a light-weight single-engine helicopter featuring a coaxial configuration and a take-off weight of 1,600 kg. The vehicle was put on

public display for the first time at the HeliRussia-2018 International Exhibition of helicopter manufacturers. This is the first light-weight helicopter built by the holding with a take-off weight of less than 2 tons.

The VRT500 helicopter has the largest cargo-and-passenger cabin in its class with a total capacity of up to 5 people. It is equipped with

an interactive control system. The machine is capable of developing a speed of up to 250 km/h, covering distances of up to 860 km, and carrying up to 730 kg of payload. The several VRT500 modifications include those designed for passengers, multi-purpose, cargo, training, VIP and emergency situations. Besides, VRT500 will become the first world's

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KUZNETSOV ENGINES

Serially-built RD-107A/RD-108A engines by Kuznetsov PJSC, Samara-based enterprise of the United Engine Corporation, were used to perform the seventh launch of the Soyuz-type space launch vehicle this year. The Soyuz-2.1a medium-lift space launch vehicle with the Progress MS-09 Cargo Spacecraft was launched at 12:51 Moscow time on 10 July from the launching site No. 31 of the Baikonur Cosmodrome. Launch of RD-107A/RD-108A rocket engines installed on the first and second stages was conducted normally.

As expected, the cargo spacecraft will approach the station and the Pirs docking compartment of the Russian segment of the International Space Station in the automatic mode under control of the ISS Russian segment's Chief Operational Crew located in MCC, and Russian cosmonauts Oleg Artemyev and Sergey Prokopyev. This will be the second cargo spacecraft to be placed into orbit by serially-built Kuznetsov engines this year. In total, this year saw seven launches of Soyuz-type space launch vehicles with RD-107A/RD-108A engines from four cosmodromes – Baikonur, Vostochny, Plesetsk and Guiana Space Centre. The spacecraft will deliver to ISS about 2.5 tons of various cargoes, including fuel, compressed gases, water, scientific equipment and components.

SELF-LOADING RIFLE TG1

Kalashnikov Concern, affiliated to Rostec State Corporation, launched a new smooth-bore self-loading shotgun TG1. The weapon is meant for training and live practicing, law enforcement and personal property protection. The product can be purchased under a usual license for smooth-bore weapons, making an online order on the official website of the concern or through a proprietary network of brand-zones.

The 12 m gun is constructed on the basis of the popular MR-155 model and features a modern gas venting system, chrome plated chamber and bore. The 12/70 and 12/76 caliber cartridges are fed out from a detachable box magazine, the design provides an automatic shutter delay. The handle with a pistol grip and fore-end are made of impact-resistant plastic. The rifle is furnished with a Picatinny rail, on which a detachable carrying handle with a fully integrated iron sight is mounted. The length of the gun is 1040 mm, while the of barrel length is 510 mm. The weight of the weapon with an empty magazine does not exceed 3.5 kg. the of the magazine case capacity is 5 cartridges.

NtechLab Face Recognition System

The FindFace Security solution created by NtechLab and implemented by Rostec in several cities during the FIFA World Cup made it possible to detain more than 180 persons included in the database of offenders. Some of them were on the federal wanted list. In the capital, the system introduction project was implemented in conjunction with the Department of Information Technology of Moscow. The system introduced in all regions of the Russian Federation will significantly improve the safety of citizens and reduce the crime rate.

About 500 cameras monitoring the city, metro, stadiums and fan zones as well as mobile biometric complexes for the mass events were connected to the face recognition system in several regions just for the World Cup period. Even within such a short time-frame, the system has shown its high efficiency. It could not be deceived by any tricks. For instance, one of the fans who was banned from sports events by the court decision tried to penetrate the fan zone five times using his glasses, hood and finally the cap for masking, but it did not help! Another striking example is a theft of the sponsor's trophy (one to be awarded to the best player of each match) from the fan zone. Video cameras were used to restore the events: it was possible to identify the persons involved and find their profiles in social media. Thanks to the face recognition system, one of the thieves was located in the fan zone the next day, and the trophy was returned, said Sergey Chemezov, CEO of Rostec State Corporation.

In 2018, Rostec State Corporation signed a deal for the acquisition of

a minority stake in NtechLab, the Russian developer of a unique face detection algorithm based on artificial neural networks and machine learning. NDF became the third party to the deal.

As for now, the NtechLab algorithm is considered the fastest and most accurate face recognition technology in the world. This is proved by numerous victories in the international competitions held by the US Intelligence Advanced Research Projects Activity, US National Institute of Standards and Technology, as well as Ohio and Washington State Universities.

The algorithm recognizes faces with an accuracy up to 99%. Finding a specific person among 1 billion people takes less than half a second. The NtechLab algorithm can also determine the emotional state, sex and age of a person.

The technology can be used in monitoring and security systems operating on the streets, in yards, house entrances, public spaces, offices, metro, stadiums and other facilities.



The high efficiency of the algorithm was confirmed during the 2018 FIFA World Cup: FindFace Security helped to detain over 180 offenders, some of which were on the federal wanted list.

Rostec was responsible for the implementation and operation of a wide range of digital solutions in the field of security and civil IT services during the 2018 World Cup. In particular, it ensured the smooth operation of the information and telecommunications infrastructure in 30 Russian cities. This infrastructure provided 2.8 million phone calls for fans, 262 TB of Internet data transmitted and Ultra HD game broadcasts for 220 countries during the World Cup.

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Acting in conformity to the MC-21-dedicated programme, Technodinamika Holding has already been chosen as the supplier of electrically-driven devices for the aircraft's fuselage cargo doors and certain parts for the advanced PD-14 engine, as well as equipment for installing and dismantling batteries found in the fuselage section.

ChipEXPO-2018

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- Department of Radio-Electronic Industry of the Ministry of Industry and Trade of the Russian Federation "Participants in the program" Development of the electronic and radio electronic industry for 2013-2025";
- Holding "Russian Electronics";
- Zelenograd Development Corporation;
- Chinese companies and the TEEMA Association of Taiwan;
- All-Russian competition "Golden Chip", in which more than 50 companies took part in 2017;
- "Novelties of electronics manufacturers" is a showcase display of new developments of domestic enterprises.

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EXPORTS OF DIFFRACTIVE OPTICS

Since the beginning of the year, Shvabe Holding has supplied 298 diffraction gratings to its foreign customers. Therefore, only for the first half of 2018 these products' export volume was higher than for the entire last year. Diffraction gratings were created by the holding company – the State Institute of Applied Optics (GIPO). It produces 70% of Russian diffraction optics. By the end of 2018, Shvabe plans to supply another 130 optical gratings to Germany, Norway and Ireland. In total, the company exported 298 optics units to four countries of the near and far abroad for the first six months of 2018. For instance, it supplied 110 grids to Ireland, 35 units to Norway, 150 units to Germany and 7 units to Belarus during the first half of the year. For comparison, foreign customers received 123 gratings in the first half of 2017 and 272 gratings in total for the whole last year, according to the holding press service. 'This is a high figure in itself, not to mention a serious increase in supplies. The optimal ratio of price and quality makes our products highly sought-after among both Russian and foreign customers. GIPO has been exporting diffraction optics to Europe and the CIS countries for more than ten years. We are constantly working on expanding the geography of supplies and strengthening our existing positions,' said Villen Baloev, CEO of GIPO.

MI-17 CHOPPERS FOR LAOS

Russian Helicopters holding group finished the execution of the first service contract in favor of Laos Ministry of Defence and during the official ceremony transferred a batch of four Mi-17 helicopters to the customer. The machines were repaired by a mobile team of specialists of the holding. The transfer ceremony took place at the air base in Vientiane. Fixed Mi-17 were examined by the Deputy Minister of Defense of Laos and the Chief of General Staff. During the official ceremony air force crew of Laos performed demonstration flight at the repaired machine, – informed the press office of Russian Helicopters.

'Holding is always ready to offer the most comfortable conditions to its customers, both for helicopter equipment supply and aftersales services providing. On request from Laos we prepared a proposal for repair works for one more batch of helicopter Mi-17 type', – noticed General Director of Russian Helicopters holding group Andrei Boginskii. At the end of the event, the parties conducted negotiations regarding the supply of new helicopter equipment and further cooperation in the sphere of maintenance services of the earlier supplied helicopters.

