

# INTERNATIONAL MILITARY & NAVY GUIDE

Special analytical export project of the United Industrial Publishing

№ 02 (55) 2021, Special Edition for Middle East

## **ROSOBORONEXPORT**

*Exclusive state  
intermediary agency*



.11

## **NITEL and ALMAZ**

*Mobile radar to  
detect stealth aircraft*



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## **GNPP REGION**

*Developer of unique  
precision weapons*



.20

## **GLOBAL LEADER**

*NIMI presents  
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## Defense Technologies for Gulf States and Middle East



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### EDITORIAL



#### IDEX & NAVDEX 2021: stronger than COVID

As it happens, IDEX & NAVDEX 2021 were the first major world defense exhibitions in the context of the coronavirus. And the very hosting of these exhibitions is already a sign of progress towards victory. Thank you to everyone who believes! Thank you to all those who, against all odds, are working for the future. These exhibitions in Abu Dhabi are such a case in point.

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

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

One can predict raise of defense means market in times like this. But together with developing of defense technologies in order to safety, rivalry among sellers of weapons and defense systems increases in order to achieve such goals as increasing profits and market share. IDEX & NAVDEX 2021 present in Abu Dhabi the best world (Russian also) military innovations for global market, which are the undisputed world leaders on price and quality in their segments.

These exhibitions show that it is not serious about how many weapons you have, but quality and possibilities of every single one of them is fact what leads to victory on the battlefield and on the global market. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With 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 IDEX & NAVDEX 2021 Russia continues the policy of open partnership with Gulf States and Middle East. Russia has a wide product line that meets all the needs of this region and ready propose the best technology and the best price offers.

**Valeriy Stolnikov**

4TH GENERATION  
COMBAT GEAR

Rostec State Corporation as well as a number of other enterprises, have begun research work to create combat equipment for the soldiers of the future. Development is planned to replace the third generation Sotnik gear.

Concern Kalashnikov and the Central Scientific Research Institute of Precise Mechanical Engineering as many other Rostec State Corporation institutions will participate the R&D project, and they will closely study advanced combat gear used by various armies of the world, determine prospects for the development of combat equipment, and establish the full range of upcoming research, development and technological research necessary for creating a new generation of equipment.

The ultimate goal will be the formation of an interdepartmental comprehensive target program 'Military gear development for 2035'.

'Rostec holds high competencies in the creation of advanced weapon systems. The new generation gear will consist of a fundamentally new set of technology, including the latest achievements of the Russian defense industry, including robotic equipment and integrated systems for exchanging information. The creation of such equipment requires a lot of scientific research. Today we have started the first stage of development – the definition of tactical and technical requirements. The corresponding task has already been received from the Ministry of Defense,' said the industrial director of the State Corporation Rostec Bekkhan Ozdov.

By the end of 2020, Rostec had delivered more than 300,000 second-generation Ratnik combat gear outfits. Currently the State Corporation is developing the third-generation Sotnik outfit, several of its elements are already undergoing preliminary tests.

## Interactive Assembly Complex

*An interactive complex of technological processes for assembling aircraft has been launched at the production sites of the Russian Aircraft Corporation MiG, which is part of the military aviation division of United Aircraft Corporation.*

The platform allows for detailed visualization of technological processes, storage and unification of unique data on aircraft assembly into a single database. With the introduction of this system, the corporation will complete the transition from the use of technological maps in paper form to electronic sources of information. Within the framework of the complex, a scheme of working instructions is used which allows to understand step-by-step the process of assembling an aircraft. With the help of the new system, employees can quickly familiarize themselves with materials structured by topics of reference books, view photo and video files, as well as study drawings and 3D models of all MiG aircraft that are currently in production.

'Assembling an aircraft is a complicated process. This interactive



complex plays a significant role in raising the level of qualifications of personnel, training young specialists remotely and directly at our facilities. If a plant employee is faced with the task of assembling a certain unit, he can at any time turn to the interactive system to clarify the necessary details. This will significantly reduce

the likelihood of any defects', said Managing Director of MiG Andrey Gerasimchuk.

The hardware part of the complex consists of a central server, user workstations in the corporate network and interactive public access stands. Employees can connect to the system from any corporate site.

## 'Smart' Target for Trainin

*Techmash Concern, part of Rostec State Corporation, has created an acoustic non-contact target complex that analyzes the velocity and coordinates of a bullet or projectile flight and transmits data on hits and deviations to a computer screen. The development increases the effectiveness of shooting training and the accuracy of firing adjustment.*

The complex is designed for firing small arms with 5.45 to 12.7 mm caliber, as well as shells of 30 mm caliber. The installation records the results of firing at a rate of up to 200 shots per second. When shooting in bursts, the average hit point is calculated.

'This new target technology has no analogues in Russia. Unlike existing designs, it supports wireless communication between sensors and the operator at a distance of a kilometer. Its characteristics make it possible to obtain information about shots' effectiveness practically instantly and adjust fire, focusing on the equipment data. Thus, the complex increases the convenience and efficiency of training. Such opportunities



will undoubtedly be of interest to the military and athletes', Rostec Weapons division stated.

