

# RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of the United Industrial Publishing

№ 07 (68), December 2022

## **FSMTC OF RUSSIA**

*Special interview  
by Dmitry Shugayev*



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*For all branches  
of the armed forces*



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№ 07 (68), December 2022

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### The best offers for Vietnam and other states

It has already become obvious and undeniable that security is becoming increasingly important among various values of civilization. Today, for any state, the ability to reliably and securely protect the territory, residents and values is a priority.

Political situation in the world (conflicts, sanctions, threats of war and other issues) makes nations once again reconsider their defense possibilities. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and nonending crisis – all of this leads to an unstable and dangerous situation.

In times like these the market of defense is undoubtedly growing. However, the dependence on the sellers of weapons and defense systems increases along with the defense technologies growth. It becomes extremely important to get products that would not fail you in a complicated situation.

VIETNAM DEFENCE EXPO 2022 presents in Hanoi the best Russian weapons and innovations for global market, which are the undisputed world leaders on price and quality in their segments.

The exhibition shows that the weapon's quality and capabilities are what really matter and the amount of weapons is not as significant, because quality and capabilities of every single one of them are exactly what leads you to victory on the battlefield and on the global market. Other significant factor is technological independence from seller. Modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hi-tech products, solid aftersales service and proven reliability, Russia is honest and friendly partner for all countries, ready for mutual work.

Taking part in VIETNAM DEFENCE EXPO 2022 Russia continues the policy of open partnership with the Vietnam and other states. Russia has a wide product line that meets all the needs of this continent and ready to propose the best technology and the best price offers.

**Valeriy Stolnikov**





### UEC ENGINES SENT ANOTHER CREW TO THE ISS

The RD-107A/RD-108A serial rocket engines manufactured by UEC-Kuznetsov, the Samara-based enterprise of the United Engine Corporation (Rostec), ensured the successful launch of the Soyuz MS-22 manned spacecraft of the 68th long-term expedition to the International Space Station.

On September 22 Moscow time Soyuz-2.1a carrier rocket was launched from site No.31 Vostok of the Baikonur cosmodrome. The rocket delivered manned spacecraft Soyuz MS-22. The RD-107A/RD-108A engines installed on the first and second stages, manufactured by UEC-Kuznetsov, operated faultlessly. The spacecraft is named after Konstantin Tsiolkovsky, the Russian scientist, inventor and founder of the theory of space exploration. Honoring the great inventor, the rocket portrays Tsiolkovsky and a commemorative inscription.

The crew of Tsiolkovsky included members of the 68th long-term expedition to the International Space Station – Roscosmos cosmonauts Sergei Prokopyev and Dmitry Petelin as well as NASA astronaut Francisco Rubio.

### INCREASING THE ELEVATOR ENERGY EFFICIENCY

Ruselectronics holding, Rostec State Corporation, has developed a synchronous motor for elevators. The product is a low-speed permanent magnet motor the use of which will allow to save electric power and ensure high performance of elevators and passenger comfort.

The new motor is designed for installation into a direct-drive elevator winch. It has been developed within the elevator main drive motor smart control system program which includes the motor itself and a control unit. The system ensures actuation of the elevator car along the shaft for standard elevators with a capacity up to 1000 kg and speed up to 2 m/s. Thanks to the application of circuit solutions, the equipment allows to avoid unnecessary friction loss and to increase energy efficiency.

'New synchronous motors for elevators expanded the commercial motor range manufactured by the company. Our products are used in automotive and machine tool industries, in pumps, compressors, automatic doors, as well as in oil and gas sector where they are used for pipeline gate valve control. The key benefit of the KEMP motors is that they have high power factor and efficiency, a wider speed control range and improved weight and size parameters, and are robust', said Boris Movtyan, General Director of KEMP.

### Successful Launch of Soyuz-2.1b Carrier Rocket

*The RD-107A/108A serial rocket engines manufactured by UEC-Kuznetsov, the Samara-based enterprise of the United Engine Corporation (Rostec), ensured the successful launch of a Soyuz-2.1b rocket carrying the GLONASS-K navigation satellite.*

Liftoff occurred at 5:52 AM Moscow time on October 10 from the Plesetsk Cosmodrome in the Arkhangelsk Region. The engines, manufactured by UEC-Kuznetsov, installed on stages I and II of the Soyuz-2.1b rocket performed normally. The navigation satellite was successfully put into orbit at the appointed time.

The GLONASS-K satellite, designed to develop the GLONASS orbital group, complemented the constellation of 25 satellites in orbit.

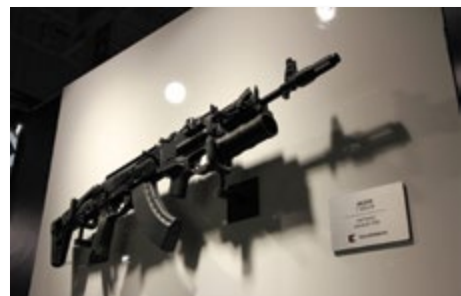
Modifications of the RD-107A/RD-108A propulsion systems have been fitted out stages I and II of all R-7 carrier rockets (including Soyuz carrier rockets) since 1958. Currently, these engines are mass-produced by JSC UEC-Kuznetsov with the design support of the de-



veloper JSC NPO Energomash named after academician V.P. Glushko. The statistical reliability of the products exceeds 99.9%.

### Production and Sale of AK-203

*A delegation from Rosoboronexport, a subsidiary of the Rostec State Corporation, took part in Defexpo India 2022, the Land, Naval and State Security Systems Exhibition, which has been held from October 18 to 22 in Gandhinagar, Gujarat.*



The company participated in the exhibition as a co-founder of Indo-Russian Rifles Private Limited, a Russian-Indian joint venture established to produce Kalashnikov assault rifles in India.

'Rosoboronexport has the world's largest portfolio of completed, on-going and future defense production projects in India. The joint venture Indo-Russian Rifles Private Limited, in which Rosoboronexport and the Kalashnikov Concern participate from the Russian side, is fully in line with the Government's Make in India initiative and Defense Acquisition Procedure (DAP) 2020 rules', said Rosoboronexport Director General Alexander Mikheev. 'The Korwa Ordnance Factory is ready to start manufacturing Kalashnikov AK-203 assault rifles by the end of 2022. Our plans include 100% localization of the production of legendary Russian assault rifles in India. In addition, in the future, the joint venture may increase production and modernize production facilities to manufacture advanced rifles based on the Kalashnikov assault rifle platform'.

Kalashnikov AK-200 series assault rifles have successfully passed the test program, are supplied to government cus-

tomers in Russia, and are also exported to partners who impose higher requirements on small arms.

These assault rifles have retained all the advantages of the traditional AK pattern: reliability, durability and ease of maintenance.

Kalashnikov A-200-series assault rifles are in line with all current trends in small arms technology. They are fitted with integral Picatinny rails for convenient and easy mounting of sights and tactical accessories, enabling the effective use of weapons in various conditions.

The rifles have a folding stock. In addition, a number of other ergonomic solutions have been incorporated into them to optimize operation. In particular, they feature a redesigned fire selector and a modified receiver cover. This gives the users the opportunity to fully realize their shooting skills, regardless of their anthropometric data and the availability of a variety of personal gear, outfit and uniforms.

During the exhibition, Rosoboronexport discussed with the Indian side the production and supply of AK-203 for the armed forces and other law enforcement agencies of the country. In addition, the company presented a wide range of additional modern equipment designed both for customizing the assault rifle itself and for equipping personnel.

'We also look forward to fruitful meetings and negotiations with partners on the entire range of issues related to military-technical cooperation between Russia and India. Rosoboronexport is ready to discuss mutually beneficial projects and talk about its exclusive proposals on joint work complying with the terms of ToT (transfer of technology) imposed by the Indian side', Alexander Mikheev added.

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## VK-1600V ENGINE FOR KA-62



Twenty-five successful starts of the VK-1600V demonstrator engine were performed at the test facility of Rostec United Engine Corporation's ODK-Klimov. The tests continue. An experimental work package was carried out during the tests of VK-1600V demonstrator engine: adjustment of the engine start-up; checking of joint functioning of the units and systems in various modes; assessment of the obtained parameters for compliance with the product specifications.

The engineering tests confirmed the engine's compliance with the characteristics of the first stage of adjustment. Totally, 25 successful starts were made. Stable operation of the compressor, stable ignition of the combustion chamber, compliance of the vibration level with the established standards were registered.

'In the near future, the tests of the demonstrator engine with improved design elements will be continued, and the units' operation within autonomous plants will be checked. In addition, this year we plan to manufacture pilot samples for certification tests', Vsevolod Yeliseev, general designer of JSC ODK-Klimov, said.

VK-1600V engine developed by JSC ODK-Klimov is designed for installation on multi-purpose and special helicopters with a takeoff mass of 5-8 tons. The first object of its application is the modern multi-purpose helicopter Ka-62.

The engine design allows further development of various modifications (including for use in unmanned aircraft and within the power plant of light passenger and regional cargo planes) and expansion of the range of engines of VK-1600 family.

VK-1600V capacity in the takeoff mode is 1400 horse powers, in the mode of 2.5 minute capacity, in case of engine failure, 1750 horse powers. Specific fuel consumption in the takeoff mode is 200 g/HP-hr. The FADEC electronic system of automatic control is used with the engine. The BARK-15V automatic regulation and control unit has dual-channel architecture, compact dimensions, and combines the functions of instrumentation and control of the engine systems, and has the functions of failure diagnostics and troubleshooting. VK-1600V engines have high indicators of reliability and cost effectiveness, the engines will be operated according to their technical condition.

## First Medical Ansar delivered to Zimbabwe

*Ansar medical helicopter and ambulance vehicle have been delivered for Zimbabwe emergency services during the Russian delegation visit to the African republic. The medical vehicle delivery ceremony was held during the 80th anniversary of the president of Zimbabwe Emmerson Mnangagwa.*

The head of the Russian delegation Aleksandr Kozlov, the Minister of Natural Resources and Ecology of Russia, conveyed congratulations to Emmerson Mnangagwa from the President of the Russian Federation Vladimir Putin and Chairman of the Federation Council Valentina Matviyenko.

'Our vehicles have proved effective in the vast expanses of Africa. Many countries in the region highly appreciate the reliability and adequate performance of the Russian aircraft. I am sure that cooperation between the Russian Helicopters holding and the Republic of Zimbabwe will be also fruitful and the delivery of Ansar medical helicopter which allows patients to be promptly evacuated will be an important step in the development of the national medical



services', said Sergey Chemezov, CEO of Rostec State Corporation.

Ansar was presented in Zimbabwe by Andrey Perevedentsev, Chief Medical Officer of the National Air Ambulance Service of Russia. He told African colleagues about the capabilities of the medical vehicles and emphasized that the helicopter was

actually a 'flying intensive care unit'.

The delivered Ansar is the first step in the establishment of medical aviation in Zimbabwe. About 50 medical helicopters will be required for the country. And it is very likely that this will be a large-scale cooperation project between Russia and Zimbabwe.

## Drilling and Blasting Unit

*Krasnoarmeisk Research Institute of Mechanization, Rostec State Corporation, has made a mobile mixing unit for drilling and blasting operations which is capable of replacing the equipment provided by foreign companies that have curtailed operations in Russia. SZM-16 on KAMAZ wheelbase is designed for explosive component transportation, mixing on site and delivering into wells and, thus, allows to save time and money.*



Mining explosives are composed of several components which are transported in separate containers for safety. SZM-16 is capable of transporting five components with a total weight up to 16 tons simultaneously, replaces

several machines at once and can be used in open-cast mines as well as in industrial and hydraulic construction.

'Launch of commercial production of drilling and blasting machines is essential for import independent

cy of basic national industry sectors. After exit of foreign companies from Russia, customer interest in Russian-made mobile mixing units has been growing. In terms of specifications, SZM-15 is highly competitive with foreign equivalents, testing is to be started in October 2022, orders on these units have been already received from major Russian mining companies', said Vladimir Artyakov, First Deputy General Director of Rostec.

SZM-16 unit is operated by the automated control system developed by KNIIM, including level, pressure and temperature sensors, interlocking and feedback system. The company has also developed customized space-saving feed pumps and other equipment for this unit.