Unique Naval Underwater Weapons and Ships

JSC Rosoboronexport (part of the Rostec State Corporation), in conjunction with JSC Sea Underwater Weapons – Gidropribor Concern, has launched a program to promote naval materiel and special equipment to the external market.

'A wide range of missions carried out by the navies of maritime powers necessitates equipping them with various types of naval hardware and special equipment. The foreign navies include 225 Russian-built ships. Of them, more than 100 surface ships and submarines are the carriers of naval underwater weapons. Rosoboronexport is offering its partners unique solutions to equip and upgrade the armament of these ships,' said Alexander Mikheev, Director General of Rosoboronexport.

Naval underwater weapons are in service with the world's major navies. However, as few as 5 to 7 countries, including Russia, are capable of designing and manufacturing these weapons independently, due to the high complexity and cost of these efforts. A number of weapons produced by JSC Sea Underwater Weapons – Gidropribor Concern, offered by Rosoboronexport, are unrivalled in the world.

Foreign customers are offered a wide range of naval hardware and special equipment. Among them are torpedoes, mines, antimine and underwater anti-sabotage weapons, as well as means of ship's self-defense against underwater weapons.

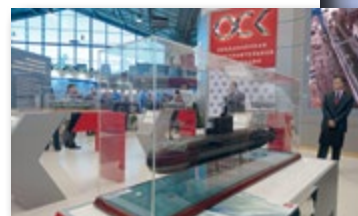
In the segment of torpedo weapons, the TE-2 universal electric remote-control homing torpedo is offered. It is designed to destroy submarines, surface ships and fixed tar-

gets. In addition, a number of newly developed torpedoes, including 533 mm torpedoes and 324 mm small torpedoes, are promising for promotion on the world market.

The MDM-1 and MDM-2 bottom mines are designed to create a mine threat and destroy surface ships and submarines in surface and submerged conditions when used in minefields. The Shelf naval shelf mine offered has no counterparts in the world. It can be placed from delivery aircraft, submarines, and surface ships. The Shelf mine has a hydroacoustic passive/active detection and targeting system protected from triggering when exposed to natural disturbances and influence sweeps that can detect any submarines and surface ships regardless of the level of their noise and speed. Its unique design makes it difficult for the target to use countermeasures and conduct an evasive action.

Naval mines are not rigidly linked to a particular ship project. Countries whose naval doctrine provides for mine planting are interested in their acquisition. Rosoboronexport expects attention to Russian-made naval mines from a wide range of countries in Africa, South-East Asia and Latin America.

As regards anti-mine weapons and means of ship self-defense against underwater weapons, Rosoboronexport offers the Mayak-2014 sonar systems, MG-74ME



self-propelled sonar countermeasure devices, small-sized self-propelled torpedo defense devices, the SHAT-U broadband acoustic sweep as well as the GKT-3M deepwater contact sweep, which is unmatched in the world market. A flexible configuration of the sweep enables its use in single ship-borne, heliborne, paired near-bottom and network versions.

In addition, diver delivery vehicles that can be used from the world's most popular Russian-built Projects 877 and 636 submarines, as well as Piranha class midget submarines are considered by Rosoboronexport to be promising for promoting on the global market.

'We also expect a considerable interest in Russia's naval underwater weapons from countries developing their own shipbuilding industry, but having no capability to develop and produce naval weapons. In addition, a number of countries are seeking the competencies necessary to establish the production of these weapons at national industrial enterprises. Rosoboronexport is ready to work in these areas,' added Alexander Mikheev.

New fuel systems for KAMAZ

In 2019, most KAMAZ trucks engines will be equipped with the new fuel systems by Altay Precision Components Plant. This was announced during the grand opening of the first Altay Common Rail System commercial production stage at Altay Precision Components Plant (AZPI).

The effect of such innovative import phase-out projects, similar to the one being implemented by AZPI, can hardly be overestimated. First of all, this means independence from foreign suppliers. And, of course, it is about reduction of

the production cost as the Russian fuel fittings are 30% lower than their imported counterparts. The total cost of the new AZPI's project was 600 million rubles. The products of the Altay company will be supplied to plants of Russian pro-

ducers of Euro-5 and Euro-6 diesel engines, including KAMAZ. In Russia, there are no other producers of complete fuel equipment apart from AZPI. Today, about 98% of the Russian fuel systems' market belongs to foreign manufacturers.

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RUSSIA, AFRICA, BRICS

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

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

Vladimir Putin attended a meeting of BRICS leaders with delegation heads from invited African states and chairs of international associations. Those invited included the leaders of African countries, namely, Angola, Botswana, Ethiopia, Gabon, Lesotho, Madagascar, Mauritius,

Malawi, Mozambique, Namibia, Rwanda, Senegal, the Seychelles, Tanzania, Togo, Uganda, Zambia and Zimbabwe. The meeting was also attended by the heads of Argentina (the current chair of the G20), Turkey (the current chair of the Organisation of Islamic Cooperation) and Jamaica (the current chair of the Caribbean Community).

At the summit President of Russia Vladimir Putin said: 'The advantage of BRICS as a format is that it is free of all the red tape you find in many other associations like this. As President of Brazil, Michel Temer said today, BRICS is an organic association of countries that have many things in common:

they have many shared interests and common approaches to addressing challenges that are relevant to all of humanity, including Russia.

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

BRICS Plus and an outreach format have already been created to this effect. For now, we agreed to rely on these formats for expanding our reach and drawing into our orbit

countries that share the underlying principles and values of BRICS.

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

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

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

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

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

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

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

urban areas is expected to reach 60 percent by 2050.

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

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

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

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

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

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

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

A considerable part of Russian initiatives provides for localising industrial businesses in Africa, including,



among other things, the construction of plants manufacturing component parts and assembly works.

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

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

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

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

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

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

/RA&MG/

FSMTC of Russia



Dmitry SHUGAYEV

The key element of the power vertical managing the MTC-system

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. The Director of FSMTC of Russia Dmitry Yevgeniyevich Shugayev is sure that ARMY-2018 Forum is one of key tool to further develop the military-technical co-operation of the Russian Federation with our traditional partners and to find new partners.

The ARMY-2018 Forum taking place in sequence in the Patriot Expocenter near Moscow is one of key tool to further develop the military-technical cooperation of the Russian Federation with our traditional partners and to find new partners. In meetings of organizing committee for preparing and holding the ARMY-2018 International Military-Technical Forum, a significant attention is traditionally paid to issues of international cooperation. FSMTC of Russia actively participates in both prepa-

ration and holding of this large-scale and important event and participates in activities at ARMY-2018 to provide demonstration of military purpose products from Russian and foreign manufacturers, as well as in arranging and holding negotiations with foreign partners related to MTC issues.

Organizer of the Forum, the Defense Ministry of the Russian Federation, and the FSMTC of Russia, as a control and supervisory authority in the field of MTC are making every effort to create friendly and supportive environment for all for-

eign participants of ARMY-2018 to the maximum possible extent.

Answering the question about what are the principles, the system of cooperation in the field of MTC is based on today, the he Director of FSMTC of Russia Dmitry Shugayev says: '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 are so called 'small' parties of military-technical cooperation who are authorized to provide service of the equipment

previously purchased by customers, to upgrade it and to supply spare parts for this equipment. These, in particular, include such integrated structures of the defense industry as United Aircraft Corporation, United Shipbuilding Corporation, Almaz – Antey Air and Space Defense Corporation and others. It is caused by the fact that these 'small' parties are just the industry representatives, i.e. 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 licensing, respectively. 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 'vertical relationship'.

I'd like to note that Russian is steadily occupies the second line in the list of world top exporters of military purpose products. At the same time we understand, that the market of military purpose products (MPP) is a very specific market having cyclic nature. A number of factors should be taken into account, including rearmament programs of armies, financial solvency of countries depending on their general economic health. Therefore, without being expecting any abrupt jumps, we build long-term relationships that allow us to speak with confidence about stable growth of export supplies.