In the future, it is planned to make the complex more mobile –

this will increase the convenience of transportation and the speed of installation and will also allow the innovation to be used in various fields and climatic conditions.

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## Organizers



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### NEW PARACHUTES FOR SPECIAL FORCES

The Technodinamika holding of Rostec State Corporation has started supplying new 'Stayer' tactical parachute systems. The technology is intended for special-purpose units jumping from aircraft speeds of up to 350 km/h and can be used in extreme cold. Stayer is a special-purpose parachute system of the 'wing' type. It allows to jump at altitudes from 700 to 10,000 meters with a maximum flight weight of up to 180kg. In 2020, a group of Russian paratroopers used the new parachutes in harsh Arctic conditions, making a group jump in the Far North for the first time in world history from the lower boundary of the stratosphere – from a height of 10,000 meters above the Franz Josef Land archipelago. The parachute allows jumping at an aircraft speed of up to 350 km/h with an additional load of up to 50kg. The wing-type system has increased control maneuverability and significantly expands the capabilities of Russian special forces to perform tactical tasks. Stayer was developed by specialists of JSC Polyot of the Ivanovo parachute plant of the Technodinamika holding. The creators of the system were awarded with departmental awards 'For Strengthening the Combat Commonwealth'. 'The development of the Stayer parachutes was carried out in the interests of the Ministry of Defense. The system has no analogues in the Russian market, has unique capabilities and has proved its reliability during exercises. Stayer has been put into service and the first systems have already been sent to the troops', commented Igor Nasenkov, General Director of the Technodinamika holding.

### ELECTRIC MOTOR TO PROTECT TROPICAL HELICOPTERS

The Technodinamika Holding of Rostec State Corporation has developed an electric motor for use in a dust protection device for tropical versions of helicopters. The device was developed as part of the import substitution program and the first prototype has already been submitted for testing. The electric motor is designed to operate in a dust protection device that protects the engine from dust and sand when flying at ultra-low altitudes. The device is intended for installation on Mi-38 helicopters and various modifications of the legendary Mi-8, capable of operating in tropical climates and in desert conditions. 'We plan that this technology will replace electric motors of foreign-made dust protection devices. The main customers of such products are African countries, but I am sure that this development will also be in demand in the domestic aviation market and will reduce dependence on imported components', commented Igor Nasenkov, General Director of the Technodinamika holding.

### Su-35S Multipurpose Fighter Jets

*The Sukhoi Company of United Aircraft Corporation has handed over to the Russian Ministry of Defense three Su-35S multipurpose fighters of the 4++ generation. The aircraft were built at the Komsomolsk-on-Amur aircraft plant named after Yuri Gagarin, a branch of the Sukhoi company, and were sent to permanent airfields of the Russian Air Force.*

'We have completed the implementation of the next long-term contract for 50 Su-35S to the Ministry of Defense. Komsomolsk-on-Amur aircraft plant is one of the most modern industrial sites in the United Aircraft Corporation, which has invested in the development and modernization of production capacities. This allows us to fulfill our obligations to customers in full and on time. The plant continues to execute state defense orders and is well prepared for future development', said General Director of United Aircraft Corporation and General Director of Sukhoi Yuri Slusar.

As a reminder, within the framework of the Army-2020 forum,



United Aircraft Corporation signed a number of long-term contracts for the supply of the latest aviation equipment for the Russian Ministry of Defense, including Su-35S fighters. The Su-35S has an extensive

range of possibilities over land and water. This aircraft and its associated technologies are distinguished by high maneuverability, a wide range of weapons and 'intelligent' crew support.

### Production of Ropeway Transport Systems

*RT-Business Development, a subsidiary of Rostec State Corporation, and the international manufacturer of ropeway equipment Bartholet Maschinenbau AG, with the participation of private investors, will create a joint venture RT-Bartholet. The new structure will become the first federal player in the ropeway transport systems market with localized production in Russia.*

RT-Bartholet will build a high-tech plant for the production and assembly of ropeway equipment in Moscow at the Technopolis special economic zone. By the end of 2021, it is planned to launch the first production line with the creation of more than 150 highly qualified jobs. The joint venture plans to reach full production localization in Russia by 2022. The total investment of the partners in the development of Russian production will amount to up to 2 billion rubles.

'Ropeway systems are actively developing around the world as a safe, environmentally friendly and cost-effective form of public transport. The Russian ropeway market has great potential both in large cities, where it is required to reduce traffic and increase residents' mo-



bility, and in regions where ski and tourist resorts are developing', commented Alexander Nazarov, CEO of RT-Business Development.

According to Bartholet, the current market for potential ropeway projects in Russia is estimated at over 40 billion rubles.