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Azimuth Company, as part of Rostec State Corporation, has demonstrated to the Moscow government the capabilities of a new urban drone control system. Jupiter system enables the operator to coordinate flights, track drone movement on a real-time basis, map the best routes and avoid collision with various objects. Jupiter is an urban air mobility automation system. It enables efficient air traffic control in big-city conditions. During the system demonstration test at Skolkovo, the guests from the Moscow Government could see how the software was able to increase promptness of cargo delivery, monitoring and aerial photography performance. 'The range of unmanned aerial vehicle applications is steadily expanding and the use of UAV for express delivery or surveillance purposes does not seem unusual today. However, until this phenomenon becomes finally widely spread, safe drone traffic in air, in particular in big cities, shall be addressed. The system developed by Azimuth personnel solves this problem in a comprehensive and efficient manner. Jupiter allows to integrate drones into the single Russian air space, dispatch them on strictly defined routes, synchronize and monitor the aircraft in a common system. In a nutshell, the system makes the use of commercial drones more efficient and safe,' said Oleg Evtushenko, Executive Director of Rostec State Corporation.

THE CSTO JOINT TRAINING  
'COBALT-2022'

In August in the Kyrgyz Republic, at the 'Edelweiss' training range in Balykchy, the tactical and special training 'Cobalt-2022' with the special forces formations included in the CSTO Collective Rapid Reaction Forces (CRRF) took place. During the training, combined groups of special forces of the member states performed training and applied operational and combat tasks of searching, blocking and neutralizing of gangs, terrorist groups, as well as closing drug smuggling channels and detection of caches, laboratories for the storage and production of drugs and their destruction. The training plan called for a command and staff training with the Operational Staff of the CSTO Collective Rapid Deployment Forces.

The Second MC-21 Aircraft Flew

*The prototype of MC-21 aircraft, previously tested with imported engines, underwent remotorization and made its maiden flight with domestic PD-14 engines from the airfield of Irkutsk Aviation Plant, a branch of Irkut Corporation. The aircraft became the second MC-21 equipped with Russian engines. Apart from installing PD-14, the systems of the aircraft were updated based on the results of past flight tests. Also, in order to integrate the domestic powerplant, a number of imported components of the airliner's equipment were replaced with Russian analogues.*

'The adhesion of the second aircraft to PD-14 engine tests is an important milestone within the MC-21 project and one of the key stages of the import substitution program because the powerplant is the true 'heart' of the aircraft, that ensures the operation of the aircraft's main systems. Jointly with other Rostec companies we are planning to complete certification of the aircraft with the Russian engine by the end of 2022. The second aircraft will allow us to increase the flight density and continue, together with our colleagues from the UEC, to work on tuning the engine and on-board



systems for the most efficient operation with MC-21', said Andrey Boginsky, UAC Deputy General Director for Civil Aviation – General Director of Irkut Corporation.

After completing three flights, MC-21 prototype will go to Zhukovsky to continue certification work at Flight Test and Development Complex of Yakovlev Design Bureau.

Flight of modernized Ka-32A11BC

*Russian Helicopters Holding Company has proceeded to the next stage of testing the modernized Ka-32A11BC helicopter, capable of extinguishing fires at subzero temperatures. The helicopter performed its first flight with VK-2500PS-02 engines, which lasted 37 minutes. During the tests, the stable operation of all systems was confirmed and the stability and high controllability were demonstrated.*



VK-2500PS-02 engines are developed and produced by the UEC-Klimov enterprise, part of the United Engine Corporation. Application of the new power plants allowed to improve flight and technical perfor-

mance of the helicopter and expand its operational capability.

The modernized Ka-32A11BC is the world's first helicopter capable of extinguishing fires at sub-zero temperatures. This was made possible

by the domestic SP-32 suspended fire extinguishing system with water heating function. Its capacity is up to 4000 liters with the possibility of using 400 liters of foam agent. Thanks to a more powerful water intake system, the tank is automatically filled in just 60 seconds – 25% faster than the previous version. Fire-fighting options include helicopter buckets and a water cannon for horizontal firefighting.

In addition, the helicopter is equipped with modern emergency rescue equipment, as well as a 'glass cockpit' – a digital flight and navigation system with display indication. Ka-32A11BC is capable of extinguishing fires in conditions of heavy smoke, on the top floors of high-rise buildings and oil and gas industry facilities.



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**GOLD MEDAL**

Shvabe's Ural-based company was awarded a gold medal for BONNY mobile incubator at the 64th International Technical Fair held in Belgrade in May, 2022. Today, it is a unique portable system developed and commercially produced in Russia which is designed to ensure safe movement and transportation of newborn babies and to sustain their lives. The system has a range of advantages compared with foreign equivalents. The incubator has been developed by the Urals Optical and Mechanical Plant (UOMP) in Yekaterinburg. The product may be used both in stationary hospital conditions (including one-person operation mode) and for long-range transportation in ambulances, airplanes, helicopters and other means of transportation. This device is especially important for hard-to-reach places, for example, mountainous and forest areas. The incubator is intended for transportation of babies weighing from 1 kg to 6 kg. The system provides safe conditions inside the baby module, protects against low temperatures, vibrations and noise. Its competitive advantages include body temperature, heart rate and blood oxygen level monitoring sensors. Earlier, BONNY has been honoured with awards by the Archimedes Innovation Club (Russia), Highly Innovative Unique Foundation (Saudi Arabia), World Invention Intellectual Property Associations (WIIPA) and Toronto International Society of Innovation and Advanced Skills (TISIAS).

**SECURE MESSENGER 'KOLIBRI'**

The Roselectronics holding together with Open Mobile Platform company has completed the development of a secure corporate messenger 'Kolibri'. The solution, designed for devices running the Aurora 4.0 operating system, allows to securely exchange information and minimizes the possibility of information leaks. The messenger is part of a comprehensive solution that also includes a VPN client 'Kolibri' and a subscriber specialized module for cryptographic information processing in microSD card format. The module is built on a domestic element base, supports Russian crypto algorithms and has built-in information security hardware. This eliminates the risk of information leaks when connecting to corporate cloud web services. As part of the state corporation, the project is being implemented by the Penza Research Electrotechnical Institute (PNIEI) of the Roselectronics holding. 'The messenger uses only Russian trusted solutions, which guarantees the information security of corporate communications. In the future, we plan to adapt the authentication technology developed by PNIEI based on biometrics, neural networks and cryptography for the Aurora OS, as well as supplement Hummingbird products with this option,' said Vyacheslav Funtikov, CEO of PNIEI.

**Equipment for the Turkish Akkuyu NPP**

*Ruselectronics holding will supply radiation-resistant video surveillance systems to the Akkuyu nuclear power plant under construction in Turkey. The equipment will allow to control the refueling of nuclear fuel in the reactor compartment of the nuclear power plant.*



As part of contract implementation, concluded with JSC Central Design and Technological Institute, the Rastr Research Institute of Ruselectronics holding will develop and supply special television systems ST-O-59R for refueling machines of all four NPP power units.

Refueling machines are designed to move fuel assemblies to the reactor core and replace spent nuclear fuel with a new one. The television equipment will allow to examine the surface of the fuel rods, inspect the seats for their installation in the reactor, control the extraction and installation

of fuel assemblies and perform general monitoring of the refueling machines operation.

The solution is a closed-circuit television system consisting of transmitting and receiving devices. A television camera, which is capable of operating under strong gamma radiation up to 10 kGy/hr (106 rad/hr) both in air and water, is placed in the radiation exposure zone. The camera is installed on the guidance device and connected to the control unit located in the control room outside the radiation exposure zone. Through the interface, the operator will be able to control camera movement, zoom and focus the image and adjust the built-in camera lighting.

**Rostec Celebrates its 15th Anniversary**

*Rostec State Corporation – the major Russian manufacturing company – celebrates its 15th anniversary. It incorporates about 800 research and development and manufacturing companies in 60 Russian regions and provides stable employment for 600,000 people.*

November 23, 2007 is generally accepted as Rostec's birthday. On that day, President of Russia Vladimir Putin signed Federal Law No.270-FZ On the State Corporation for the Promotion of the Development, Manufacture, and Export of High Tech Products 'Rostec'.

Today Rostec is the major manufacturing company in Russia. The key business areas of the Corporation include aircraft and engine manufacture, automotive engineering, radioelectronics, information and medical technology, innovative materials and many others.

At year-end 2021, consolidated revenue of the Corporation was 2.06 trillion Rubles – almost four times as high as in 2009.

MC-21 new generation medium-haul passenger aircraft, Russia's first PD-14 turbofan engine for civil aviation, Russia's first GTD-110M high power turbine, Mi-171A3 offshore helicopter for fuel and energy sector facilities,



new Ultriks Kvadri influenza vaccine and COVID-globulin antiviral medicine are among Rostec's landmark product projects over the past years.

In addition to the contribution into the commercial manufacturing sector, the Corporation is the major state defence procurement contractor. The company accounts for more than 40% of the total state defense procure-

ment order. Focus is made on provision of advanced weapons, military and special-purpose vehicles for the army. Key types of products include airplanes, helicopters, armored vehicles, precision-guided weapons and countermeasures, ammunition, electronic warfare systems, communications, reconnaissance and control systems, etc.

# INTERNATIONAL EXHIBITION OF ARM & MILITARY MACHINERY

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### COMPUTER INCIDENT RESPONSE (CSTO CCC)



In Yerevan hosted the XIII meeting of the Council of the Collective Security Treaty Organization Consultative Coordination Center for Computer Incident Response (CSTO CCC), which was attended by delegations of representatives of relevant national authorized bodies. Members of the CSTO CCC have discussed the most urgent threats to information security, such as phishing and DDoS attacks. They compared the current situation in the field of information security with the situation in 2021. They stressed the importance of further development of information cooperation to detect, prevent and eliminate the consequences of computer attacks, as well as to respond to computer incidents. The meeting participants considered the essence of attacks, noted the importance of raising user awareness of information security issues, and exchanged information on national approaches to counteracting the operation of phishing resources. The CCC also discussed the necessary measures to combat botnets, and the importance of interaction with telecommunications operators was emphasized. National approaches and practices used in the CSTO member States were reviewed. The CCC members have discussed the design and preparation for a planned technical training on computer security in the second half of this year. They shared their positive experience in protecting national critical information infrastructure facilities from cyber threats, information on computer incidents in the information spaces of the CSTO member States, and information and analytical materials provided by national points of contact. The Armenian side introduced the participants to the deployed hardware-software system for counteraction to computer attacks, using the example of one of the national facilities of critical information infrastructure, which has been upgraded this year.



### UAC presents a wide range of aircraft

*United Aircraft Corporation (PJSC UAC, part of Rostec State Corporation) participated in the international exhibition IndoDefense Expo & Forum 2022, which took place from November 2 to 5 in Jakarta, Indonesia. The multimedia exposition included a wide range of civil and military aircraft such as MC-21 medium-haul airliner, SSJ-100 regional jet, Su-30SME multifunctional fighter, as well as Yak-130 combat trainer.*

The exhibition was to become a venue for business program participants, who held meetings with current and potential customers, present up-to-date product line and after-sales service systems for Russian aircraft.

One of the key models at the UAC exposition was MC-21, a new generation medium-haul passenger aircraft. The airliner is manufactured according to the latest developments and aims for the most demanded segment of the market. Advanced aerodynamics, engines and new generation avionics provide high flight performance and lower operating costs compared to its analogues. Aerodynamic perfection of the aircraft is achieved with high aspect ratio wing made of composite materials. PD-14 engines are characterized by high bypass ratio, low fuel consumption, reduced noise and emissions of harmful substances.

Guests and participants of the exhibition in Indonesia could also get acquainted with the Superjet – a family of regional aircraft of a new generation, which combines the latest technologies. This model offers passengers comfort comparable to the cabins of mainline airliners, significant economic advantages to carriers, convenience for the crew and maximum level of environmental safety. Serial production of SSJ-100 is currently carried out by the production center of Irkut Corporation in Komsomolsk-on-Amur. Prototypes of import-substituted version of the aircraft (SSJ-NEW) are also being assembled there as a preparation for the serial production of the airliner.