It is important for us to participate in long-term programs, provide technical support to our clients, create maintenance stations with understanding that many of our clients are aimed at creation or improvement of their own industry, for example.

We are open for new cooperations and we understand that this is the trend. Of course, the situation of 'buy or look for it in another place' is becoming a thing of the past.



The Federal Service for Military-Technical Cooperation (MTC) is a key element of the power vertical managing the MTC system. As federal executive authority, Federal Service for Military-Technical Cooperation (FSMTC of Russia) performs MTC control and supervision functions.

FSMTC of Russia reports to the Russian Federation President.

FSMTC of Russia is subject to jurisdiction of the Russian Federation Defense Ministry.

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 MTC system; implementation of MTC related international treaties; level of foreign trade prices for military purpose products.**
- **Decision making on MPP import and export; issue of licenses for MPP import and export; authorizing MPP developers and manufactures to conduct foreign trade operations to supply spare parts and support materiel to MPP, their repair, certification, etc.;**
- **Consideration of applications from foreign customers, their registration, record and control over their implementation;**
- **Record and registration of foreign trade contracts;**
- **Maintenance of the register of MTC entities and issue of appropriate certificates to them.**

Naturally, sales of the final product is our main priority, but our partners increasingly aimed at building their national manufacturing facilities to develop their industries. The relationship with partners in the 'only export' coordinate system are gradually replaced by cooperation in the

field of creation of new high technology products as a result of mutual efforts. And we are ready for this kind of cooperation as a country that has built its own defense industry. We are ready for cooperation and we will help our partners to create systems they need today.

/RA&MG/

RUSSIAN DEFENSE INNOVATIONS

Rosoboronexport is the general partner of the International military-technical forum 'Army-2018'

JSC Rosoboronexport (part of the Rostec State Corporation) – the sole Russian state intermediary agency, which is responsible for import/export of the full range of defense and dual-use end products, technologies and services. Rosoboronexport is the general partner of the International military-technical forum 'Army-2018'. The company's participation in 'Army-2018' shows a serious export orientation of this forum.

At the International military-technical forum Army-2018 Rosoboronexport will present their exposition in the framework of the demonstration center of the Rostec Corporation in the joint exhibition of the Corporation. Rosoboronexport's stand will use the modern multimedia tools (a table with the effect of levitation, video wall, touch panels, etc.), where will be presented for a wide range offered for export military products from Russia. There is the latest exhibition technology, also with holographic multimedia cata-

logs and many other innovations. On that stand Rosoboronexport will present several high-technology products – T-90S, MiG-29M, Su-35, Ka-52, Mi-171SH, S-400 'Triumph', 'Pantzir-S1' and a submarine of project 636), BTR-82A and others.

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. This year JSC Rosoboronexport will mark its 18th anniversary.

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

Address by Rosoboronexport's Director General Alexander Mikheev to the participants and guests of the Army 2018 Exhibition



Dear colleagues!

On behalf of Rosoboronexport, I welcome and congratulate you on the beginning of the fourth Army 2018 International Military Technical Forum.

Rosoboronexport (part of the Rostec State Corporation) traditionally participates in this event and we are particularly pleased to see that the exhibition is rapidly evolving from year to year and reaching significantly higher quality and organizational levels every time.

Today, this is one of the best venues in the world for Russian and foreign defense industry companies. The Patriot military park provides manufacturers of military equipment and weaponry for all services and branches of the armed forces with a real opportunity to showcase their capabilities, talents and professionalism to existing and potential foreign customers.

We really have what to be proud of and cherish. Today, Russia's global competitiveness, the strength and might of the Russian Army and Navy and, of course, the success in the world arms market is directly dependent on the success of the defense industry. That is why Rosoboronexport has traditionally supported the Army Forum and the

organizers of other arms exhibitions held in Russia. They provide an excellent opportunity to show foreign customers the largest number of full-scale military products, many of which are on display for the first time. Here, at Kubinka airfield and at the Alabino training ground, you can see them in action. The forum's demonstration program is an incredibly spectacular event, where the power of domestic weaponry and military equipment is validated under real conditions.

Rosoboronexport's exhibit display has been shaped taking into account the experience of the world's best exhibitions and reflects the basic needs of all segments of the modern arms market. At Army, we target potential customers at purchasing the most in-demand products: tanks, armored vehicles, artillery systems, small arms, air defense and electronic warfare systems, submarines, combat ships of various classes and types, combat aircraft and helicopters, training aids and much more. Here at the forum you can learn in as much detail as possible the weapons that became legendary after successful tests under real combat conditions during the antiterrorist operation in Syria.

For the first time in 2018, the International Forum 'National

Security Week' will be held simultaneously with Army 2018, where the best new security developments from Russian companies will be presented. Rosoboronexport is actively exploiting this segment of the world market that shows a significant positive trend. The security solutions and products we offer in various areas and at all levels are of great interest to foreign customers.

The business program of our event is distinguished by its richness and scale. Every Army forum brings dozens of requests from partners for the procurement of military products, as well as new contracts to Rosoboronexport. Last year, for example, more than 70 delegations from around 50 countries visited us. Now we expect an increase in this number.

I would like to wish all the participants and guests of Army 2018 the most fruitful and hard work, new partners, business ties and excellent mood. I am sure that together we will maintain Russia's leading position in the defense sector, we will be able to meet the most unexpected and major challenges, and we will continue to successfully develop Russia's military-technical cooperation with foreign states in all regions of the world.

Alexander Mikheev,
Director General
of Rosoboronexport





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

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

arms control treaties and the relevant international agreements. Director General of Rosoboronexport – Alexander Mikheev.

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

The main result of biography of Rosoboronexport, despite the diffi-

cult 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 cus-

tomers every year. Over the period of its operation in the international market, Rosoboronexport has delivered hundreds of thousands of units of military equipment and weapons worth more than US\$ 120 billion to 115 countries.

Rosoboronexport pays great attention to both major billion dollar contracts and small deals. The company seeks to operate flexibly and efficiently by using modern and advanced marketing and customer settlement methods. The special exporter cooperates with more

than 700 Russian defense-industrial enterprises and organizations, which enables it to offer partner countries the comprehensive and cost-effective solutions for strengthening their defense capability and national security.

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



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

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/

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

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

Foreign customers are offered package solutions for national systems intended to defend land, air and

Core areas of activities of Rosoboronexport

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

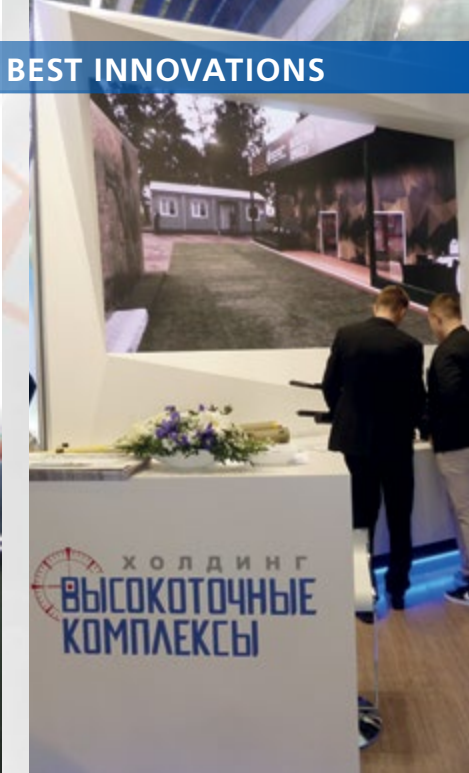


HIGH-PRECISION WEAPONS

Masterpieces from Russia

High-Precision Weapons holding creates absolute and unsurpassed military-technical innovations

The role of high precision weapons is growing reasonably worldwide. These are high precision arms which primarily define reliability and efficiency of defensive and assault capabilities of modern armed forces including their tactical level above all. Among the largest manufacturers of the most advanced weapons of such kind is Russian High-Precision Weapons holding company within the state-owned Rostec group. The company is well-known all around the world thanks to its high precision weapons which outperform foreign counterparts and successfully serve in armies of all world continents. The military products made by High-Precision Weapons are known in all over the world and regularly are presented at the largest defense exhibitions in the world. The holding's exposition always becomes one of the most interest and most demanded by military experts and ordinary public.