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### PISTOL ASPID RG120 AND RG120-1

The Central Scientific Research Institute of Precise Mechanical Engineering of the State Corporation Rostec will hand over the 9x19 RG120 Aspid sports self-loading pistol and its RG120-1 modification for approbation to law enforcement agencies and shooting clubs. The feedback received will help to refine the weapon and successfully pass the tests. The approbation stage is necessary to familiarize potential consumers with the combat, ergonomic and operational characteristics of the pistol. It precedes the preliminary and acceptance testing of sporting weapons.

'Aspid' recently passed certification and confirmed its compliance with all regulatory requirements. Now we can transfer samples of the pistol to professional shooters – to the clubs of the Federation of Practical Shooting and a number of law enforcement agencies. The comments received will be included in the design documentation to refine the weapon. By the stage of preliminary tests, The Central Scientific Research Institute of Precise Mechanical Engineering will assemble pistols, where all reviews will already be taken into account,' said Bekkhan Ozdov, industrial director of the weapons complex of Rostec State Corporation.

'Aspid' is included in the famous 'snake' line of pistols along with the 'Udav' (Boa) and 'Poloz' (Whipsnake). It can be used in competition in three practical shooting classes: 'standard', 'lightweight' and 'serial'. The pistol for the 'standard' class (RG120 modification) is equipped with a magazine for 22 cartridges, for the 'serial' and 'lightweight' (RG120-1 modification) – for 18 cartridges. At the same time, the lightweight 'Aspid' received mounts for a collimator sight, and the serial one is equipped with a Picatinny rail – a rail adaptor system for sights and additional equipment.

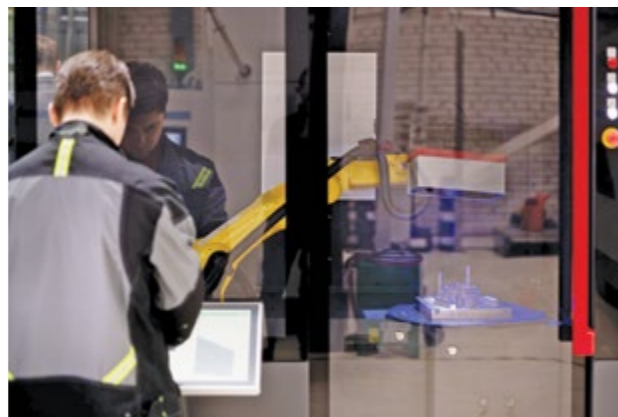
Modifications RG120 and RG120-1 also differ in that the RG120-1 does not have external mechanical safeties, all safeties are internal, automatic. This allows you to instantly get the weapon out of the holster, without fear of catching on something protruding parts. The saved fractions of seconds can improve the result of the athlete. All modifications will receive special overlays on the pistol grip, which will allow the weapon to be adjusted to the individual shooter's grip. Depending on the configuration, the weight of a pistol with an empty magazine will be from 800 to 1100 grams. The warranty life of the pistol is at least 25 thousand rounds, and the magazine's is at least 7 thousand rounds. The weapon can be operated at temperatures from minus 30 to plus 50 degrees.

### Additive technologies

*The Center for Additive Technologies of Rostec State Corporation has put into operation 24 new pieces of equipment for the manufacture of aircraft engine parts using industrial 3D printing. This will increase production by 261% in 2021. The center also received the status of a full-cycle service company, which allows organizing serial production of products for the latest domestic aircraft engines, including the PD-14.*

The new equipment includes SLM metal powder printing units. This is a technology based on the complete melting of particles, followed by the creation of monolithic parts. This technology minimizes the risk of microcracking caused by porosity of structures and increases the strength of the product in comparison with traditional casting processes.

'Additive technologies can reduce costs and reduce parts' weight by up to 50% while maintaining strength characteristics. The use of components made by industrial 3D printing in aircraft engines makes it possible to accelerate development and production, as well as improve the characteristics of domestic aircraft. Today, the Center for Additive Technologies is one of the 20 largest enterpris-



es of its type in the world alongside projects of the world's largest aircraft manufacturers. Due to the provision of new equipment, the design capacity of the Center for Additive Technologies increased by 261% and the enterprise acquired

the status of a full-cycle service company. At the new facilities, we plan to produce components of the latest Russian aircraft engines by serial methods,' said Vladislav Kochukov, General Director of Rostec's Center for Additive Technologies.

### The world's first multi-purpose ATGM

*KBP Instrument Design Bureau (part of High Precision Weapons holding company of Rostec) has started developing the world's first multi-purpose anti-tank guided missile system (ATGM), which can effectively shoot down drones, announced the Industrial Director of the Rostec State Corporation, Bekkhan Ozdov.*

There are currently no other anti-tank systems in service anywhere in the world that would be capable of reliably engaging unmanned aerial vehicles, because of their small size, maneuverability and low contrast for targeting in the thermal spectrum. Certain brands of ATGMs can shoot down large and low-speed aerial targets with sufficient heat radiation, such as helicopters.