In addition to civil aircraft, the supermaneuverable multifunctional two-seat Su-30SME fighter was presented as part of the UAC exposition. The aircraft is designed for attacking aerial targets in free airspace and against the back-



ground of the earth, as well as ground and surface targets day-and-night in favorable and adverse weather conditions.

Another aircraft demonstrated at Indo Defense Expo & Forum 2022 was the combat training Yak-130. This model is characterized by high maneuverability and modern avionics complex, typical for advanced combat aircraft. Yak-130 has a subsonic aerodynamic configuration and flight performance characteristics. It can be successfully employed to train pilots in conditions close to a combat situation with the use of air-to-air/air-to-ground weapons.

The Indonesian Ministry of Defense hosted the international IndoDefense Expo & Forum 2022 biennial exhibition. The theme of the exhibition covered almost the entire range of weapons and military equipment used in the Army, Navy and Air Force of the Southeast Asian countries. The event participants demonstrated developments in aviation, helicopters, unmanned aerial vehicles, special vehicles, navigation equipment, communication systems, radio equipment and satellite technologies, and much more.

### Structural Materials for Aerospace Sector

*ORPE Tekhnologiya named after A.G. Romashin, as part of Rostec State Corporation, has increased production of polymer, fiber-glass and aluminum load-bearing honeycomb fillers by more than twice and has completely covered the Russian aerospace sector needs. The factory capacity makes it possible to produce up to 600 cubic meters of structural materials which are used in advanced PD-8 and PD-14 engines, Su-57 fifth-generation fighters and Oreol space ship.*



Material for honeycomb fillers is chosen individually for each structure and depends on the terms of reference. Thus, aluminum foil load-bearing honeycomb fillers can with-

stand high loads and therefore they are used in combat aircraft, including Su-57 fighters, Proton-M and Angara launch-vehicle components.

Polymer fillers are more lightweight, but less resistant to loads. They are predominantly used in interiors. These include a railway car, passenger plane cabin or interior space of Oreol space ship modules. Fiber-glass fillers withstand temperatures up to 300 degrees and have high strength, radio transparency, resistance to corrosive media. They are used in land- and sea-based radar domes, aircraft engine components, including PD-8 and PD-14.

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## UPGRADED RUSSIAN MILITARY HELICOPTERS



Rosoboronexport JSC (part of Rostec State Corporation) showcased its partners and potential customers Russian helicopters new and upgraded versions of Russian helicopters and a wide range of applications in various weather and climatic conditions in the form of scale models and advertising materials. At the 15th International Helicopter Industry Exhibition (HeliRussia 2022) Rosoboronexport demonstrated the Ka-52 scout/attack helicopter, upgraded versions of the Mi-28NE attack and Mi-171Sh military transport helicopters, as well as the Mi-38T transport/assault helicopter. In addition, visitors to the company's booth had opportunity to get acquainted with the Mi-35M transport/attack helicopter, Mi-17V-5, Ka-32A11M, Ka-226T and Ansat military transport and utility helicopters.

The Ka-52 scout/attack helicopter, exhibited at HeliRussia 2022 as a scale model, is currently the best in the class of attack helicopters in terms of its fighting capacity and the range of aircraft weapons used, hover ceiling and rate of climb, maximum weapons load weight and sortie radius, as well as safe and autonomous operation in field conditions. Thanks to its coaxial rotor configuration, the Ka-52 offers unique in-flight performance and maneuverability, allowing it to dominate the battlefield. It is the world's only helicopter equipped with a catapult crew rescue system.

The upgraded Mi-28NE attack helicopter is fitted with the latest guided missile systems and data link equipment for interoperability with unmanned aerial vehicles, thus enhancing its capabilities against enemy targets covered by air defenses. The Mi-28NE helicopter has an increased flight speed and a higher service ceiling.

The Ka-52 and Mi-28NE are equipped with a state-of-the-art defensive aids system, which automatically protects them against infrared guided missiles, thereby greatly increasing their survivability in combat conditions. The main advantages of the Mi-38T transport/assault helicopter over the helicopters of its class available on the world market are extended flight range, payload capacity and cargo cabin volume. This helicopter can more effectively carry out troop transport and special roles (search-and-rescue, medical evacuation, VIP transportation).

## The First Mi-8MTV-1 under a Non-Profit Leasing Contract

*Russian Helicopters Holding has delivered the first Mi-8MTV-1 helicopter to KrasAvia in Krasnoyarsk under a contract with State Transport Leasing Company (GTLK). The contract includes the supply of 26 helicopters within a non-profit leasing program for air fleet modernization in Russian regions.*

Mi-8MTV-1s have upgraded lighting equipment which improves spatial orientation and flight safety. The helicopters will deliver passengers and cargo to remote villages in Siberia and Far East.

'For many parts of our country, helicopters have been and still are the only possible means of transport that connects hard-to-reach villages with towns. All 26 new Mi-8MTV-1s will be outfitted with the advanced lighting equipment which is used on Russian helicopters for the first time. GTLK will receive 12 such helicopters before the end of the year and the second part of the batch will be supplied to airlines in 2023,' Rostec's aircraft cluster reported.

New LED-based aircraft navigation lights provided for the helicop-



ter have improved color rendering and reduced power consumption. They will enable pilots to have better orientation during takeoff and landing on noninstrument fields.

The Mi-8MTV-1 features powerful propulsion, improved avionics and

fuselage design. The helicopter cabin includes 22 seats and areas prepared for installation of medical modules. Modifications include provisions for installation of additional fuel tanks and of external sling system for transportation of loads up to 4 tons.

## The Imports of Oil and Gas Drill Pipes are phased out

*The civil division of Motovilikha Plants was the first in Russia to set up the manufacture of long-length nonmagnetic drill pipes for oil and gas sector made from in-house steel. They have been designed under the import phaseout program and meet all international quality standards. Operation of a pilot batch is to be started at oil and gas fields, and with the start of mass production, the company will be able to cover up to 30% of demands of Russian customers for such products.*



Nonmagnetic pipes are used in telemetry systems and are absolutely indispensable for geological exploration, horizontal and directional drilling. Previously, such pipes were

purchased abroad or made from imported feedstock produced in EC and PRC, however, supply from EC has been terminated after toughening of sanctions in 2022. As a conse-

quence, demand for such products on the domestic market has become five times higher.

Within the shortest possible time, Motovilikha – Civil Mechanical Engineering personnel were able to make 176-178mm long-length nonmagnetic pipes, 9.5m in length, from the in-house steel which are as good as similar foreign products in terms of performance.

Besides drill pipes, nonmagnetic steels are used for navigation equipment, heat exchangers, shipbuilding and many other applications. Currently, the industrial demand for this material in Russia exceeds 40,000 tons per year and will be growing from year to year.

# ANNUAL PHOTO ALMANAC FOR MILITARY-TECHNICAL COOPERATION



Achievements and prospects



## RUSSIAN MILITARY TECHNICAL COOPERATION ANNUAL PHOTO REPORT

Main partners and projects

Special directions of development

New export products

The new project of the United Industrial Edition is an annual photo almanac dedicated to the most important and most striking in military-technical cooperation between Russia and foreign countries. The Almanac is an annual supplement to the magazine 'Russian Aviation & Military Guide'.

The almanac includes key partners and supplies, new military products, major contracts and programs, participation in biggest international salons and exhibitions, supplies of dual-use products and much more. The almanac will be released in 2023.



# VLADIMIR PUTIN and NGUYEN XUAN PHUC

Last november there was historical meeting between President of the Russian Federation Vladimir Putin and President of the Socialist Republic of Vietnam Nguyen Xuan Phuc, who was in Russia on a working visit. The discussion covered current issues pertaining to Russian-Vietnamese cooperation in various areas, including political dialogue, trade and economic relations, defence industry cooperation, science and technology, people-to-people contacts, and regional issues. Following the talks, a joint statement was adopted reflecting a shared vision for developing the comprehensive strategic partnership between the Russian Federation and the Socialist Republic of Vietnam until 2030.

**At** the meeting President of Russia Vladimir Putin said: 'Comrade President, I am very happy to see you, welcome. We take part in various online events, but I am glad to see you here in Russia in such a normal way.'

This year we already celebrated the anniversary of our Declaration of Strategic Partnership, but relations between Russia and Vietnam run much deeper than the decades that we have lived under this memorandum. We remember this, we truly value the level of our strategic partnership with Vietnam.

It must be said that our relations exist in the context of present circumstances. Despite the pandemic, trade between our countries increased by more than 15 percent last year, and by more than 16 percent over the first nine months of this year.

The itinerary of your visit to Russia is quite packed and ambitious. I know you have prepared a package of important documents in various fields concerning both economic and cultural cooperation.

I am very happy to see you. Please convey my best wishes to the Secretary General of the Communist Party of Vietnam – we are also in

touch. Our foreign ministries maintain regular contact. We have similar positions on many international issues, we constantly work within the UN and regional organizations. Vietnam remains our reliable, loyal friend and strategic partner. It is a pleasure to see you.'

President of the Socialist Republic of Vietnam Nguyen Xuan Phuc said to Vladimir Putin: 'Comrade Vladimir Putin, as you rightly said, it is also always a great joy for us to meet with you here in Moscow.'

It is remarkable that our current visit is taking place on the 80th anniversary, to the day, of the parade on

Red Square. After this parade, Red Army soldiers marched directly to the front and eventually liberated all Europe from Nazism. We all remember this righteous struggle of the Russian people. We have always had special feelings for Russia and take great joy in the enormous achievements made by Russia under your leadership over the past 20 years. We are confident that with your vast experience you will continue leading Russia to success and prosperity.

We would like to make special mention of Russia's achievements in developing the economy and raising its status in the international arena. We know perfectly well that it was you who reclaimed and upheld Russia's international status and we, the entire leadership of Vietnam, are very happy about this. We always view Russia as a very important foreign policy priority, a close friend and partner.

Before this visit to Russia, General Secretary NguyenPhu Trong discussed the status of bilateral relations with me for a very long time. We always strive to maintain and build on the traditionally friendly relations between Vietnam and Russia.

I would also like to tell you that before my visit to Russia, I instructed our Deputy Prime Minister Le Van Thanh to work, in cooperation with his Russian colleague, on advancing cooperation in different areas, especially in the Intergovernmental Commission.

We intend to strengthen good political relations between our countries and facilitate the resolution of specific problems in bilateral cooperation with a view to taking our ties to a new level. I can say that we are trying very hard to resolve the issues where Russia has an interest. There are grounds to say that we have managed to resolve a lot of them.

We realise that our problems in bilateral relations are technical or procedural for the most part. But we also understand that they must be resolved and we will do all we can to expedite the solution of these problematic issues.

We are striving to create the most favourable conditions for the work of our companies in order to take our relations to a new, more substantive, and higher level.

As you rightly said, this joint statement is very important. We believe

such statements facilitate the long-term development of our relationship. We also need other framework agreements and statements that will become guideposts for bilateral cooperation.

I am very happy that we have managed to coordinate this highly important document. It contains many specific items that are important for our relations in the short- and long-term perspective.'

/RA&MG/







# FSMTC OF RUSSIA

***Dmitry Shugaev:** 'Russia and Vietnam have a particularly strong historical background in military-technical bonds. It dates back to the period of the Democratic Republic of Vietnam and the Soviet Union. Today we continue active interaction in this field and, since 1998 there is a joint intergovernmental commission on military-technical cooperation between our countries.'*

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

– **Mister Shugaev, what are the main principles of Russia's military-technical cooperation with foreign countries today?**

– As you know, military-technical cooperation is one of the components of the foreign policy pursued by our state. The main principles of our foreign policy remain the same for military-technical cooperation. They are: mutual respect and cooperation on the basis of equal rights, non-interference in the internal affairs of other states, compliance with international laws and commitments. Naturally, at the same time we are against the use of threats, blackmail, coercion, use of force and any kind of restrictions in international relations.

All of the above allows us to build cooperation not only with states that share the views and foreign policy of the Russian Federation, but also with countries that are under serious Western influence.