The main goal of High-Precision Weapons holding founded in 2009 was consolidation of technological capabilities of dedicated enterprises to create advanced weapons, defense and special-purpose equipment related to high precision weapon systems. Nowadays High-Precision Weapons holding includes 19 Russian defense enterprises among which are trusted centuries-old leaders in their industries such as Tula Arms Plant which is more than 306 years old.



High-Precision Weapons holding activities increase every year both at internal market (it is a major supplier of high precision arms for Russian Armed Forces) and external market. Export to various regions of the world grows on a constant basis. Annual export gain is 25-40%. Such stability is also record-breaking for the whole Russian engineering industry. The holding purports to double military equipment supplies by 2020. Among the most stable export regions are Middle East, Gulf states, Northern Africa and India. Its export-oriented activity has been increasing lately at promising markets of South East Asia, Latin America, Central and South Africa. The global success of High-Precision Weapons has been also proven by Stockholm International Peace Research Institute (SIPRI) which has given the holding 39th position in a global rating of world arms manufacturers.



HIGH-PRECISION WEAPONS



Most of experts emphasize not only quantitative success of the High-Precision Weapons holding at world arms market but also good quality indicators of its products. The majority of defense products exported by the High-Precision Weapons holding are best in class. Many of them are trend-setting and unrivaled in terms of efficiency, reliability as well unique price and quality criteria. According to experts the most world popular weapons made by the High-Precision Weapons holding include Pantzir-S1, Kornet-E/EM, Konkurs, Metis-M1, Krasnopol, Arkan, Verba, Sosna, Palma and many others.



The holding enterprises are mostly involved in development, production, upgrade, repairs and sale of arms, military and special-purpose equipment. Besides, the holding is a world trend setter as to a number of some high precision weapons since many products were made at holding-owned enterprises and later recognized worldwide. The holding designers form a technological benchmark dedicated to advanced weapons development even today.



KORNET-E/EM

MULTI-PURPOSE LONG-RANGE MISSILE SYSTEM



Multi-purpose long-range missile system 'Kornet-E/EM' is designed to engage existing and future combat tanks protected by explosive reactive armor, light armored vehicles, fortifications, surface low-speed air targets (helicopters, UAVs, assault aircrafts) by day and at night in adverse weather conditions as well as in optical and radio jamming environment.

Advantages and Operating Features

- Targets engagement in automatic mode reduces psychophysical stress of operators, requirements to their skills as well as reduces their training period.
- Simultaneous salvo firing at two targets greatly increases rate of fire and firing effectiveness of the system.
- Firing by two missiles in one beam to engage extra dangerous targets including those protected by ERA.
- Two times (up to 10 km) as compared to 'Kornet-E/EM' ATGW increase of firing range and guidance accuracy increases up to 5 times.
- Wider possibilities for ATGW thanks to engagement of small-size air targets (helicopters, UAVs, assault aircrafts).
- 'Kornet-E/EM' system can be installed on wide range of carriers with small loading capacity (1 pc AL 0.8-1.0 t; 2 pcs AL 1.2-1.5 t). System provides firing by all missiles of 'Kornet-E/EM' family.



HIGH BRAND OF UAC

Russian aviation: international prospects in the civil and military segments

The United Aircraft Corporation (UAC) is the major Russian aircraft manufacturers and one of the biggest in the world. This Corporation unites more than 80 per cent of design and production assets of Russian aircraft industry. It also manages all key and most promising programs of development of the industry. UAC, which under one company represents the most well-known Russian aviation brands such as Sukhoi, MiG, Tupolev, Yakovlev and others, is today one of the world's biggest manufacturers and suppliers of aircraft.

Thanks to the success of its products UAC is one of the world's leading aircraft manufacturers. UAC's revenues have been lately growing on average more than 20% per year. Superjet 100 civil airliners, Su-30 and MiG-29 fighters, Yak-130 operational trainers are among the most popular aircraft exported by UAC. UAC is working to simplify foreign market procedures, which is good news for present-day and future UAC's partners worldwide.

Moreover, one year ago as part of an effort to expand foreign presence UAC was given a military-dedicated

foreign trade license to be implemented on a direct basis. The military-dedicated foreign trade license has been issued by Federal Service for Military and Technical cooperation. This helps UAC improve maintenance and repairs of equipment previously delivered abroad, which includes every Su, MiG, Il, Yak and Tu airplanes.

Alongside with the right for direct maintenance and repairs of the equipment previously delivered abroad, the document also specifies UAC's capabilities to update such equipment and train foreign personnel to maintain and repair

UAC products. Besides, the license authorizes UAC to establish joint ventures abroad which can maintain and repair aircraft.

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

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

able increase of export of Russian aircraft having better reliability, up-to-dateness and well-balanced prices both for airplanes and further maintenance.

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

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

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

However, Russian aviation export is notable not only for military aircraft. In recent years rather good results have been shown by civil segment



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

The key advantage of Superjet 100 is lower operational costs as compared to its 100-seat competitors. Operational costs are minimized due to higher fuel efficiency and lower take-off weight. According to the aircraft operation study, its ownership cost is averagely 15-20%



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lower than the other similar class aircraft. The highly competitive lease rate supported by a state guarantee of depreciation value is also worth being taken into account.

SSJ100 capable of carrying 98 passengers is the first in its class aircraft featuring five-across seating, with big 32 inch distance between

seats. Thanks to a combination of wider seats and higher cabin (over 2 meters) SSJ100 has more cabin space and bigger stowage bin capacity than such of competitors. The airplane has been built with the use of the latest design procedures and technologies by leading manufacturers such as French Snecma (engines)

and Thales (avionics), US Goodrich (wheels) and Honeywell (APU). The interior has been designed by Italian office Pininfarina. In February 2012 the aircraft was certified by European Aviation Safety Agency (EASA).

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

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

It is worth noting that today a business jet version of the SSJ100s is also available. Following the results a number of measures, including auxiliary fuel tanks installation and other engineering solutions the range of the business version of the SSJ100 is increased to about 7,000 km-long nonstop flight.

At the several international Airshows the United Aircraft

Corporation demonstrated its Superjet 100 aircraft with a VIP interior and very high comfort standards. The Superjet 100 aircraft as well as the new Russian MC-21 aircraft family from UAC both demonstrate an optimal combination of commercial effectiveness and maximum passenger comfort. The Superjet 100 in its VIP configuration enjoys high demand. After a number of enhancements such as installation of additional fuel tanks and other system improvements the flight range of the VIP-version of the Superjet 100 was increased to 7,000 km that should satisfy the needs of most demanding customers.

The demand for UAC's military product lineup is stable, however it in particular has risen considerably after successful performance of such aircraft as the Su-35, Su-34, Su-30SM and MiG family fighters in real combat missions. Russian-made aircraft have once again proven their high combat effectiveness and flight and technical characteristics.

Tupolev PJSC, part of the United Aircraft Corporation, delivered in operation another missile carrier-bomber Tu-22M3 to the Russian Long Range Aerospace Forces after the testing and repairing work.

Long-range bomber Tu-22M3 has undergone the complete list of works in the scope of minor repair and modifications under service bulletins in Kazan aviation factory workshops (KAZ n.a. S.P.Gorbunov – Tupolev PJSC affiliate). All ground and flight tests of the bomber were successfully performed at KAZ flight-test center. Upon completion of operational readiness, acceptance and check flights, Tu-22M3 performed a flight to the basing location.

Tu-22M3 – a long-range multimode bomber – missile carrier, intended to reach ground and sea targets within the full range of the aircraft speeds at high, medium and low altitude. It was put into service in 1989. Around 500 aircraft Tu-22M of various modifications were built at the Kazan Aviation manufacturing group.

The international authority of the UAC is also growing, thanks to the success of its international and domestic aviation projects. For exam-

ple, a great deal of attention is shown around the world is to company CRAIC – the joint venture of United Aircraft Corporation (UAC) and Commercial Aircraft Corporation of China (COMAC). This year CRAIC has officially announced the commencement of Joint Concept Definition Phase (JCDP) within the program of CR929 aircraft development.