'KBP has started developing new ATGMs. The new design is no longer solely a highly specialized anti-tank weapon, but a multipurpose defensive and assault weapon capable of effectively hitting both traditional targets such as tanks or armored vehicles, but also a whole range of previously unattainable targets such as unmanned aerial vehicles,' said Ozdov, without specifying the name



of the new weapon system. The new missile will combine both thermal and optical seeker technology, completely unique for any other ATGM designs. 'New homing technology with TV-thermal imaging is being created for the new system. The new missile will operate on fire-and-forget principle,' added Ozdov.

High Precision Weapons holding has also made a parallel announcement that KBP is working to improve the technology of manufacturing warheads for ATGM missiles. In particular, the new missiles will have come with new and improved compositions of explosives.

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## PRELIMINARY TESTS

The 'Lotos' self-propelled artillery gun developed by the Central Scientific Research Institute of Precision Engineering (TsNIItochmash) is undergoing preliminary tests. The combat vehicle for airborne forces will travel over 600km, fire 300 rounds and overcome various types of obstacles. The pre-test program includes over 80 items making it possible to determine and evaluate the tactical, technical and operational characteristics of a prototype 120-mm gun and to develop recommendations for conducting state tests. 'Lotos will demonstrate its work in motion, afloat and while landing. Of the 600km test route, 50% will be on dirt roads, 30% on cobblestone and gravel roads, and 10% will be off-road. The tests will make it possible, among other things, to evaluate the capabilities of the self-propelled gun to overcome various obstacles', said Bekkhan Ozdov, industrial director of Rostec. During the firing tests, checks will be made of the maximum and minimum range and accuracy of fire on the ground, accuracy of direct fire, and rate of fire with various types of ammunition. 'Lotos' has a mass of no more than 18 tons, maximum speed – 70 km/h, engine power – 450 hp, cruising range – not less than 500 km. The combat crew consists of four people. Rate of fire is 6-8 rounds per minute. The firing range is up to 13 km.

SPRUT-SDM1  
IN SUBTROPICS AREA

The Sprut-SDM1 light amphibious tank for airborne troops, created by the Volgograd Tractor Plant (VgTZ) and Kurganmashzavod, which are part of the High-Precision Weapons holding of Rostec State Corporation, have successfully passed state tests. During the check, the military equipment demonstrated high navigability in the Black Sea and proved its reliability afloat. Tests have confirmed that the machine is capable of overcoming water obstacles without preparation when the sea rough, to fire afloat and easily mount an unprepared shore. 'Given its purpose, this machine must meet very serious requirements. During state tests, the light tank underwent extreme checks at sea, in central Russia and the subtropics, where the air temperature reached +40 degrees Celsius. All tests were passed successfully. Low temperature tests are scheduled for early 2021. Sprut-SDM1 is primarily intended for Russian paratroopers. It can be expected that the capabilities shown by Sprut will interest foreign customers as well', said Bekkhan Ozdov, industrial director of the armaments complex of Rostec State Corporation. Each stage of inspections in different conditions also provides for shooting tests which allow to start serial production of the machines.

## New Regional Passenger Aircraft IL-114-300

*On December 16th, 2020, a new regional passenger turboprop aircraft IL-114-300 made its maiden flight at the Zhukovsky airfield. Aircraft developer is Aviation Complex named after S.V. Ilyushin (the main enterprise of the Transport Aviation Division of UAC (United Aircraft Corporation) within the Rostec State Corporation).*

The flight was performed by an experienced crew consisting of PJSC 'IL' Chief Pilot, 1st Class Test Pilot, Hero of Russia Nikolai Kuimov, 1st Class Test Pilot Dmitry Komarov, and 1st Class Flight Test Engineer Oleg Gryazev.

During the flight, the flight crew checked power plant operation modes, aircraft stability and controllability, as well as the operation of its systems.



'The first flight of the IL-114-300 is the result of the excellent work of tens of thousands of people – researchers, engineers, specialists – working in the design bureau and at the plants of the United Aircraft Corporation, at the enterprises of our suppliers and partners. The development of the new regional turboprop aircraft opens up new prospects for the Russian civil aircraft industry,' said Yuri Slyusar, General Director of United Aircraft Corporation.

## Klimov presents design of VK-1600V engine

*The JSC Klimov Company of the United Engine Corporation has presented the design of the new VK-1600V engine for Ka-62 helicopters. The engine design was presented to a committee which confirmed that the submitted VK-1600V meets the requirements for engine airworthiness and environmental protection.*

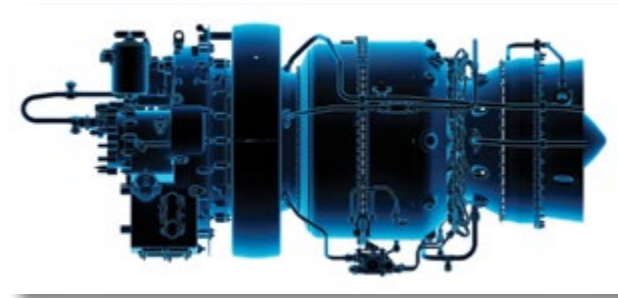
Consideration of the new engine by the committee is an important stage of development ahead of planning the certification tests. The prototype commission also green-lighted the automatic regulation and control unit for the VK-1600V – the BARK-15V, developed at JSC Klimov.