– **In your opinion, why does Russia confidently maintain its leading positions in the world market of weapons, security equipment and systems?**

– Indeed, over the past several years the Russian Federation has been confidently holding the leading positions in the world arms market. This is due to the fact, that all parts of a well-functioning system professionally work together within the military-technical cooperation between the Russian Federation and foreign countries.

Specifically, when our foreign partners make contracts with Russian suppliers for the purchase of military products, they understand that they will get high end equipment that meets their needs and has the characteristics of the world's best models, tested in real-world combat conditions. Besides, Russian suppliers are always ready to discuss any issues within the framework of contract performance.

Of course, foreign customers of Russian military products planning to develop military-technical cooperation with Russian Federation, along with other factors, also take into account our historical background, and see us as a reliable supplier capable of providing its partners with top level products.

– **Russia has always been and is an extremely reliable partner and supplier, including in such a complex area as the military-technical field. What makes Russia's commitment consistent and reliable? What are Russia's unconditional advantages as a military-technical partner?**

– I reiterate that our relations with our foreign partners are built on the basis of mutual respect and equality, not recognizing any use of political or economic pressure or blackmail.

We make no political nor legal demands, except as set forth in recognized international instruments.

Certainly, Russia is willing to honor the wishes of foreign customers to the maximum extent possible, as long as this does not pose a threat to national security.

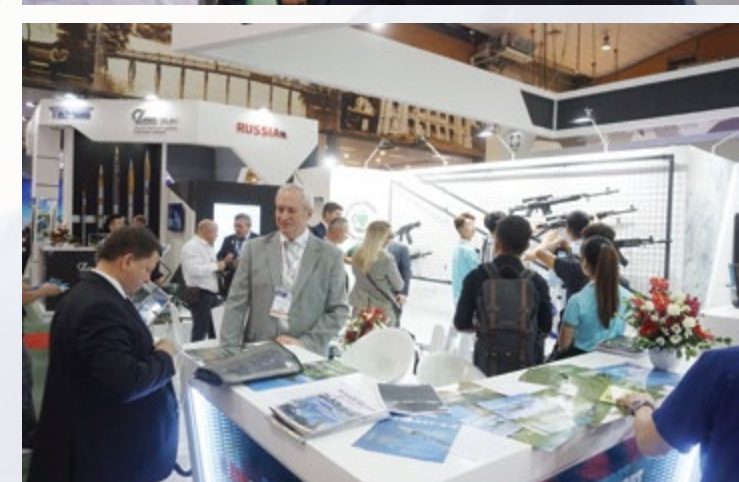
Furthermore, our commitments to protect the interests of our partners remain strong, especially in the context of the US illegal anti-Russian sanctions policy and Washington's cross-border approach to the Countering America's Adversaries through Sanctions Act.

For the sake of the common interest, we use alternative payment solutions for the products delivered and increasingly use national currencies for payments. It is imperative that we take into account the requirements of the national legislation of foreign customers.

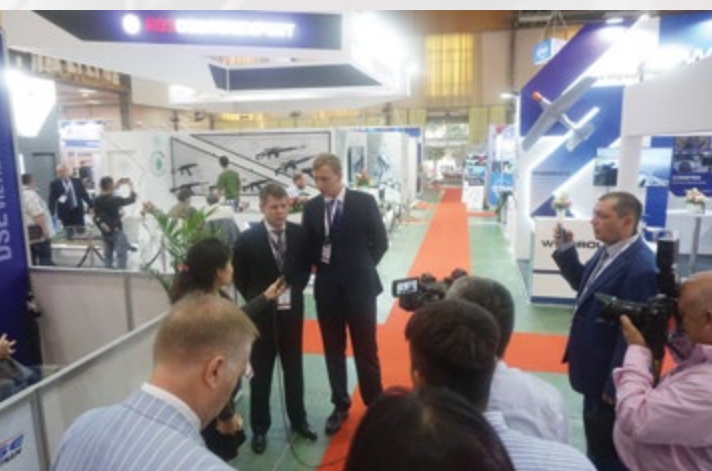
Traditionally, we offer high-end weapons products on the international market with characteristics comparable to, and in some cases surpassing, those of their foreign peers, including in terms of price-performance ratio.

Needless to say, we are committed to preventing delays in the delivery of purchased equipment. We are actively developing an after-sales service system for previously supplied equipment, arranging licensed production and cooperating in high-tech areas.

Overall, throughout a long period of time, the Soviet and, after that, the Russian system of military-technical cooperation has systematically strengthened its global credibility both as a reliable partner and supplier of military products. And now, in the face of unprecedented sanctions







pressure, we continue to honestly and efficiently carry out the work entrusted to us – to develop military and technical co-operation with foreign countries.

**– What allows Russia to overcome unparalleled pressure by Western countries, as well as sophisticated technologies of unfair competition?**

– Now we live in a world that faces a transition from unipolarity to multipolarity. Washington with the desire to maintain its global hegemony is increasingly using illegal methods of coercion in international relations in the form of direct blackmail and various kinds of sanctions, including threats of the use of military force. All this does not make the US any more popular in the international field. The introduction of sanctions against any state always has a more or less negative impact on the global economy. When powerful global players such as China and Russia are involved in the sanctions war, the consequences of the confrontation can be very unforeseeable.

Most of the world community understands this. This is evidenced by the failure of U.S. plans to isolate Russia internationally, as most of the world does not support the policy of sanctions pressure by the United States and its allies directed against the Russian Federation.

Convinced of the ineffectiveness of economic and political sanctions, Washington and its supporters began to use blatantly terrorist methods.

As propagandistic anti-Russian outbursts, there is a bloat on the issue of 'Russia's readiness to use tactical nuclear weapons' in a special military operation, among other things. Unfortunately, we cannot expect the situation to change any time soon, so our system of military-technical cooperation, which has been under Western sanctions pressure for many years, is systematically improving working methods to successfully counter the restrictions imposed on it.

We have achieved good results in this direction: alternative schemes of mutual settlements are introduced, the system of insurance of international freight transportation is improved, and the interests of our partners are protected.

International economic organizations are being created at the state level, the financial policy of which provides for the rejection of the U.S. dollar. And more and more countries are striving to join them.

Our world is being reshaped; a new world order is being established. In order to strengthen Russia's international standing, its political position and national security, we, the employees of the Russian Federation's system of military and technical cooperation with foreign states, are also rearranging ourselves.

**– How successful is Russia's historical military-technical cooperation with Southeast Asian countries?**

– Historically, Russia has maintained strong friendly ties and develops military and technical cooperation with many South-East Asian countries. These include Vietnam, Laos, Cambodia, Myanmar and others.

Russia and Vietnam have a particularly strong historical background in military-technical bonds. It dates back to the period of the Democratic Republic of Vietnam and the Soviet Union. Today we continue active interaction in this field and, since 1998 there is a joint intergovernmental commission on military-technical cooperation between our countries.

The Russian-Myanmar military-technical cooperation is certainly worth mentioning, as it has evolved since 2001. Today, the mechanism of the Russian-Myanmar Joint Commission on Military-Technical Cooperation is successfully functioning.

We also have a good and very positive history with other countries in the region – Cambodia and Laos. During the Soviet era, military-technical cooperation provided great assistance to the people of these states, both in the supply of weapons and military equipment and in equipping military facilities.

Russia is certainly interested in ensuring that our relations in the sphere of military-technical cooperation in Southeast Asia will continue to deepen.

**– How important is the partnership with Vietnam in this region**

**and in the context of Russian defense exports?**

– The strategic partnership with Vietnam plays a crucial role for Russia in the Southeast Asian region. This country remains one of Russia's main military-technical partners in the region.

Despite attempts made by some Western countries to pursue their own interests in military-technical cooperation with Vietnam, Russian arms and military equipment exports to Vietnam have grown manifold over the past decades. It illustrates the strategic nature of the partnership between our countries, which are historically bound by strong friendship.

**– What traditions of cooperation between our countries, founded in the middle of the twentieth century, can be considered the most stable and successfully developing?**

– Strengthening Vietnam's defense capabilities by supplying Russian modern weapons and military equipment is the most successful form of cooperation between our countries.

During the Soviet period, T-54/55 and T-62 tanks, 'Su' and 'MiG' airplanes, 'Mi' and 'Ka' helicopters, artillery, missile and patrol boats and other equipment were supplied to Vietnam. The military hardware stock is currently being upgraded with more up-to-date types on a routine basis.

Besides, for decades we have been successfully training Vietnamese soldiers in higher military institutions. This is also an unwavering tradition that has been steadily developing.

**– What types of Russian arms and military equipment are most popular in the region and in Vietnam?**

– Armored vehicles and aircraft, artillery pieces and ships of various types are the most popular in the region, and particularly in Vietnam.

**– What features of Russian weapons and technical expertise are particularly appreciated in Vietnam (and in Southeast Asia as a whole)?**

– In Vietnam, as elsewhere, the capability of the Russian weapons and technical expertise to produce top-quality, reliable weapons and military equipment that operate flawlessly in humid tropical climates is most highly appreciated.

**– To what extent is there technological inheritance between Soviet and Russian military equipment and armaments? What examples of the refurbishment and updating of armaments and military equipment from the USSR and Russia in the Vietnamese People's Army can be given as the most telling?**

– It is a fact that most of the Vietnamese People's Army is equipped with Soviet and Russian-made equipment, the stock of which is being renewed by our countries on a planned basis today. This best demonstrates the continuity of Soviet and Russian armaments and military equipment.

For example, Su-27, Su-30MK2 and Yak-130 aircrafts were delivered to Vietnam to replace MiG-21s, and the tank park was improved, which reinforced T-54/55 and T-62 tanks with T-90 tanks. The Vietnamese Navy is equipped with modern Project 636 submarines and 'Molniya' missile boats.

**– What important military-technical cooperation contracts between Russia and Vietnam can be identified as the most promising? In which areas is cooperation developing particularly dynamically?**

– The most promising are contracts for the supply of 'Mi' and 'Ka' helicopters, 'Su' aircraft, armored vehicles and various types of ships to Vietnam. Cooperation in the area of retrofitting Vietnamese enterprises and establishing joint ventures is also promising.

**– What does the Russian FSMTC leadership think of the Vietnam Defence 2022 exhibition venue? What are its key benefits and importance for strengthening cooperation between our countries?**

– We are deeply impressed with the Vietnam Defence 2022 exhibition platform. Vietnam Defence 2022 is a key feature that offers exhibitors an excellent opportunity to discuss the technological specifics of producing and running military products and to promote their latest products and services to practically every country in South East Asia.

/RA&MG/







# ROSOBORONEXPORT TO SHOWCASE 400+ RUSSIAN DEFENSE PRODUCTS AT VIETNAM DEFENSE 2022 IN HANOI

Rosoboronexport JSC (part of Rostec State Corporation) is the organizer of Russia's single exhibit at the Vietnam Defense 2022 International Defense Exhibition & Conference, which will be held on December 8-10, 2022 at Gia Lam Airport in Hanoi, Vietnam.

**R**ussia and Vietnam build their relations on long-standing traditions of friendship and mutual respect. Rosoboronexport supports the development of bilateral strategic partnership and makes every effort to strengthen military-technical cooperation between our countries,' said Alexander Mikheev, Director General of Rosoboronexport. 'The company takes part in the Vietnamese defense exhibitions with great pleasure and presents the best Russian industrial products there. At Vietnam Defense

2022, we will show our partners the latest planes and helicopters, armored vehicles, air defense assets, small arms and unmanned aircraft systems.'

The Russian single exhibit will include more than 400 military, civilian and dual-use products developed and manufactured by leading Russian enterprises, including those affiliated to Rostec.

At its booth, Rosoboronexport will exhibit a full-scale model of the Orlan-10E unmanned aerial vehicle (UAV), as well as a line of Russian-made UAVs, including the Orlan-30,

a new product of 2022, the Orion-E reconnaissance/strike unmanned aircraft system and the Kub-E loitering munition.

Visitors to the exhibition will be presented with the Su-57E fifth-generation fighter, Su-35 and Su-30SME supermaneuverable fighters, IL-76MD-90A(E) military transport aircraft, Ka-52 scout/attack helicopter, Mi-171SH military transport helicopter and the Ka-28 shipborne ASW helicopter.