CRAIC General Manager Mr. Guo Bozhi emphasized that the formal commencement of JCDP is of great significance to promote the deep participation of potential suppliers in

Gear, Environmental Control System, Avionics and others.

Chief CR929 Program Designer from Russian side Maxim Litvinov explained that this stage shall foresee more detailed analysis of technical aspect with regards to RFP Working Packages that are planned to be released by the end of 2018. JCDP includes RFP stage during which airframer requests proposals from potential suppliers of the systems and equipments. JCDP stage within CR929 Program doesn't include interaction in relation to the power propulsion



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product definition, optimize airborne systems and aircraft technical concepts. JCDP stage shall allow China and Russia joint team, together with key worldwide potential suppliers within JCDP phase of CR929 program, to perform a more thorough review of requirements to the main airborne systems: Propulsion System, Landing

system. As for this system, RFPs to the potential suppliers of long range wide body aircraft program were sent in December 2017 and the answer to such requests was received. Completion of RFP-related procedures within the Chinese-Russian long range wide body aircraft program is expected at the end of 2019. /RA&MG/



India, Russia aim for new breakthroughs in BRAHMOS missile programme

The world-class BRAHMOS supersonic cruise missile system, produced by BrahMos Aerospace, has expanded the realm of India-Russia strategic partnership and elevated bilateral defence ties to a higher level. The joint venture (JV) military programme involving two scientific institutions of eminence – India's DRDO and Russia's NPOM – has produced a powerful tactical weapon with no parallels in the world. The project, which started in 1998 with an initial investment of \$250 million having a 50.5% Indian share and 49.5% Russian share, today has become the most successful Defence JV programme in the world.

As a new-age precision strike missile with land, sea/sub-sea and air deployability and operability, the formidable BRAHMOS has redefined and influenced warfare tactics and strategies in the 21st century. Initially developed in anti-ship configuration, BRAHMOS has evolved over the years to establish its impeccable land-attack

capability. Presently, it is the only weapon system which can be fired in land-to-land, land-to-sea, sea-to-land, sea-to-sea, sub-sea-to-land and air-to-sea configurations. No other country in the world has been able to develop such a highly versatile, multi-role modern weapon for its military.

Flying at a top speed of Mach 2.8 and carrying a powerful warhead of up to 300 kg, the two-stage BRAHMOS

has been designed to annihilate high-value land and sea-based enemy targets with impeccable accuracy, high speed and deadly firepower.

While the Russian scientists and engineers contributed in developing the critical propulsion system, including the ramjet engine and booster for the missile along with the warhead, the Indian scientists and technology experts played an equally important

role by designing and developing the fire control system, electronic system, guidance system, avionics and materials for airframe among other components for the missile. In the initial phase, NPOM provided its facilities to test all the technologies needed to develop and configure the new weapon system.

Today, the Indian Navy has deployed the powerful BRAHMOS on all frontline surface warships while the Indian Army is the only land force in the world which has operationalised the land-attack variant of the tactical missile.

A major technological breakthrough in the BRAHMOS project came on 22nd November 2017 when BrahMos Aerospace for the first time successfully test fired the advanced air-to-surface variant of the missile from the Indian Air Force's Sukhoi-30MKI combat aircraft against a sea target. It became a world record feat for India which showed the country's exclusive capability to launch a supersonic cruise missile from land, sea, sub-sea and air.

The air-launched BRAHMOS project faced many challenges as it involved the integration of a very powerful, high-speed missile onboard a heavy, long-range air superiority fighter platform. The Russian-origin Sukhoi-30 combat aircraft underwent structural modifications to carry the BRAHMOS-A whose weight was also reduced by 500-kg in order to fit it onto the heavy strike fighter. The missile also featured other design refinements, including redesigned fins and nose cap, for aerodynamic stability in the early stages of its flight from the supersonic air platform.

The highly intricate mission, backed by the Russian and Indian Governments and the scientific experts of both sides, once again brought together all major defence-sector entities, including DRDO, NPOM, Sukhoi and HAL, to synergise all their resources and successfully realise the BRAHMOS ALCM programme.

Today, the BRAHMOS air-launched cruise missile (ALCM) has become an unparalleled precision strike weapon in terms of range, lethality, and effectiveness among world-wide conventional airborne weapons. It has given an unprecedented fillip to the Indian Air Force's air combat capability.

As India and Russia now intend to export BRAHMOS in the international market, it is the advanced BRAHMOS-A which has gained maximum attention. Russia's Irkutsk Aviation Plant in particular, has been keen on modifying and integrating the airborne missile on the Sukhoi-30 fighter platforms operational in all the friendly countries of India and Russia.

Moreover, with the Russian military presently equipping itself with a large number of modern land, sea and air platforms, the prospects for BRAHMOS getting inducted into the Russian Armed Forces in near future has certainly brightened.

India, with the necessary support and backing from Russia, has also started indigenising the BRAHMOS Weapon System. 'Of course, given that the Indian economy and Indian infrastructure and technology have improved over the last many decades, what we are now focusing on along with Russian partners is to manufacture and produce more in India using technology that is available in Russia to upgrade our equipment, to manufacture new equipment and to build upon the successes of the past,' says Dr. Sudhir K Mishra, CEO & MD of BrahMos Aerospace.

Consequently, BrahMos Aerospace has successfully tested land-attack BRAHMOS with an indigenous seeker and has also carried out 'life extension technology' tests successfully in recent past with indigenous components.

Additionally, India and Russia have also initiated work on more advanced variants of BRAHMOS,



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including the BRAHMOS-NG (next-generation) and a hypersonic BRAHMOS-II (K), paving the way for the 'world's best and fastest cruise missile project' to continue retaining its legacy position of 'market leader' well into the distant future. /RA&MG/



JSC 'CONCERN 'AVTOMATIKA'

Concern 'Avtomatika' (part of Rostec State Corporation) is the largest enterprise of the Russian Federation concerned with problems of information security, with development and production of secrecy communication equipment and systems, protected information and telecommunication systems and also special automated control systems. JSC 'Concern 'Avtomatika' makes its products both in the interests of governmental authorities and in interests of commercial organizations. Double-purpose products are exported via state holding company 'Rosoboronexport'. Concern 'Avtomatika' presents several developments at the forum ARMY-2018.

Stationary UAV electronic warfare system 'TARAN'

The System's equipment, which is located in the open air, provides operation in the temperature range from -40 ° to + 50 °C, as well as:

- when exposed to atmospheric precipitation (rain) with an intensity of 5 mm/min;
- when exposed to sand and dust.

The structural strength ensures operability of the system under wind loads at a wind speed of up to 15 m/s.

The design of the equipment ensures the maintenance personnel safety during its operation. Special notes and warning signs providing safe operation of the equipment are located at the points convenient for their visual perception.

The System control interface provides the implementation of processes and functions, which are to be automated

The System can be stored in a heated room (or with air conditioning) at a temperature of 5 to 40°C, and at a relative humidity of up to 75% at a temperature of 25°C, provided there are no vapors of chemically active substances in this room.



The 'Taran' system is designed to influence the navigation, information transferring/dumping and UAV control channels in order to prevent UAV operation within the protected territory. The radio-signal suppression range for UAV control and navigation channels is not less than 2.7 km in the line-of-sight conditions.

The system can be equipped with an antenna-feeder path of isotropic radiation. In this case, the 'Taran' system provides the impenetrability field over an object with a radius of at least 2700 meters.

System contents:

- antenna-feeder units
- noise-generator units
- a rotary-supporting unit of the radio-signal suppression system controlled from the automated workstation
- a power supply device
- a cable and harness kit
- an installation kit

Portable UAV electronic warfare system 'PISCHAL'



The system is designed to ensure security during public events, as well as protection of state, military and civil secure facilities, and provides suppression of signals from all commercial and special-purpose UAVs.