The task of the commission was to review the design of the products to determine the scope and methods of carrying out certification work and testing in accordance with the current regulatory documents. The engine model was presented in the form of an electronic 3D model.

'We have passed an important stage in the process of creating a new

engine. It is noteworthy that in difficult conditions of restrictions we fulfill all obligations and comply with all deadlines. The project has been approved by the aviation authorities and further serious work lies ahead,' said Dmitry Yurchenko, Program Director – Chief Designer of JSC Klimov.

The VK-1600V engine in the 1300-1800 hp power class was designed for the Russian-made Ka-62 helicopter. At the beginning of 2021, it is planned to transfer a demonstration engine for benchmarking tests. Certification of the VK-1600V is scheduled for 2023.



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## FIRST TWO KA-226T HELICOPTER FUSELAGES



Ulan-Ude Aviation Plant of the 'Russian Helicopters' holding has finalized the assembly line for the fuselage of the light Ka-226T helicopter. The fuselage is produced in two lines and will be transferred by the end of November to 'Technodinamika' for testing of the accident-resistant fuel system.

During the visit to Ulan-Ude Aviation Plant assembly line the Minister of Industry and Trade Denis Manturov familiarized himself with the Ka-226T assembly line. Until the end of 2020, Ulan-Ude Aviation Plant will assemble a number of stands and assemblies of the Ka-226T helicopter for static, dynamic and live tests. In particular, production testing for bird resistance and windscreen cleaning systems are underway.

The enterprise has already produced thousands of items of tooling: from small templates to large-sized assembly slipways. In September, overall fuselage assembly for the Ka-226T was completed and slipway installed which are already laid for manufactured assemblies: the bottom of the crew cabin, the central fuselage compartments, and the tail empennage beams.

The Ka-226T light multipurpose helicopter with a twin-rotor coaxial carrier system has a maximum take-off weight of 3.6 tons and is capable of carrying up to 1 ton. The Ka-226T is the first aircraft in the domestic helicopter industry which was developed entirely digitally without the use of paper drawings. This can significantly reduce risks and costs for both the development of the helicopter and for any subsequent modernization of the machine.



## Russian Army Receives new 'Alligator' Helicopters

*Arsenyev Aviation Company 'Progress' named after N.I. Sazykina of the Russian Helicopters holding handed over to the Ministry of Defense of the Russian Federation all the Ka-52 Alligator combat reconnaissance and attack helicopters scheduled for delivery in 2020 in accordance with the terms and conditions of the state contract.*

In addition, the company is currently working on the modernization of the Ka-52 helicopter in conjunction with JSC NCV Mil and Kamov design bureaus.

'This year was challenging, first of all, from the point of view of the epidemiological situation. Despite the difficulties in the pandemic, we managed not only to fulfill all our obligations under the state contract on time, but also to lift our first modernized Alligator, the Ka-52M, into the sky', said Yuriy Denisenko, Managing Director of 'Progress'.

The new Ka-52M is equipped with an upgraded optoelectronic system with an increased target detection and recognition range and a new digital drive, which will improve the accuracy of cannon firing. The upgraded Ka-52 also received a new radar system with an active phased antenna array and a long-range guided missile.



The Ka-52M main rotor blades are equipped with a more powerful heating element, which will allow the aircraft to operate over the entire temperature range, including Arctic conditions.

The helicopter is equipped with landing gear wheels with increased bearing capacity and wear resistance, as well as lighting equipment based on LEDs. The modernized Alligator also has a new cockpit interior, which will ensure the fulfillment of modern ergonomic requirements.

## First 'Ansats' to European Customer

*Russian Helicopters has handed over the first Ansats aircraft to a European customer. The operator of the vehicle, with medical specification, is the Ministry of Internal Affairs of Republika Srpska (Bosnia and Herzegovina). This is the first aircraft handed over under a three-helicopter contract.*

Ansats aircraft for Republika Srpska are equipped with a medical module with a stretcher and a medical shelf. The cabin provides for transporting a patient and two chairs for accompanying doctors. The medical equipment includes an artificial lung ventilation system, a tele-ECG, which allows monitoring cardiac activity in real time, and other equipment for evacuating patients. The delivery set includes five seats that can be installed instead of the medical module to carry seven passengers in the cabin. The aircraft also has an active vibration damping system.

'This delivery demonstrates the competitiveness of the Ansats in the European market, and we see prospects for new orders. I am sure that other European operators will ap-



preciate the favorable cost of operating the helicopter, its versatility and reliability. Two more Ansats for the needs of the police will be transferred to Republika Srpska in 2021 and 2022, they will be ad-

ditionally equipped with searchlights, a parachute-free landing system, a winch and an external sling', said Andrey Boginsky, General Director of the Russian Helicopters holding.