Rosoboronexport will offer the Buk and Tor surface-to-air missile (SAM) systems, Pantsir-S1 self-



propelled anti-aircraft gun/missile (SPAAGM) system, Verba and Igla-S man-portable air defense systems (MANPADS) suitable for building up air defenses at various levels. Electronic warfare assets, including those designed to counter various unmanned aerial vehicles, will also be on display.

At the Rosoboronexport booth, delegations of the Armed Forces of Vietnam and the countries in the region can get acquainted with the world's bestsellers in the segment of the armored vehicles market. Among the vehicles on display are the proven and reliable T-90S and T-90MS MBTs, BMPT Terminator tank support fighting vehicle, TOS-1A heavy flamethrower system, upgraded Msta-S self-propelled howitzer, Khризantema and Kornet-EM ATGM systems. Rosoboronexport partners from Southeast Asia are expected to pay increased attention to the Sprut-SDM1 light amphibious tank and BT-3F and BTR-82A armored personnel carriers, which have excellent capabilities to cross water obstacles.

During Vietnam Defense 2022, Rosoboronexport is ready to offer various models of Typhoon-type mine-protected vehicles and Linza ambulance, as well as to consider options for organizing their licensed production on the territory of partner countries.

The Kalashnikov Concern will present its products as part of Rosoboronexport's exhibit. The manufacturer of the most popular and well-known brand of small arms in the world will showcase its AK-200

series, AK-15 and AK-19 assault rifles that meet all modern requirements for ergonomics and are suitable for mounting various sights and tactical accessories. The company's partners may be interested in other Kalashnikov products as well: 9mm Kalashnikov PPK-20 submachine gun, Chukavin sniper rifle, 9mm Lebedev pistol.

Visitors to the special exporter's booth are expected to pay great attention to small arms from other well-known Russian manufacturers, including 5.45mm and 7.62mm KORD assault rifles, 9mm PP-19-01 submachine gun.

Rosoboronexport presents a wide range of naval products: the Gepard-3.9-class frigate, Project 22160 patrol ship, Project 21980E special purpose craft, as well as the Karakurt-E and Sarsar small missile ships. At its booth, representatives of the Navies of the countries in the region will find a wide range of missile, artillery and torpedo armament for ships



and submarines, air defense assets, communications, sonars, underwater/surface target acquisition sensors, anti-saboteur capabilities.

'During the business program of the exhibition, the Rosoboronexport delegation is ready to discuss cooperation in the field of industrial partnership and the construction of infrastructure facilities with its Southeast Asian partners,' Alexander Mikheev added. 'We have unique competencies in this area, and our proposals are backed up by successfully completed and functioning projects on the customers' territories.' /RA&MG/







# 'TOR' FAMILY SURFACE-TO-AIR MISSILE SYSTEM – BATTLE TESTED

Rosoboronexport will display state-of-the-art Russian weapons and military equipment at the Viet Nam Defence Expo 2022. These include the Tor family of short-range anti-aircraft missile systems, developed and manufactured by the Izhevsk Electromechanical Plant Kupol (affiliated with the JSC Military Defence Group 'Almaz – Antey').



**T**he Tor family of SAMs is capable of providing air defence for military units and strategic facilities against current and advanced air defence systems in all weather conditions, at any time of day and night, under conditions of intensive fire and electronic countermeasures.

The distinctive features of the Tor-E2 are:

- super fast deployment time from mobile to combat mode – 3 minutes, which ensures quick engagement of the vehicle in the most disturbing initial period of the battle;
- capability to conduct reconnaissance of the combat situation on the move (which is not the case with many analogues) and to hit targets on the move (which is not the case with any of the analogues), thus ensuring that the vehicle may accompany troops both on the move and in action without impeding their movement;
- All-time maximum ammunition – 16 SAMs per vehicle, allowing to repel a massive air raid.

Air reconnaissance assets allow Tor-E2 to independently reconnaissance up to 32 km range (actually up to radio horizon limit) and timely detection of low targets (with effective scattering surface 0.1 sq. m and less). The airspace survey speed is 1 turn of the antenna per second, which is the world's best indicator in the class of low-range SAM systems. Within a single antenna revolution, the SAM can detect up to 48 targets, priorities them according to threat level and take the 10 most dangerous ones for auto-guidance. By means of batteries' command posts, the combat vehicles can be integrated with superior air defence assets and get information from them regarding the air situation beyond the range of the airborne target detection station.

The response time from target acquisition to SAM launch is 5-10 seconds, depending on the target's heading relative to the guidance antenna at the time of acquisition. Range of targets flying at near-sonic speed is 1 to 16 km, altitude is 1 to 12 km, attitude parameter is 0 to  $\pm 9.5$  km. In the most dangerous close-in zone – up to 7 km in range and 6 km in height – the SAM 'Tor-E2' is capable of engaging targets flying at 700 m/s and above. It can simultaneously engage four targets (in a 30x30o sector). The targeting method is radio command, which provides high aiming accuracy, allows the SAM to react instantly to any evasive maneuvers performed by MAA, as well as to form complex trajectories of flight, providing the most efficient destruction of targets. The system is capable of effectively countering MAA flying at extremely low altitudes (10 m and below), which allows it to repel attacks by modern and advanced anti-missile weapons and unmanned aerial vehicles (UAVs).

Another key feature of the Tor family is its high jamming immunity capabilities, demonstrated by the tests conducted by the Greek Armed Forces where NATO's EW capabilities failed to suppress the Russian system.

The vehicle is highly automated – if necessary, it can operate unattended in fully automatic mode.

Optionally, the Tor family of SAMs are available in a variety of carrier

designs. The standard tracked version has a specific ground pressure of 0.8 kg/cm<sup>2</sup>, has a speed of 65 km/h on the highway, 45 km/h on unpaved roads and 25 km/h on rough terrain. In addition to the standard tracked version, Tor-M2K on a wheeled chassis, Tor-M2DT on a twin tracked off-road vehicle and the Tor-M2KM autonomous combat module are in serial production. The Tor-M2K is optimally suited for countries with a developed network of paved roads. Compared with the basic version on a good road, it has a higher speed – 80 km/h, less damage to the road surface, easier and cheaper to produce and operate.

The Tor-M2KM autonomous combat module, having completely abandoned its chassis, is noticeably cheaper than the Tor-E2, weighs less than half its weight, and can even be airlifted by Mi-26 helicopter. The Tor-M2KM is perfectly capable of defending stationary objects and can be used from the deck of a ship, a railway platform, and the roofs of buildings. The module is easily coupled with any chassis of suitable payload capacity, which is a beneficial solution for countries interested in integrating SAMs with their own chassis. The carrier base of the Tor-M2DT is a twin tracked off-road vehicle. Specific ground pressure is 0.3 kg/cm<sup>2</sup>, the maximum speed is 43 km/hour. This SAM system is specialized for operation in extreme climatic conditions and difficult terrain.

The high combat capabilities of the Tor family of SAM systems have been repeatedly confirmed in practice, including in live combat, during which they shot down hundreds of different means of air attack. The unparalleled performance of the Tor family of SAMs is highly appreciated by Russian operators as well as Russia's foreign partners and allies. These SAMs are in service with the armies of Belarus, Armenia, Venezuela, Greece, Egypt, Iran, China, etc.

Izhevsk Electromechanical Plant Kupol provides maintenance and warranty services, periodic and overhauls, and accompanies its products throughout their lifecycle. The company is continuously improving its production technologies, regularly re-equipping its production facilities,



ties, and continuously increasing its production capacity. All workshops are equipped with modern, high-precision and high-performance equipment. The quality control system meets the strict requirements of the GOST RV 0015-002 defence standards and internal standards of the Almaz – Antey Group.

Non-stop perfection of products, technical upgrade of production facilities, use of high tech and strict quality control ensure that Izhevsk Electromechanical Plant Kupol and Tor family SAMs remain leaders in the field of short-range air defence systems.

/RA&MG/





JSC "Tactical Missiles Corporation"  
  
 JOINT STOCK COMPANY  
**"Concern 'Granit-Electron'"**  
 FEDERAL SCIENTIFIC AND PRODUCTION CENTER

*Missile corvette pr. 1241.8  
 'Molniya' of the  
 Vietnamese Navy*

# ADVANCED MILITARY EQUIPMENT FROM CONCERN 'GRANIT-ELECTRON' FOR THE MODERN NAVY OF VIETNAM

Mikhail A. Lobanov,  
 Chief of Centre for military technical  
 cooperation and foreign relations

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**Concern 'Granit-Electron' JSC (subsidiary of JSC 'Tactical Missiles Corporation'), together with JSC 'Rosoboronexport', is looking forward to further develop military and technical cooperation with friendly countries in the supply of advanced electronic warfare systems for the navy.**

**T**he Socialist Republic of Vietnam is one of the key states in the Asia-Pacific region with well-equipped armed forces, including a modern navy. The military equipment supplied by Concern 'Granit-Electron' for the Vietnamese Navy proved its reliability in ensuring the security of the country, which

contributed to the strengthening of Russian-Vietnamese relations.

Taking into account the operation of warfare systems on ships of any fleet, there is a need to upgrade the previously supplied equipment.

Concern 'Granit-Electron', having more than 30 years of successful experience in military-technical cooperation, is continuously work-

ing on improvement of time-proven equipment, enhancing functional and operational properties of equipment, and introducing advanced technologies in accordance with modern requirements.

For example, for the Vietnamese Navy, Concern 'Granit-Electron' currently offers the modernization of all shipborne automated fire con-

trol systems (FCS) for anti-ship missiles, installed on the ships of the Vietnamese Navy in order to provide the implementation of cruise missiles – the brand-new product, developed by the 'Tactical Missiles Corporation'.

The upgraded FCS ensures the missile range up to 260 km, high-precision guidance and effective target engagement. The FCS can be interfaced with the shipborne combat information control system, as well as with the satellite navigation system, which enables effective employment of the missile.

The new FCS opens additional opportunities for the operator's work, in particular, enables the data on-line processing and analyzing on the basis of the firings results.

During the modernization of the FCS the latest element base was used which guarantees the systems support for 10-15 years, ensuring the maintainability of equipment.

Besides, to improve tactical and technical characteristics and functional capabilities of radio-electronic warfare systems on the operating ships of Vietnam Navy, Concern 'Granit-Electron' also offers the upgraded 3C-25E target designation radar.

The upgraded 3C-25E radar can be positioned as multifunctional integrated system on the basis of active and passive channels, linked with satellite navigation and airborne target designation means. Such equipment ensures the integration of shipborne, airborne, space and coastal information sources capable of influencing tactics, strategy, forms and methods of combat operations.

The modernized 3C-25E target designation radar features implementation of technologies for electronic scanning of space, introduction

of secure interference-free channel for interaction with the ships of the tactical group and control of joint combat operations, improved operator's interface with the display of information against the background of the Navy digital charts, simplified maintenance of the system due to the transition to digital processing, reduced number of devices.

The upgraded 3C-25E radar enables to supplement and change composition of linked equipment and devices. At the Customer's request, the upgraded radar can be supplied in standard version with hydraulic antenna drive, as well as with electric antenna drive when located under radar-transparent dome.

Thus, supplying Vietnamese warships with advanced modernized equipment of Concern 'Granit-Electron' gives an impetus to increase the combat potential of the Vietnam's Navy.

At the DSE-2022 exhibition, as part of the official Russian delegation organized by 'Rosoboronexport' JSC, specialists of Concern 'Granit-Electron' conduct negotiations and consultations with the Vietnamese side to realize bilateral military-technical cooperation projects. /RA&MG/

*Boris Obnosov (Director General of the Tactical Missiles Corporation)  
 and Igor Ponomarev (Director General of JSC 'Concern 'Granit-Electron') inspect  
 the upgraded fire control system (FCS KASU) for anti-ship missiles 'Uran-E'*





# KALASHNIKOV'S NEW PRODUCTS

The largest Russian small arms manufacturer and one of the most globally recognized brands – Kalashnikov – is not limited to the famous assault rifles. Currently, Kalashnikov Group includes precision weapon, military special vehicle, UAV, military and commercial motor boat, machine and medical equipment manufacturers and many others. The most recent developments clearly demonstrating the diversity of products made by the modern Kalashnikov are described below.