System contents:

The 'Pischal' system in its standard configuration includes the following units:

- The 5-band 'Pischal' system with a built-in accumulator battery;
- An accumulator battery charging unit;
- A built-in operability control indicator (a battery charge status indicator and a generator performance indicator for each band);
- External ('belt') accumulator batteries.

Optional equipment:

- a support rack for positioning
- a collimator sight
- a rigid coffer for transporting the system by air, railway and sea transport
- a portable semi-rigid bag.

E-11N equipment for automatic encryption of telephone and digital information



This equipment provides:

- information reception and transmission via VHF telephone channels of radio stations;
- information reception and transmission via digital communication channels with S1-FL-BI (C1-ФЛ-БИ) interface;
- encrypted telephone communication with guaranteed reliability when operating with portable and mobile radio stations;
- communication over HF radio stations using the HF modem;
- lipreader conversion of voice information into digital form and vice versa;
- input of eight crypto-keys with validation check and their storage during the validity period;
- selective erasing of any of the eight crypto-keys and their total erasure;
- maintenance of clock synchronization in the case of reliability degradation in the communication channel down to 5x10-2;
- transmitting a warning signal to the subscriber during the synchronization process.

The equipment includes:

- SA267E (CA267E), which provides voice conversion and cryptographic protection;
- SA266E (CA266E), which provides information transmission via HF communication channels;
- MTT-UK-1E (MTT-YK-1E), which provides control for the radio station and voice communication;
- VA264E (BA264E), which provides conversion of 27 V DC voltage, 110 V or 220 V single-phase AC with a frequency of 50-60 Hz, 115 V single-phase AC with a frequency of 400 Hz into a stabilized 15 V DC voltage with an output power of up to 30 W;
- UA158-3E (YA158-3E), which provides the address information input.

E-11S equipment for automatic encryption of telephone and digital information

This equipment ensures:

- information reception and transmission via digital communication channels with S1-FL-BI (C1-ФЛ-БИ) interface;

- input of eight crypto-keys with validation check and their storage during the specified period;
- selective erasing of any of the eight crypto-keys and their total erasure;
- maintenance of clock synchronization in the case of reliability degradation in the communication channel down to 5x10-2;
- transmitting a warning signal to the subscriber during the synchronization process;
- connection to the switching equipment via the 10-wire interface;
- operation in the 'RADIO RECEIVER BYPASS' mode and information transmission from the digital source via RS-232 interface in this mode.

The equipment includes:

- SA268E (CA268E) – the main package – it provides cryptographic protection of voice and documentary information, connection to a specialized VHF radio station, with channeling means over S1-I (C1-I) interface;
- SA266E (CA266E) – for connection to HF radio stations;
- SA249E-1 (CA249E-1) – for connection to VHF radio stations, voice frequency channels;
- AT-3132E – for connection to devices operating via RS-232 interface;
- AT-3104E – for information transmission via HF communication channels in simplex, half-duplex and duplex modes;
- MTT-UK-1E (MTT-YK-1E), which provides control for the radio station and voice communication;
- VA264E (BA264E), which provides conversion of 27 V DC voltage, 110 V or 220 V single-phase AC with a frequency of 50-60 Hz, 115 V single-phase AC with a frequency of 400 Hz into a stabilized 15 V DC voltage with an output power of up to 30 W;
- RA-005IE (PA-005IE) – for connecting a remote unit or a switchboard;
- UA158-3E (YA158-3E) – to provide key information input using a punch tape;
- PA627 (ПА627) – for switching to the intercommunication and switching equipment input of the mobile unit of the AT-3104E or SA266E system and the SA249E-1 system or without them.



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КРЕЧЕТ

ТЕХНИМПУЛЬС



Three Bogatyrs named KRECHET

PETROVICH all-terrain vehicle This project had been existed from 2008 to 2017. In 2017 the company undergone certain changes, and the project have been dubbed KRECHET (Gyrfalcon). Presently, Tehnoimpuls, LLC manufactures three models of KRECHET all-terrain vehicles: Z210-91 is a passenger all-terrain vehicle with 4x4 wheelbase, Z310-91 is a passenger all-terrain vehicle with 6x6 wheelbase, Z320-91 is a cargo and passenger all-terrain vehicle with 6x6 wheelbase.

In

March 2018 an expedition of sorts was arranged to Rybachy Peninsula (Murmansk Oblast). It was a good opportunity to prove adequacy of functionality being in the heart of design of KRECHET all-terrain vehicle by our company. Starting from the beginning of March the path to Rybachy Peninsula is extremely difficult and dangerous, and locals never go there on any vehicles but snowmobiles. And the ones that go on snowmobiles are the most reckless at that. But for our company and our all-terrain vehicles this was a kind of challenge, which we accepted.

Two all-terrain vehicles: KRECHET Z210-91 and KRECHET Z310-91 were

delivered by car transporters to Pechenga settlement in the middle of March. That was our starting point. Before departure, we decided to 'probe' the snow, to get the feeling of



the circumstances, which appeared to be very unfavourable even for an all-terrain vehicle.

Riding around the area, climbing sopkas (hills), checking maximum speed on flat snow we came across deep loose sugar snow with depth from 85 cm to 1.5 m and deeper. At the shallowest depth of 85 cm KRECHET accelerated to 30 km/h. But we couldn't boast similar speed, when climbing the hills. Upward motion on such snow created the feeling of advancing the void, sinking into friable snow with no crust. This hindered the movement sufficiently. But such conditions convinced us in correctness of chosen technical solutions included into KRECHET all-terrain vehicle. We could find a workaround in any tricky situation due to the decisions made by our designers and engineers. Winch, axle pressure distribution, smooth car bottom, wheel and axle locks – all these functions provided maximum self-sufficiency of the vehicle irrespective of the landscape or climatic environmental conditions. The vehicles also demonstrated excellent team work.

On March 26 our team departed to Rybachy Peninsula. Our aim was to reach Bolshoe Ozyorko bay. It took 2 full days to cover the route. The road was intricate, repeated elevation changes, dangerous slopes and hills, perfidious cornices that could lead you into abyss. Weather changed every hour, sunny day could turn into pitch-dark squally wind blizzard. We employed all our inventory to overcome all that had befallen us. Both vehicles worked in team safeguarding each other with pull ropes and supporting each other in especially hazardous areas. There have been no breakdowns within the whole route.

KRECHET all-terrain vehicle managed to cope with all difficulties, proved its efficiency of all technical solutions designed by the engineers, starting from transmission and ending with auxiliaries for passing complicated sections of the route. KRECHET all-terrain vehicle proved its absolute applicability in severe climate on the example of the Kola Peninsula. If the locals can be trusted, no machinery could pass our route in such short period, even when the road is open for local vehicles. /RA&MG/





RUSSIAN NAVY DAY

Vladimir Putin and Sergey Shoigu marked the main military holiday of summer

In the last Sunday of July in Russia, traditionally celebrated the Navy Day. This holiday has always been a special celebration of Russian honor, pride and military power of the navy. This year the holiday was especially powerful. An official reception to mark Russia's Navy Day was held at the Admiralty in St Petersburg – Navy capital of Russia. Also in this city there was the Main Naval Parade, and the Supreme Commander-in-Chief Vladimir Putin reviewed it on the Neva River.

During official reception Vladimir Putin said: 'The profession of a navy man in our country has always been an honourable one that personified courage, valour and dedication. Such respect is well-deserved: everyone knows that the naval profession is a difficult and important work. It means service in the most difficult and rough environments, often involving long separations from the family and loved ones. But for a navy man, the noble goal of serving the Fatherland has always been a top priority.

The high combat readiness and effectiveness of the naval forces is a major component of ensuring the country's military capability and its security, as well as the security of its citizens. And, of course, we will continue to implement measures aimed at strengthening and developing the Navy and better equipping its fleet.

This year, the Navy has already received four surface vessels, one anti-terror boat, and three support ships. Overall, in 2018 the Navy will receive 26 new ships, cutters and vessels, including four ships with the Kalibr missile system.

Rearmament and modernisation is making good progress largely due to the workers of our shipbuilding industry and their professionalism and responsible attitude. The Navy infrastructure, including ship base infrastructure, has also been developing to meet the latest requirements.