# ROSOBORONEXPORT

## GREETING from Director General of Rosoboronexport to the participants and guests of the International Defense Exhibition IDEX 2021

*Dear friends,*

*On behalf of Rosoboronexport, I welcome and congratulate you on the opening of the 15th International Defense Exhibition IDEX 2021.*

*IDEX has a long history. It has been held since 1993 and is now rightly considered one of the most representative international exhibitions of weapons and security technology. Russia has always been its active participant.*

*Companies from all over the world are showcasing their products at IDEX. Rosoboronexport is proud to organize a joint display of products from Russia's major developers and manufacturers of high-tech weapons and military equipment.*

*Interest in our exhibits from Russia's permanent partners and potential customers is growing here every year. I am sure that IDEX 2021 will traditionally open new horizons in the Middle Eastern region, which is so essential to the Company from a marketing point of view.*

*In Abu Dhabi, Rosoboronexport is showcasing some of the most in-demand products in the world for all services of the armed forces. We unveil new products from our export catalog here every time – this year will not be an exception.*

*Along with the new products that offer significant export potential, Russian companies traditionally showcase at the exhibition their best selling items in the world arms market: airplanes and helicopters, air defense systems, tanks, ships. Many of them have been tested in real combat conditions. Visitors to Russia's exhibit display will see full-scale hardware here as well.*

*We are closely monitoring the trends in the international arms market, including in the Middle East. At IDEX 2021, along with displaying the best Russian weapons, we are ready to tell our partners about the diversity of forms of mutually beneficial cooperation.*

*I wish you good luck, success and fruitful cooperation!*

**Alexander Mikheev,**  
**Director General of Rosoboronexport**





# RADAR AGAINST HYPERSONIC TARGETS

JSC Rosoboronexport (part of Rostec State Corporation) has started marketing work to bring on the world market of armaments the 59N6-TE mobile three-dimensional radar, developed and produced by the JSC 'Federal Research and Production Center 'Nizhniy Novgorod Research Institute of Radio Engineering' (NNIIRT).

**T**hanks to the work of thousands of Russian researchers, designers and engineers, Rosoboronexport may offer to its foreign partners unique defence solutions, which often do not have counterparts all over the world and are in line with the newest trends in modern warfare. Today Rosoboronexport is introducing to the market a cutting edge radar, capable of detecting effectively a wide range of existing and future aerial targets, to include hypersonic targets. While developing the export version of the radar, the growing role of air defence assets for the provision of security of states was taken into account, as well as the needs of foreign customers in the expansion of the reconnaissance capabilities of their air defence

***The 59N6-TE is a radar of medium and high altitude, having a decimeter wavelength range. Apart from hypersonic targets, it also effectively detects aerodynamic and ballistic objects.***

units,' said Rosoboronexport's Director General Alexander Mikheev.

The 59N6-TE mobile three-dimensional station is an exclusively Russian-made product, which implies present-day Russian hardware components with digital processing and signal generation. It is fully solid-state and has high potential together with enhanced jamming resistance. The 59N6-TE is a radar of medium and high altitude, having a decimeter wavelength range. Apart from hypersonic targets, it also effectively detects aerodynamic and ballistic objects.

The 59N6-TE radar provides for the measurement of the range, azimuth and altitude of aerial targets. It is capable of detecting objects, flying at a speed of up to 8 000 km/h at a range of up to 450 kilometers and at an altitude of up to 200 kilometers. After detection, it exchanges radar information with C4I complexes. It operates in conditions of jamming and carries out direction finding of active noise jammers.

The station has an automatic and a semi-automatic mode of aerial targets' acquisition and tracking. In a real time

mode it may simultaneously track no less than 1 000 objects and recognize 8 classes of targets, which includes selection of anti-radar missiles and warning its own combat crew of the danger of elimination, inter alia, by high precision munitions and homing missiles. The 59N6-TE radar also includes equipment for the recognition of detected aerial targets in international radar recognition systems Mk-XA and ATC RBS.

The 59N6-TE radar set includes an antenna-hardware complex and an indicator post, placed on a standard vehicle chassis of the 'KAMAZ-6560' type. There are also options to place

the item on a single vehicle chassis, deploy it in a stationary version or to place the radar antenna system on a high tower support and other installations. Besides, the station is equipped with remote operator's work stations, which may stay at a distance of up to one kilometer from the indicator post if connected via glass fiber links, and up to 15 kilometers in case of using a radio link.

'I'm confident that in present-day conditions and with obvious prospects of hypersonic technologies, the 59N6-TE radar will take top positions in its market segment and will become an important asset for countries, which are building their own air defence systems with the account of the world trends of air attack weapons development. We rely on high demand for the new station in the countries of the Asia-Pacific region, the Middle East and North Africa,' added Alexander Mikheev. /IM&NG/

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# BK-10 ASSAULT BOATS FOR SUB-SAHARAN AFRICA

Rosoboronexport JSC (part of the Rostec State Corporation) has begun to carry out its first export contract recently signed with a foreign customer from Sub-Saharan Africa for the supply of Project 02450 fast assault boats BK-10 designed and manufactured by Kalashnikov Concern, a Rostec's member.