## SV-21 rifle

**A** manually reloaded precision rifle is designed to enable quick and easy rebarreling upon expiry of barrel life. The rifle is supplied with changeable barrels for 7.62x54R and .308WIN cartridges, 10-cartridge common magazine from the readily available and time-proven iconic Dragunov sniper rifle ('Tiger').

The rifle is based on a 'carrier return spring housing' with a free-floating barrel and tubular forearm, moreover, the bolt is locked with the barrel nut. Rebarreling and locking head replacement are carried out manually within about 10 minutes. Rifle weight without cartridges and with a 650mm barrel is 5.2kg. SV-21 is designed for civil market, but may be also modified for combat use in future. Kalashnikov's new weapon has been presented at the Army 2022.



## IZH H600 hybrid machining center

**M**achine tool engineering is a strategically important sector of Russian industry, however, our country has been in dependence on imports over the last years. In these conditions, Kalashnikov expands the output of high precision machines which will be capable of substituting the foreign products withdrawn from the Russian market. In particular, a new IZH H600 hybrid machining center has been commissioned recently under the sponsorship of the Industrial Development Fund.

It combines laser cladding functions and 5-axis milling to ensure the manufacture of complex products up to 300kg in weight with dimensions 600x500x500mm. In addition to parts manufacture, IZH H600 may be used for application of protective coatings by welding. The new multifunctional machine enables the finished product output time to be reduced without using additional tools and dedicated jigging.

## Kalashnikov RDS-CC collimator

**T**his collimator has been developed with the participation of Kalashnikov's personnel and is manufactured by Vologda Optical and Mechanical Plant. The collimator makes weapon targeting twice or thrice as fast due to backsight and foresight substitution with a moving dot which is to be aligned with



the target. Aiming accuracy is also improved in this case.

Kalashnikov RDS-CC can be used in a regular and infrared band with ten crosshair brightness adjustment stages depending on lighting. The collimator is energized by standard batteries which can generally last for 10,000 hours in normal operating conditions. All-metal collimator housing protects the mechanisms against dust and moisture ingress as well as against impacts. The new Kalashnikov's collimator is attached to standard Picatinny and Weaver rails.

## Diana spike strip

**A** rather dangerous product developed by CNIITM based near Moscow is hiding under this feminine name. This device is designed to stop the movement of any types of wheeled vehicles and is used by law enforcement agencies.

Diana needs just a few seconds to be deployed. In future, an even faster 'fired' version is to be designed and will be capable of being actuated without leaving the special



vehicle. The key difference between Diana and other similar systems is that, when a vehicle is driven over the strip, a part of the structure becomes embedded in the tires and prevents further movement making an offender stop just after a distance of 100 m to 150 m.

## Khaska-10 air-cushion craft

**K**haska-10 is being developed by Rybinsk yard. The new vehicle proceeded to the test stage in September 2022. This is a sidewall craft where the air cushion is limited by special flexible sidewalls to reduce air flow rate. The craft is created within the national offshore field development program. Khaska-10 will be able to be used for transportation purposes in the Arctic shallows and Far North hard-to-reach areas.

Number 10 in its name means that Khaska is capable of carrying up to 10 tons of cargo. Such capacity and dimensions enable the craft to accommodate, for example a three-axle Kamaz on board. Two 1500 hp engines can attain a speed up to 40 knots (74 km/h). The craft is operated by a three-man crew and is capable of operating in standalone mode. /RA&MG/







## Project 22800 Karakurt

### Compact power

### *Great capabilities with low displacement*

- ◆ Considerable fire power;
- ◆ Ensuring tactical supremacy;
- ◆ Strong Air Defence;
- ◆ Solving of the tasks in times of piece.

Despite its lower class, the firepower of a Karakurt corvette can be compared to a frigate.

Karakurt class ships are capable of achieving and maintaining maritime supremacy of an assigned sea area and of delivering high-precision missile strikes against critical land facilities located at the depth of an enemy's territory.

Multichannel anti-aircraft artillery-missile system ensures strong defence of a ship from all types of aerial attack means.

In time of peace Karakurt class ships are able to maintain order in littoral areas.

#### Armament

Club – N integrated missile system:  
Range of fire, km – 300;  
Missile load – 8 missiles.

Pantsir-ME AA missile-artillery system:  
Range of fire of missiles/artillery, km – 20/5;  
Ammunition load of missiles/gun rounds, un. – 32/1000.  
Artillery gun mount AK-176MA-01 1x1 76,2 mm:  
Range of fire, km – 15,7.

Pozitiv-ME 1.2 3D radar:

Detection range of an air target, km – 150.

Mineral-ME radar:

Detection range of a sea-surface target, km – up to 450.

MR-123-02 Bagira fire control radar system.

Incorporating of Project 22800 Corvettes to the Navy will result in substantial increase in fire power of the fleet at low cost.

#### Main characteristics:

- ◆ Full displacement, t: 870
- ◆ Main dimensions (length, beam), m: 67x11
- ◆ Maximum speed, kts: 30
- ◆ Range, miles: 2500
- ◆ Endurance, days: 12
- ◆ Seaworthiness, points: 8



## Project 12701 Alexandrit-E

### Coastal minesweeper

### *Covert threats: found and defused*

Effective ship with minehunter and minesweeper functions.

- ◆ Highly effective sweeping and search for mines;
- ◆ Minimal physical field signature;
- ◆ Control over the ship and a tactical group is highly automated;
- ◆ Traditional and new methods are used to combat maritime minefields;
- ◆ Brand new shipbuilding technologies and composite materials are used.

Modern ahead of course mine search and destroy system and sweeps are installed on Alexandrit-E.

The ship is capable of providing effective countermine protection of naval bases, EEZs, ships and vessels on routes, and highly accurate search and destroy of minefields.

Project 12701 as well can carry out countermine reconnaissance.

#### Armament

Alexandrit-ISPUM integrated mine search and destroy system or Alister 9 AUV with K-Ster search and destroy system;  
GKT-2 and GOKT-1 deep-water sweeps;  
SHAT-U broadband acoustic sweep;  
Diez-E automated countermine measures control system;  
AK-306 artillery gun mount 30-mm.  
Alexandrit-E comprises effective countermine measures means.

#### Main characteristics:

- ◆ Full displacement, t: 890
- ◆ Main dimensions (length, beam, draft), m: 61,6x10,3x3,3
- ◆ Maximum speed, kts.: 16
- ◆ Range, miles: 1500
- ◆ Endurance, days: 10
- ◆ Seaworthiness, points: 7







## BK-10

Appears where nobody expects

*High-speed, small size, low profile boat designed for Special Forces*

- ◆ High-speed, substantial range and perfect maneuverability;
- ◆ Modern small size navigation, communication and surveillance means;
- ◆ Substantial troops capacity;
- ◆ Ergonomic control panel;
- ◆ Can be both installed aboard the ship or vessel and transported by railway, road, marine or air transport.

The boat is designed to support Special Forces in littoral areas. BK-10 as well can disembark landing troops on the coast at any point, to a maritime platform or to a vessel.

Suspension boat seats are available for the crew.

The windows of the pilot house are bulletproof. Installation of armored plating on both sides is optional.

The boat can be equipped either with two 7,62 mm machine-guns or with a 40 mm grenade launcher.

High-speed boats account for better effectiveness of Special Forces in littoral sea areas and inland waters.

### Main characteristics:

- ◆ Full displacement, t : 3,7
- ◆ Main dimensions (length, beam, draft), m:10,5x3,7x0,6
- ◆ Troops capacity, men: 10
- ◆ Maximum speed, kts.: 40
- ◆ Range, miles: 400



## BK-16E

Rapid power

*Hi-tech, high-speed, multifunctional boat with low displacement*

- ◆ High-speed, substantial range, perfect maneuverability;
- ◆ Spacious, armored and comfortable troops compartment;
- ◆ There is a bow ramp with a bow-to-stern through passage;
- ◆ Substantial fire power;
- ◆ Ergonomic pilot house;
- ◆ Can be both installed aboard the ship or vessel and transported by railway, road, marine or air transport.

BK-16 is designed to provide support to Special Forces in littoral areas. The boat can be easily transformed to a command and control boat, a fire support boat, an anti-sabotage boat, a police boat, a boat for SAR operations, an ambulance boat or a fireboat.

Suspension boat seats with armored seatbacks are available for troops.

The boat can be equipped in various combinations with 12,7 mm and 7,62 mm machine guns, remotely controlled combat machine-gun and grenade launcher stations.

Outstanding specifications, balanced configuration, ergonomic design of BK-16 provide for possibility to carry out various tasks in littoral areas and inland waters.

### Main characteristics:

- ◆ Full displacement, t: 26,6
- ◆ Main dimensions (length, beam, draft), m: 18,0x3,8x0,9
- ◆ Maximum speed, kts.: 45
- ◆ Troops capacity, men: 19
- ◆ Range, miles: 400







## Project 22356

### Power in Perfection

*Hi-tech frigate of the new modification, comprising power, functionality and eye-catching design*

- ◆ Perfect seaworthiness, substantial endurance and range;
- ◆ Multifunctional, compact, highly automated;
- ◆ Well-balanced and powerful armament;
- ◆ Modern design;
- ◆ Reliable and efficient main power plant.

The ship is tested during transoceanic trips and perfectly adapted for distant sea and ocean area missions.

Project 22356 provides reliable air, underwater and anti-ship defence of big ships, vessels and convoys.

The ship is capable of destroying critical land facilities, combat surface ships including those with a strong air defence. Project 20382 as well can provide effective fire support for the Army and landing troops on the coast.

#### Armament

Club – N integrated missile system:  
Range of fire, km – 300;  
Ammunition load, missiles – 16.  
RIF-M ADMS:  
Range of fire, km – 40;

Ammunition load, missiles – 32.

A-192E artillery gun mount 1x1 130 mm:

Range of fire, km – 22.

Palma anti-aircraft artillery and missile system:

Range of fire of missiles/artillery, km – 10/5.

Paket E/NK anti-submarine torpedo system 2x4 327 mm:

Range of fire, km – 20.

Furke 2M radar:

DAir target detection range, km – 200.

Zaria ME – 03 sonar system.

A hangar and a helipad for a 12 t helicopter.

Project 22356 frigate ensures effective protection of the State's interests at seas and oceans.

#### Main characteristics:

- ◆ Full displacement, t: 4350
- ◆ Main dimensions (length, beam, draft), m: 135x16,4x4,66
- ◆ Maximum speed/economical, kts.: 29,5/14
- ◆ Range, miles: 4500
- ◆ Seaworthiness, points: 8



## Mi-28NE

### Combat helicopter

#### *Flying tank*

**Fulfillment of combat tasks in the interests of army aviation with high efficiency, thanks to powerful armament complex and a combat survivability improvement set of means.**

The Mi-28NE is designed for round-the-clock search and engagement of enemy's manpower, armored and non-armored equipment at the frontline and in tactical depth, destruction of enemy's air attack low-speed targets as well as for cover and fire support of tactical landing troops.

The helicopter has high combat survivability in the air due to effective armor protection of critically important systems and aggregates. It shows efficient protection against portable SAM with multi-specter thermal homing warheads owing to helicopter fitting with ECM system.

Mi-28NE can be applied in mountainous, hot and humid climate conditions, moreover, it provides capability of landing on unpaved sites that are located at the altitudes of up to 4000 m.

#### Main characteristics:

- ◆ Max takeoff weight, kg: 12.100
- ◆ Maximum payload, kg: 2.100
- ◆ Max speed, km/h: 315
- ◆ Service ceiling, m: 5.600
- ◆ Flight range (internal fuel tanks), km: 425
- ◆ Armor protection weight, kg: 300







# Pantsir-S1

## Anti-aircraft missile and gun system

### *Perfect protection of any object*

Mobile, multi-channel short-range air defense system has high firepower and is able to effectively engage a wide class of air attack weapons

'Pantsir-S1' AAMGS is distinguished by the presence of combined missile-cannon weapons, a short reaction time and the ability of a combat vehicle to conduct reconnaissance and destruction of air targets in motion.