The Navy has always been among the first to master scientific, technical, engineering and design achievements. Meeting the Navy's current and prospective needs should further stimulate the development and introduction of advanced and innovative technologies and serve as one of the drivers for the technological breakthrough. And this, as experience shows, will be inevitably followed by the flow of breakthrough knowledge into the civilian sector.

I am confident that every person who serves in the Navy knows that they have the entire great history of the Russian Navy behind them, all the outstanding achievements of our predecessors and the valour of our respected veterans. I hope the current generation of navy men will honourably continue this great history.



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Honour and valour, being true to one's duty and oath have always been and will remain the underpinnings of the spectacular victories won by our Navy. For more than three centuries now, the Russian fleet has enabled Russia to affirm its status as a great naval power, capable of standing up for its national interests and protecting its shores.

The Main Naval Parade that took place on the Neva River this year, united more than four thousand Navy personnel from the Baltic, Northern and Black Sea fleets and the Caspian Flotilla, as well as more than 40 ships and motor boats of various kinds, along with a Navy aviation group all took part in the parade.

Before the main part of the parade, the President sailed round the combat ships, which were lined up for the parade in the inner harbor of Kronstadt, and welcomed their crews. The President also visited the Peter and Paul Fortress and the Cathedral of Saints Peter and Paul.

At the Main Naval Parade Vladimir Putin said: 'I congratulate all those who guard the maritime boundaries of our Motherland, take part in long-distance expeditions, and all those who have dedicated their lives to the surface and submarine forces, naval

aviation, coastal defence troops, and who are committed to serving to the glory of the Russian Navy.

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been and will remain the underpinnings of the spectacular victories won by our Navy. For more than three centuries now, the Russian fleet has enabled Russia to affirm its status as a great naval power, capable of standing up for its national interests and protecting its shores.

The fleet's history is personified by the courage, valour and spirit of its sailors and officers. Their devotion to the Fatherland served as a guiding light for bold pioneers, and inspired ship builders to reach new heights by developing engineering marvels. These glorious traditions cannot fail to inspire current generations.



The celebration of Navy Day emphasises the power of the sacred maritime brotherhood that unites all Navy bases and units of the Baltic, Northern, Pacific, Black Sea fleets and the Caspian Flotilla.

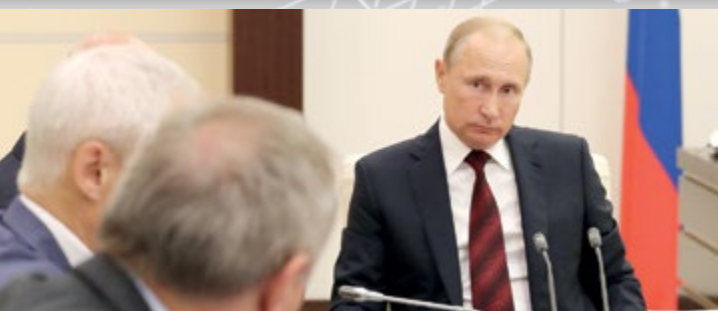
The Russian Navy has been successful in ensuring our national defence capability, and continues to make a substantial contribution to the fight against international terrorism, while also playing a vital role in guaranteeing strategic parity. Every day dozens of ships and submarines ensure the defence of Russia's interests in any part of the World Ocean.

We have every right to be proud of our Navy, our Naval forces, their high-class combat readiness, strategic, tactical and operational capabilities, as well as the power and beauty of the Russian fleet.

Our people have always admired the sailors of our Navy, since only the brave and resilient can shoulder maritime service, and understand the value of military readiness, strict discipline, unity and chivalry. Together with having the latest knowledge and impeccable skills in mastering the latest advances in military hardware, these qualities enable our Navy to deliver on even the most complex missions! /RA&MG/



MEETING ON SPACE SECTOR DEVELOPMENT



In Novo-Ogaryovo (Moscow Region) Vladimir Putin held a business meeting on space sector development. The meeting participants discussed the implementation of the programmes to develop the space sector and measures to ensure its stable growth. The meeting was attended by First Deputy Prime Minister – Finance Minister Anton Siluanov, Deputy Prime Minister Yuriy Borisov, Presidential Aide Andrei Belousov, Deputy Commander-in-Chief of the Aerospace Forces and Commander of the Russian Space Forces Alexander Golovko, and General Director of the Roscosmos State Corporation for Space Activities Dmitry Rogozin.

President of Russia Vladimir Putin marked: 'As you know, a few weeks ago we met with the new leadership of Roscosmos corporation. Today we will continue analysing the situation in the space sector. This sector is of strategic importance for the country. Its steady and progressive development is essential for building up Russia's defence capability and national security, for enhancing the country's scientific potential and for creating innovative commercial technology.'

Space exploration and making use of the opportunities it offers to serve the interests of the economy and social sphere are major areas for Russia's technological breakthrough. Today I suggest discussing the implementation of the programmes for the development of the rocket and space industry and additional measures to ensure its stable and balanced growth.

Instructions were issued to the Government and Roscosmos in this connection, primarily to increase the orbital group, create a super heavy-lift launch vehicle, implement a manned flight programme and complete the construction of the Vostochny Space Launch Centre. I hope to hear reports on the implementation of these instructions today.

It should be noted that Russia has the necessary design, engineering and technical capabilities to success-

fully implement all of these projects, as well as the experience of designing complex space equipment and unique space exploration competences.

At the same time, our space industry must consistently improve the quality of its products and works, which should come at globally competitive prices. This is the key condition for increasing the industry's commercial potential to ensure its successful operation on the global market, where competition, or even rivalry, continues to increase.

We must create conditions for fruitful and coordinated work of all space industry companies and their personnel, including designers, engineers and workers. We must also enhance the financial stability of these companies and provide additional social guarantees and incentives for improving the professional skills of their personnel and for attracting young talented professionals.'

After President speech General Director of the Roscosmos State Corporation for Space Activities Dmitry Rogozin said: 'Based on your instructions, starting from January 1, 2017, we introduced a new procedure requiring all vehicles produced in Russia or supplied to Russia to be equipped with ERA-GLONASS units. This has already saved hundreds of lives. We are even ahead of European practice here. We propose to introduce a similar practice when Russian airlines buy or lease for-

eign-made aircraft and even more so, aircraft made in Russia. They should all be equipped the same way – and we propose making it a legal requirement – with GLONASS or GLONASS-GPS modules in some cases. This will enable more accurate navigation for the crews. We have airports equipped with this system, but the planes, which are still mostly foreign-made, do not have these units. I would ask you to support my proposal. I have prepared a report and will submit it to you today.

And the second question. I would like to show you an album today after the meeting. Since April 2014, we have been photographing the Crimean Bridge, while it was being built. From the first step on each autoshot path, 240 paths in all, were shot monthly by our satellite-based remote sensing devices. Now we have a group of 10 satellites; in a few years, there will be 23. This is also a very important area for the commercialisation of space activities. At present we can remotely monitor how objects change, observe changes in the landscape, changes in the natural environment, illegal logging and many other things.

Before the end of this month we will be presenting the latest capabilities of Roscosmos and its orbital group to the federal districts and the regional governors. These new capabilities need to be commercialised and promptly introduced into the national economy.'

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'KB RADAR': FROM BELARUS – TO ALL OVER THE WORLD

JSC 'KB Radar' – Managing Company of the 'Radar Systems' Holding – is one of the leading research and production enterprises of the military-industrial complex of the Republic of Belarus, and one of the recognized world leaders in its segment. The products of the enterprise are well known and are used practically on all continents of the world.

JSC 'KB Radar' – Managing Company of 'Radar Systems' Holding, which has been set up with the purpose of joint coordinated implementation of the processes of development and commissioning of radar systems and EW assets, other military and dual-use systems in accordance with the specialization and regulations of the Managing and Participant companies of the Holding,

based on the latest achievements of science and innovative technologies.

The 'Radar Systems' Holding is one of the leading organizations of the Military and Industrial Committee of the Republic of Belarus conducting the uniform policy in the sphere of defense, development of the military industries sector, cooperation of the Republic of Belarus with foreign states in military technologies.