**T**he contract signed by Rosoboronexport was the first document for the supply of Russian-made final naval products to Sub-Saharan Africa in the last 20 years. This is an undoubted success in fostering military-technical cooperation with the countries of the region that is strategically important for Russia. We have been working long and purposefully to develop relations with them and expand our African footprint, which now covers almost the entire continent. The Russia-Africa Summit and Economic Forum, held in Sochi in October 2019, gave a strong impetus to the growth of our cooperation and its transition to a new quality level,' said Alexander Mikheev, Director General of Rosoboronexport.

The Project 02450 fast assault boat BK-10 is intended for transporting personnel, landing troops on unimproved shores, providing fire sup-

*Powered by two high performance outboard gasoline engines, the BK-10 can reach speeds of up to 40 knots. With its large-capacity fuel tanks, the boat has a cruising range of up to 400 miles without refueling. It can carry up to 10 troopers and is equipped with a metal bow platform or ramp to facilitate landing on an unimproved shore. The boat provides comfortable accommodations for the troopers and the crew: it is fitted with high-performance shock-absorbing saddle-shaped seats which can be easily and quickly dismantled if required.*

port to forces ashore, fighting piracy and terrorism, rendering assistance to those in distress. It features high speed performance and long operational range.

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The BK-10 has an armored wheelhouse and a bullet-resistant

windshield. Armored plates can be installed around the perimeter of the troop compartment to protect the soldiers. Strong engine protection bars are installed.

In addition, the boat has high firepower – up to four 7.62-12.7 mm machine guns, which significantly expands its mission area in its class.

The BK-10 may be carried by all means of transport (road, rail, air, river and sea) and used as a water-borne platform.

'The BK-10 surpasses all its closest competitors on the world market in terms of range, troop capacity and firepower. In turn, the relative simplicity of the construction technology enables Rosoboronexport to offer its partners the boat both as a final product and for licensed construction at the customer's national shipyards,' Alexander Mikheev added. /IM&NG/





# MOBILE RADAR TO DETECT STEALTH AIRCRAFT

Rosoboronexport (part of the Rostec State Corporation) has started promoting the P-18-2 Prima high-mobility 2D surveillance and acquisition radar, developed and manufactured by PJSC NITEL and PJSC NPO Almaz, to the foreign market.

**R**osoboronexport adds dozens of weapon and military equipment models to its export catalog every year. They acquire unique characteristics and set new trends in their segments of the global arms market through the efforts made by Russian scientists, engineers and designers. We are starting to promote the Prima mobile radar, which offers a unique capability to effectively detect current and emerging low-visibility targets, including any stealth aircraft, said Alexander Mikheev, General Director of Rosoboronexport and Deputy Chairman of the Russian Engineering Union.

The Prima solid-state radar is based on modern hardware components and digital signal processing and generation technology. It features high energy potential and increased immunity. The radar is designed to detect, track, locate and identify air targets of various classes and types as friend or foe in both jamming and clutter environments, take the bearing of jammers, and

feed radar data to users' automated command-and-control systems.

The P-18-2 is distinguished from most other radars available on the market by its high mobility achieved through the installation of all equipment and antenna post on one vehicle. At the same time, its crew consists of only two people who can operate both from the equipped cabin and remote workstations. The radar features a high level of automation and can be deployed and stowed within about 5 minutes.