'Pantsir-S1' anti-aircraft missile and gun system is designed for air defense of small military and administrative-industrial facilities and areas, including mobile ones, against fixed- and rotary-winged aircraft, cruise missiles, and precision munitions as well as for strengthening air defense units against massive air strikes.

#### Main characteristics:

Firing distance to the airplane with radar cross-section area of 2 sq. m and target speed of 300 m/s:

- ◆ By missile:
  - range: 1200-20000 m
  - altitude: 15-15000 m
- ◆ By gun:
  - range: 200-4000 m
  - altitude: 0-3000 m
- ◆ Number of simultaneously engaged targets: 4
- ◆ The maximum speed of engaged targets: 1000 m/s



# NR-900EK3M

## Frustrates terrorists' plans

### *Indispensable detector for field conditions thanks to extended continuous operation and application in tactical airborne missions*

- ◆ extended detection range and searching rate;
- ◆ device localization in any operational mode: active, 'stand-by' or switched off;
- ◆ detection behind barriers (walls, fences etc.).

NR-900EK3M allows roads, terrain and objects inspection for mines, improvised explosive devices (IED) and other explosive appliances with electronic components. Moreover, the detector successfully searches for hidden caches with weapons, ammunition, explosive devices and communication facilities, as well as checks suspicious items.



#### Main characteristics:

- ◆ Type of screening signal: radio pulses
- ◆ Receiver type: 2-channel (2nd and 3rd harmonic bands)
- ◆ Output power (average / max), W: 0.15 / 200
- ◆ Power source: Li-ion, 7.4 V, 5.5 Ah
- ◆ Time of preparation for operation, min.: 5 max
- ◆ Time of continuous operation w/o battery replacement, h: at least 4
- ◆ Operating temperatures, °C: -30...+50
- ◆ Weight (in operating / traveling state), kg: 4.6 / 9.8





## Strekoza

Detects explosive devices at 30 m level

*Highly efficient system, which allows remote detection and precise localization of IED*



Strekoza system carries out preliminary engineering reconnaissance to detect IED (electronic control device) on a spread ground area in the course of special search-operations.

The system operates as part of ground-based robotic mobile system for IED detection.

The obtained data can be transmitted to the control center in real time. If necessary, Strekoza can use 'hang-up' technique to examine a part of ground area in detail.

### Main characteristics:

- ♦ Modulation type: PAM
- ♦ UHF probing signal average power in searching mode, mW: max 400
- ♦ IED detection range, m: up to 30
- ♦ Payload composition: non-linear radio locator, video camera, GPS-module, data transmission channel
- ♦ Power supply (of non-linear locator): 2 accumulators 3.7 V
- ♦ Payload weight (with integrated battery), kg: max 2

## NR-MMD

Light and efficient

*Ideal for mobile units and combat vehicle crew supply*

- ♦ high sensitivity;
  - ♦ compact size for transportation;
  - ♦ capacity to operate underwater at a depth up to 30 m.
- NR-MMD detects antipersonnel antitank mines that contain metallic components: on the ground surface or embedded in soil, snow, brickwork or even shallow water.



### Main characteristics:

- ♦ Depth of detection in the ground (water), cm:
  - TS-50 antipersonnel mine: up to 15
  - TM-62M antitank mine: up to 50
- ♦ Consumption power, mA: max 120
- ♦ Time of continuous operation, h: at least 8
- ♦ Dimensions, cm: 345 x 120 x 55
- ♦ Weight (with batteries), kg: 1.7
- ♦ Power supply: 4 AA (LR-6) elements

## PYa

Handy and Powerful

The 9mm Yarygin Pistol is a proper handgun to engage enemy manpower protected by Class 2 body armour at designated distances in any theatre of action.

It is based on a semi-automatic double action (DA), which allows the operator to shoot from cocked position and in the DA mode thus augmenting his/her combat readiness. The pistol has ambidextrous fire controls and two stages of safety release – grip and trigger. Yarygin Pistol is weather resistant and has a successful combat-proven record in modern conflicts all over the world. The pistol uses modern and powerful 7N21 ammunition with enhanced penetration capabilities due to Steel core bullet and normal 9x19mm (Para).



### Main characteristics:

- ♦ Caliber, mm: 9
- ♦ Magazine capacity, rds: 18
- ♦ Weight, w/empty magazine, kg: 0,95
- ♦ Dimensions, mm: 195x140x38
- ♦ Sighting range, m: 50
- ♦ Trigger pull, kgf:
  - from pre-cocked position: 1,5-2,5
  - DA mode: 4-7
- ♦ Cartridges: 7N21/9x19 (Para)



# T-90 VLADIMIR TANK: INTERNATIONAL HIT

T-90 tank was brought into service thirty years ago in autumn 1992. This series of vehicles took on the world market – they became the world's best-selling tanks in the first decade of the 2000s. The T-90 has been upgraded numerous times over the past years. For the latest T-90M 'Protyv-3' version being deployed currently, the Uralvagonzavod designers have introduced a set of conceptual innovations both in terms of protection and armament and crew's comfort, meaning that they have actually created a new tank.

## Its own way of the Russian tank

**T**he T-90 was created with due regard to the T-72 tank development and improvement experience, and to the study of recent military conflicts. American M1 Abrams – one of the heaviest modern thick-armored tanks – was treated as the main competitor. The Urals-based plant took a different approach.

Shtora-1 soft kill system was installed on a tank for the first time ever to ensure guided missile control disruption and laser range-finder countermeasures. 1A45T Irtysh automated integrated fire-control system and PNK-4S commander's sighting and observation complex allowed to fire the cannon and machine guns from stationary position and in motion at any time of day or night. Armored combat vehicles, including tanks, were killed by guided missiles using 9K119 Refleks guided anti-tank missile system developed by Instrument Design Bureau in Tula. Thanks to this system, the tank firing range was increased up to 5 km.

## Way out is in exports

In the early 1990s, when the vehicle had been almost ready for mass production, the Soviet Union broke up and so did all intricate relationships in the defence industry. The T-90 project was finally shaped up mainly owing to the talents of Chief Designer Vladimir Potkin who saved both the new tank and Uralvagonzavod as a whole by providing job orders for many years to come.

As a result of dramatic reduction in the state defense procurement budget, the volume of new vehicle output was small and the tank procurement was terminated by the Ministry of Defence by the end of the 1990s.

With that the history of the T-90 could have come to an end, but too many things were at stake – operation and existence of the Design Bureau and renown Uralvagonzavod. Export promotion process for the new T-90S version started.

## Indian transit

The Indian military, who were looking for the basic tank for their army, showed the main interest in the vehicle. Indians requested to replace the engine with a more powerful one which was developed within the shortest possible time. Three vehicles were prepared and sent to India for testing in 1999. Strenuous work in those days affected the Chief Designer – Vladimir Potkin suddenly died in the middle of his active work. The T-90s flew to the Indian test site on the day of the tank maker's funeral.

History had never known such tank tests to which Russian tanks were subjected in India during two months. T-90s overcame the absence of roads in deserts in heavy dust pollution conditions and heat up to 53 °C. Corrective measures were taken by Russian personnel on site. T-90s withstood all tests and a record-breaking contract, worth \$ 1 billion, was signed as a result.

General D.Singh believed that T-90S constituted the second essential deterrent next to nuclear weapons, and the tailor-made tank version was named 'Bhishma' ('Terrible') after the warrior of an Indian epic.

## A 'breakthrough' solution

The Indian contact was followed by other international contracts for the Russian tank. In the 2000s, the T-90 was the most commercially successful tank in the world. In addition to India, which was still the major importer, the tank was brought into service in Azerbaijan, Algeria, Turkmenia, Uganda, Vietnam, Iraq and other countries. Customers were and are still attracted by the vehicle's exceptional reliability, fail-safety, maintainability and durability with the best value for money.

It is safe to say that the international success of the T-90 inspired a renewed interest in the project among the Russian military – it was the export version that was used as the basis for a new state defence procurement. The T-90A version was brought into service in 2005, and the first T-90M 'Protyv-3' tank (considered as a new vehicle by experts) began entering service in 2020. /RA&MG/





# UPGRADED MI-171E HELICOPTERS TO EXPORT

Rosoboronexport and Russian Helicopters, subsidiaries of Rostec State Corporation, have signed a contract to manufacture and supply a batch of upgraded Mi-171E helicopters to a foreign customer. The machines have uprated powerplants, improved avionics, and increased load-carrying capacity. The contract provides for the export delivery of the latest upgraded Mi-171E helicopters manufactured by Ulan-Ude Aviation Plant, part of Russian Helicopters Holding Company.

**O**ur equipment is distinguished by unique design solutions, proven effectiveness and high reliability. With such a set of qualities, Russian helicopters are in demand in the global market, and demand for them remains high even in the current geopolitical situation. Rosoboronexport's order book

for Russian Helicopters products now exceeds 200 billion rubles and will grow in the coming years,' said Rostec CEO Sergey Chemezov.

Mi-17 type helicopters are successfully employed in high altitude conditions in Latin American countries, in particular, in police operations against drug trafficking. There is experience of their use in arctic

conditions in Argentina, in the tropical climate of the Asia-Pacific region and in African countries.

'In 2022, the sales of Russian helicopters supplies to foreign customers through Rosoboronexport have exceeded 30 billion rubles. Most of the exported helicopters were manufactured at Ulan-Ude Aviation Plant whose share in Rosoboronexport's

order book is currently over 80 billion rubles,' said Rosoboronexport General Director Alexander Mikheev. 'Due to strong support from the government and stable receipts from foreign customers, the plant's production facilities fully meet modern world requirements and its technological capabilities are growing and developing. This makes it possible to meet market demands for production of upgraded high-tech Mi-171Sh and Mi-171E helicopters, which are leaders in their class. The plan for export deliveries of these machines in the near term exceeds 100 units'.

The upgraded Mi-171E helicopters feature an improved powerplant consisting of two VK-2500PS-03 engines. The engines offer higher power and longer service life and are equipped with a FADEC-type digital control system.

'The rotor system has undergone a major upgrade, which includes composite main rotor blades, X-shaped tail rotor with composite blades, new swash plate and reinforced trans-

mission. The helicopter has a more aerodynamically efficient stabilizer, improved tail rotor pylon and it is now possible to install both starboard and portside sliding doors. Maximum external sling payload

has been increased by 20% to 5000 kg. A state-of-the-art avionics suite provides round-the-clock use of the helicopter in any weather,' said Alexey Kozlov, General Director of Ulan-Ude Aviation Plant. /RA&MG/





# RUSSIAN MILITARY and CIVILIAN PRODUCTS at AAD 2022

Rosoboronexport, part of Rostec State Corporation, was organized Russia's exhibit at the AFRICA AEROSPACE & DEFENCE (AAD) 2022 international conference and exhibition of arms and military equipment for all branches of the armed forces. The exhibition was took place from September 21 to 25 at Air Force Base Waterkloof Centurion in Pretoria, South Africa.



**'S**ub-Saharan Africa is now among the growth leaders in the level and quality of military-technical cooperation with Russia. Rosoboronexport has been developing mutually beneficial ties with practically all the states in the region, helping them strengthen their defense capabilities, sovereignty, fight against organized crime and terrorism,' said Rosoboronexport Director General Alexander Mikheev. 'At AAD 2022, we are showcasing about 400 best Russian products for all branches of the armed forces, police and special operations units, security equipment and cyber security solutions, as well as a wide range of civilian products.'

AFRICA AEROSPACE & DEFENCE is the most important marketing event that gathers together representatives from most countries of Sub-Saharan Africa. At the AAD-2022 Rosoboronexport meet delegations from various law enforcement agencies of South Africa and regional states and provided them with information on Russian-made weapons and military equipment that are being promoted on the world market.

Rosoboronexport showed Russian-made pieces of hardware for land forces that are most in demand in Africa, including the T-90S MBT, TOS-1A heavy flamethrower system, Smerch multiple rocket launcher system, Msta-S self-propelled howitzer with a standard NATO 155 mm gun, BTR-80A and BTR-82A armored personnel carriers, various versions of the Tigr and Typhoon wheeled armored vehicles, as well as the Kornet-EM ATGM system. Small arms, including Kalashnikov AK-100-, AK-200- series, AK-12, AK-15 and AK-19 assault rifles, and body armor facilities were spark a lot of interest.