The Holding would perform a 'turnkey' work cycle – from development to production and follow-up of the equipment designed, training the Customer's specialists in its operation, maintenance and repairs.

The Holding joins the companies with a long-standing record, offering their specialization, unique technologies and achievements.

The company's history starting from April 6, 1974 when a special department was set up at the Science Research Institute of Automation Means (city of

Minsk), is the history of selfless service of the team of scientists, specialists, all employees in the interests of the country, strengthening its defense, scientific and industrial potential.

9th March 2006 is today's company founding date. The RUE 'KB Radar', based on resolution of the Minsk City Council, was registered in the Unified State Register of Juridical Entities and Individual Entrepreneurs as Entry No 190699027.

From 30 December 2010, the company bears the legal status of an Open Joint Stock Company (JSC 'KB Radar'). Currently 100% of the shares belong to the State.

In connection with establishment of the 'Radar Systems' Holding, as from 17th October 2011 the company was re-named into JSC 'KB Radar' – Managing Company of 'Radar Systems' Holding controlled by the State Military and Industrial Committee of the Republic of Belarus.



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SECURE RESCUE AT ANY HEIGHT



Unique autonomous rescue parachuting back-pack system for emergency escape

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

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

Actually the technical reviews shows that at present there are practically no means for secure alternative escape starting from 60÷80 m height and higher available on the market. But according to the said firefighter's statistics about 3÷5% of people being caught in alarm situation on the high-rise building used to try escaping from the windows and

usually perished. On the other side homeland security analytics says that in average an every skyscraper in the world is expected to be subjected to a fire case (terroristic attack or other emergency) once in every 47 years.

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

The SRS Ltd company in outsourcing cooperation with 18 leading Russian and foreign aerospace companies has fulfilled full-scale research and development activities to devel-

op the project from conceptual proposal stage to releasing operating prototypes unparalleled anywhere in the world.

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

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

case of emergencies than traditional evacuation methods are impossible.

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

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

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

absorbing systems entered into force in 2013.

To have certification tests performed a special Hybrid-III (USA) crush test dummy-based 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;

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

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





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

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

The SRS Ltd. Intellectual Property Rights on SPARS® and its ‘know-hows’ have been completely protected within Russia (9 Patens, 3 Trade Marks) and abroad under PCT (Patent Cooperation Treaty) procedures 2 ‘umbrella’ requests for SPARS® have entered national level in 15 countries and covered 78% skyscrapers and



95% potential SPARS® manufacturers. 13 Patents of the US, China, Japan, Canada, South Korea, Singapore, the Ukraine, Indonesia, Malasia and Australia have been already received.

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

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

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; air-borne attractions & entertainment companies etc.) should only require a free window exit sized 1000x500 mm at the appropriate height to use Autonomous Pneumo Transformable Escape Chute and propose to its clients an additional exceptional secure service with limited warranty.

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

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

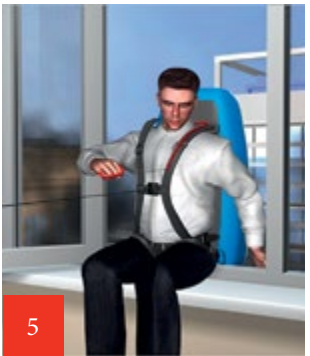
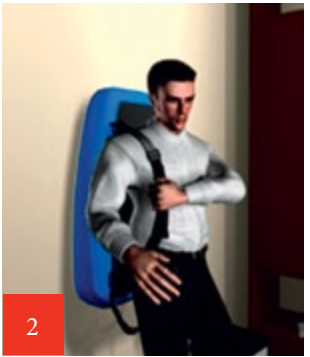


There are following innovations in the proposed SPARS® technology:

1. A brand new free parachuting technology (means and escape method) was created for emergency escape from heights higher than 50 m where practical methods for safe evacuation of a person are not available on the market.
2. Sinergy solution based on specially designed and produced from film-laminated fabric a rapid inflatable air-beam single volume frame structure for:
 - Elastic catapult ejection of a human from a window of an emergency object;
 - Forced deploy of the canopy with only 3÷5 m loss of height and irrespective of air flow speed pressure for deployment (usual parachute requires of 25÷100 m free fall and/or 250÷350 km/h speed of airplane to be deployed);
 - Guaranteed safe landing with 5÷6 m/s vertical velocity on any underlying surface in urban terrain using integrated air-frame shock absorbing pneumo dumper.
3. Fully automatic mode of usage (after manual initialisation of the apparatus) and all the descend envelope accelerations bearable for an ordinary person make the escape solution available for use by untrained people from 18 till 70 years old;
4. New type of light weight air-proof film coated fabric for air-beam inflatable frame structure was created.

The Special National Standard (GOST) for shock acceleration limits for untrained human using new type of lodgment Rescue Parachuting Systems was issued.

The Crash test dummy Hybrid-III 50% percentile was instrumented, calibrated with the help of centrifuge, certified and used as anthropomorphic instrument for human acceleration checking during field tests and validation of the Autonomous Pneumo Transformable Escape Chute.



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In 2018

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'RA&MG'№06 (24)	August 18th	ARMY-2018 (21-26.08.2018, Russia, Moscow)
'RA&MG'№07 (25)	August 04th	Gidroaviasalon 2018 (06-09.09.2018, Russia, Gelendzhik)
'RA&MG'№08 (26)	September 17th	Africa Aerospace and Defence 2018 (19-23.09.2018, South Africa, Pretoria)
'RA&MG'№09 (27)	September 24th	ADEX 2018 (26-29.09.2018, Azerbaijan, Baku)
'RA&MG'№10 (28)	November 05th	Airshow China 2018 (06-11.11.2018, Zhuhai, China)
'RA&MG'№11 (29)	November 07th	INDO DEFENCE 2018 (07-10.11.2018, Indonesia, Jakarta)
'RA&MG'№12 (30)	November 26th	IDEAS 2018 (27-30.11.2018, Pakistan, Karachi)
'RA&MG'№13 (31)	December 01th	EDEX 2018 (03-05.12.2018, Egypt, Cairo)

In 2019

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'RA&MG'№01 (32)	February 12th	AERO INDIA 2019 (14-18.02.2019, India, Bangalore)
'RA&MG'№02 (33)	February 15th	IDEX 2019 / NAVDEX 2019 (17-21.02.2019, UAE, Abu Dhabi)
'RA&MG'№03 (34)	March 24th	LIMA 2019 (26-30.03.2019, Malaysia, Langkawi)
'RA&MG'№04 (35)	April 01th	LAAD 2019 (02-05.04.2019, Brazil, Rio de Janeiro)
'RA&MG'№05 (36)	May 12th	IMDEX ASIA 2019 (14-16.05.2019, Singapore)
'RA&MG'№06 (37)	May 14th	SITDEF 2019 (16-19.05.2019, Peru, Lima)
'RA&MG'№07 (38)	June 16th	Paris Air Show 2019 Le Bourget (17-23.06.2019, France, Paris)
'RA&MG'№08 (39)	June 24th	IMDS-2019 (26-30.06.2019, Russia, Saint Petersburg)
'RA&MG'№9 (40)	July 20th	MAKS-2019 (23-28.07.2019, Russia, Moscow)
'RA&MG'№10 (41)	September 16th	AVIATION EXPO CHINA 2019 (18-20.09.2019, China, Beijing)
'RA&MG'№11 (42)	October 01th	INMEX SMM India 2019 (03-05.10.2019, India, Mumbai)
'RA&MG'№12 (43)	October 13th	SEOUL ADEX 2019 (15-20.10.2019, Korea, Seoul)
'RA&MG'№13 (44)	October 28th	BIDEC 2019 (28-30.10.2019, Bahrain, Manama)
'RA&MG'№14 (45)	November 02th	Defense & Security 2019 (04-07.11.2019, Thailand, Bangkok)
'RA&MG'№15 (46)	November 16th	Dubai Airshow 2019 (17-21.11.2019, UAE, Dubai)
'RA&MG'№16 (47)	December	Gulf Defense & Aerospace 2019 (December, 2019, Kuwait, Al Kuwait)

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