Russian civilian products that are popular in the region attracted the attention of delegations from African States' land forces, police and special security services, various civil and municipal agencies. Rosoboronexport showcased a wide range of automotive and special-purpose vehicles, engineer and road-building equipment, tactical vehicles for personnel transportation. In addition, the company presented its competencies in organizing manufacture of this equipment in customer countries.

There was interest from foreign air force representatives to the MiG-35D multifunctional front-line fighter, Yak-130 advanced combat trainer, Mi-17 military/transport helicopters, Mi-35 transport/attack helicopters as well as the Ka-52E and Mi-28NE attack helicopters. Considering close attention of the world market to unmanned aerial vehicles, Rosoboronexport exhibited the Orion-E reconnaissance/strike unmanned aircraft system (UAS), Orlan-10E multifunctional UAS, and the latest Kub-E loitering munition system.



Rosoboronexport offered its partners a wide range of air defense assets of various range to protect their airspace, including the S-400 Triumf air defense missile system, Buk-M2E and Tor-M2E surface-to-air missile (SAM) systems, ZU-23 self-propelled anti-aircraft gun (SPAAG) system, Pantsir-S1 self-propelled anti-aircraft gun/missile (SPAAGM) system, Verba and Igla-S man-portable air defense systems (MANPADS). The assets displayed can be used to build a layered air

defense system. They are also effective against unmanned aerial vehicles of various classes. Along with this, Rosoboronexport exhibited the Repellent-Patrol and RB-504P-E electronic warfare systems designed to counter small-size UAVs.

Rosoboronexport demonstrated BK-9, BK-10, BK-10M and BK-16E high-speed landing and assault boats to delegations of African navies. In addition, the company showed its partners the Karakurt-E missile corvette and the Project 22160 patrol ship. /RA&MG/





# RUSSIAN SECURITY TOOLS AND SOLUTIONS

Rosoboronexport JSC (part of Rostec State Corporation) was organized a joint exhibit of Russian military products at the 26th International Homeland Security Exhibition, Interpolitex 2022, which was held in October in Moscow. Company showcased a wide range of Russian security tools and solutions.

**T**he exhibit presented modern small arms, including Kalashnikov AK-200-series, AK-12 and AK-15 assault rifles, as well as other weapons intended for police and special forces units. Among the displayed weapons were the CP.1M self-loading pistol, PP-2000 and CP.2M submachine guns, upgraded CP.3M small-sized assault rifle and the ADS amphibious rifle capable of firing underwater that have high export potential. The guests of the exhibition were also be shown the VSSM upgraded special sniper rifle, GM-94 magazine grenade launcher

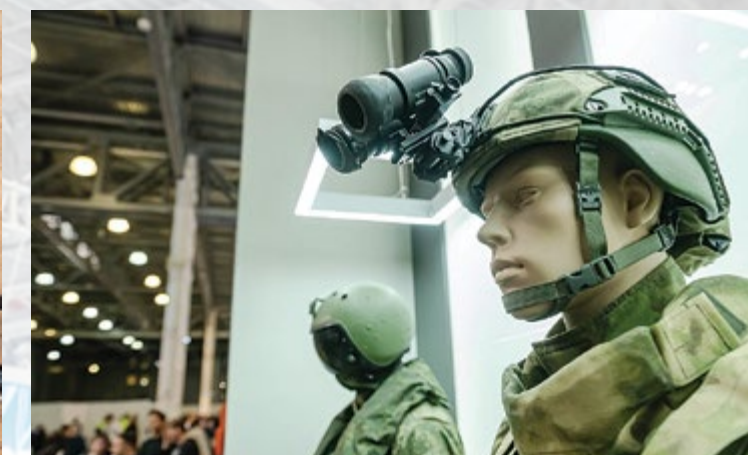
and the 12.7 mm SHAK-12 heavy assault rifle system.

'The Russian small arms presented by Rosoboronexport are very popular among the law enforcement agencies of our partners in the Middle East, Africa, the Asia-Pacific region and Latin America. They have proven themselves in the professional environment – among special forces units, anti-terror groups and the police,' said Alexander Mikheev, Director General of Rosoboronexport. 'In addition, we will show a wide range of security equipment, civilian weapons, police and guard gear, we will exhibit a number of new prod-

ucts, including the new ORSIS 12.7 mm sniper rifle. We will offer various solutions for cybersecurity, installation and premises security and urban environment monitoring.'

The ORSIS 12.7 rifle exhibited at Interpolitex for the first time, this is a new-generation high-precision sniper rifle suitable for counter-sniping and engaging lightly armored vehicles.

Rosoboronexport also showed other novelties from Russian defense manufacturers, for example, the KIB-10 body armor kit and the SPARTA 10 ultralight tactical shield. Another debut at Interpolitex was the



IT-ONV-01 wide-angle night vision driver goggles for driving combat vehicles at speeds up to 90 km/h with the headlights off. The goggles also enable the user to conduct visual surveillance, navigate the terrain, and operate with small arms and grenade launcher sights.

In addition, diverse equipment and gear for security structures, police and special forces units were on display at the Rosoboronexport's stand. Among the items on display were communications equipment, electroshock weapons, metal/explosive/toxic substance detectors, imaging infrared attachments and sights, bulletproof vests, tactical helmets and drone countermeasures.

The company also showed the guests of the exhibition Russian developments in the field of small-arms training of units and individual servicemen, including the Rubezh and TEST-E training simulators, IED detectors/jammers and mine-clearing systems, for example, URAN-6 multifunctional mine-clearing robotic system, which has been tested in real combat conditions. /RA&MG/





# LAAD 2023

## The return of the largest Defence and Security fair in Brazil under new management

The 13th edition of LAAD Defence & Security, the largest and most important defense fair in Latin America, will take place from April 11 to 14, 2023, in Riocentro, Rio de Janeiro. The big news for the administration, which is no longer for the British Clarion and went to Creative Events, a Brazilian company by Sergio Jardim, which has been in front of it since 2007. Sergio Jardim answered a few questions about LAAD 2023.



**- Mister Jardim, in each new edition of LAAD we see a significant expansion of the exhibition area and number of exhibitors, what are your expectations for LAAD 2023?**

- We expect that LAAD 2023 will repeat the success of LAAD 2019 and bring a greater number of national and foreign exhibitors. To a large extent this is due to the interest that Brazil arouses in the defense and security industry due to the opportunities and challenges that the country presents in this area.

**- What are the new features planned for this edition?**

- The resumption of LAAD shows overcoming the challenges of the

pandemic and the opportunity to bring together, in a face-to-face event, the Armed Forces of countries in the region with a defense and security industry that demands the opportunity to launch new products and to meet new customers.

**- On the subject of Covid-19, which security measures will be implemented in this edition?**

- Creative Events will follow the protocols required by the authorities at the time of the show and the additional protocols established by the events industry. We can mention measures that are being adopted today but that may be updated in April 2023: adjustment and access control to meet new capacities, proof of vaccination certificate, expansion of the medical

center, specific signage, preferential use of digital media, Alcohol-based hand sanitizers, booths with more open spaces, individual packages, among others.

**- Brazil, and several countries in the region, have been increasing their Armed Forces processes modernization, how can LAAD contribute to this?**

- LAAD brings to Brazil and countries in the region the opportunity of face-to-face contact with providers of products, services and technologies, which can be used to modernize their means. The exhibited items represent the state of the art in technology in this industry.

**- The public security and civil defense sector has also undergone major changes, with changes in procedures and the acquisition of new materials, how do companies see these movements?**

- LAAD brings many exhibitors working in the public security and civil defense sectors, displaying products, services and technology specifically targeted at these sectors. Companies in this industry are prepared to exhibit the modern means that the sectors demand.

**- Will LAAD's management changes benefit the event participants?**

- The presence of Clarion in Brazil, a multinational company with more than 200 annual events in 20 different industries, allowed us to have contact with world-class techniques and tools in the organization of fairs. Creative Events, as a Brazilian company run by Brazilians, will use this background and it will be in a better position to provide agile and dedicated service, to build and guide the future of our fairs.

**- What prospects do you have for the future of LAAD?**

- LAAD plays a fundamental role in integrating the exponents of the Brazilian and international defense and security industry with the officers of the Armed Forces of the region, thus allowing periodic updates on products, services and technologies. We look forward to continuing to meet this important

demand and improving with each future edition of LAAD Defence & Security.

**- What are the main products that will be on display?**

- LAAD brings a wide range of products. Among others, equipment for communications, radars, personal protection, weapons for personal use, armor, missiles, airplanes and helicopters, combat and troop transport vehicles, ships and vessels, military engineering, integrated control, training and simulation systems, uniforms, air defense systems, satellites, equipment for special forces, fire systems, optical systems, parachutes, etc.

**- How is the role of Defense and other authorities in LAAD?**

- The Ministry of Defense and the Armed Forces have given institutional support to the fair since its first edition and invite official delegations from more than 100 countries to attend the event. The Minister and the Commanders of the singular forces maintain offices at the fair. Creative Events works with Defense to operationalize the fair's strategic planning, bring exhibitors and invite visitors. The Ministry of Justice and the Councils of law enforcement agencies also provide institutional support to the event.

**- What is LAAD's most important program?**

- A fundamental part of the fair is the Official Delegations Program, which organizes the visit of official delegations, from the confirmation of invitations and use of the official hotel, to support in visiting companies at their stands during the days of the event. LAAD brings 183 official delegations from 81 countries, totaling around 400 official delegates. The same team also organizes the presence of 350 police authorities.

/RA&MG/





## INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES

In 2023

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'GUIDE' №01 (73)	January 20th	<b>AERO INDIA 2023</b> (February 2023, India, Bangalore)
'GUIDE' №02 (74)	February 05th	<b>IDEX 2023 / NAVDEX 2023</b> (20-24.02.2023, UAE, Abu Dhabi)
'GUIDE' №03 (75)	March 25th	<b>LAAD 2023</b> (11-14.04.2023, Brazil, Rio de Janeiro)
'GUIDE' №04 (76)	April 10th	<b>FAMEX 2023</b> (26-29.04.2023, Mexico, Mexico)
'GUIDE' №05 (77)	April 20th	<b>DEFEX 2023</b> (09-11.05.2023, Greece, Athens)
'GUIDE' №06 (78)	April 20th	<b>IDEF 2023</b> (09-12.05.2023, Turkey, Istanbul)
'GUIDE' №07 (79)	May 05th	<b>SITDEF 2023</b> (18-21.05.2023, Peru, Lima)
'GUIDE' №08 (80)	May 10th	<b>LIMA 2023</b> (23-27.05.2023, Malaysia, Langkawi)
'GUIDE' №09 (81)	May 20th	<b>KADEX 2023</b> (07-10.06.2023, Kazakhstan, Nursultan)
'GUIDE' №10 (82)	June 07th	<b>IMDS-2023</b> (21-25.06.2023, Russia, Saint Petersburg)
'GUIDE' №11 (83)	June 07th	<b>PARTNER 2023</b> (27-30.06.2023, Serbia, Belgrade)
'GUIDE' №12 (84)	July 01th	<b>MAKS-2023</b> (18-23.07.2023, Russia, Moscow)
'GUIDE' №13 (85)	July 25th	<b>ARMY 2023</b> (14-20.08.2023, Russia, Moscow)
'GUIDE' №14 (86)	September 08th	<b>SEOUL ADEX 2023</b> (19-23.10.2023, Korea, Seoul)
'GUIDE' №15 (87)	September 28th	<b>BIDEC 2023</b> (October, 2023, Bahrain, Manama)
'GUIDE' №16 (88)	October 21th	<b>Dubai Airshow 2023</b> (12-16.11.2023, UAE, Dubai)
'GUIDE' №17 (89)	November 12th	<b>Expodefensa 2023</b> (27-29.11.2023, Colombia, Bogota)
'GUIDE' №18 (90)	November 20th	<b>EDEX 2023</b> (04-07.12.2023, Egypt, New Cairo)

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