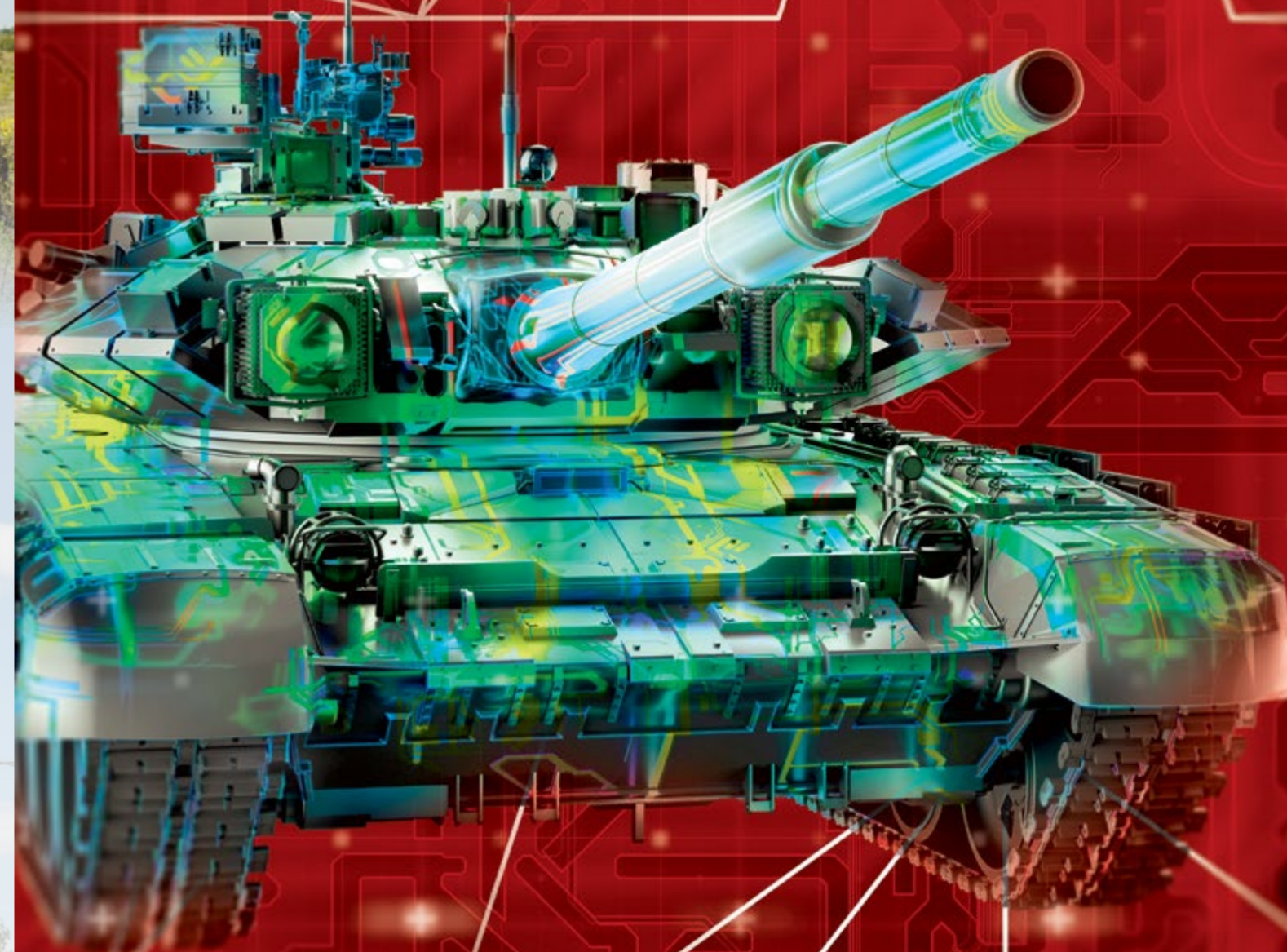
The Prima radar operates in the VHF band and is capable of detecting any aircraft, including stealth ones. Its range coverage exceeds 320 km and elevation coverage is up to 45 deg. The minimum detection range is 500 meters. The developers have introduced a number of technology solutions to ensure the radar's operation in a jamming environment, difficult terrain and in adverse weather conditions. The radar automatically detects and tracks low-speed and low-visibility targets in a clutter environment.

The radar is equipped with advanced satellite navigation equipment exploiting GLONASS/GPS signals that provide automatic positioning. It has a built-in diesel power plant and a power take-off generator, and can also be connected to a three-phase general-purpose electrical network. At the customer request, the standard diesel generating set can be replaced with a similar, including foreign-made, one. The radar's base vehicle chassis can also be replaced with a similar one.

'Russian electronics and air defense systems offer unique technical capabilities for integration into existing customer's national air defense systems, thereby significantly improving their effectiveness, which had also been taken into account in developing the Prima radar. I'm sure that a unique set of features will ensure the excellent export capacity of the radar and bring it to the leading positions in Southeast Asian, African and the Middle East markets,' Alexander Mikheev added.

/IM&NG/

## ARMY2021 INTERNATIONAL MILITARY-TECHNICAL FORUM



22-28 AUGUST  
PATRIOT EXPO

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INTERNATIONAL CONGRESSES  
AND EXHIBITIONS

In 2020 Rosoboronexport and UralVagonZavod (UVZ), both part of Rostec State Corporation, have demonstrated the combat capabilities of the 155mm Msta-S self-propelled howitzer. The demonstration of the self-propelled gun system to Middle Eastern customers took place at the Nizhny Tagil Institute of Metal Testing's (NTIIM's) Staratel Proving Ground.

'This combat vehicle has powerful artillery armament and road performance that are not inferior to modern armored vehicles. It is equipped with advanced communications, satellite navigation and surveillance systems. During the tests, the Msta-S showed excellent results in target engagement using an automated fire control and the Orlan-10E unmanned aerial reconnaissance system. I'm sure that our Middle East partners were able to see once again the advantages of the Russian military equipment,' said Viktor Kladov, Director for International Cooperation and Regional Policy at Rostec.

The 155mm Msta-S self-propelled howitzer is equipped with an automatic laying and fire control system,

Our partners have praised the combat capabilities of the new artillery system. The howitzer showed excellent results. Firings with automatic realignment were also carried out during the firing tests. Field tests showed the reliability and effectiveness of the Russian gun and substantiated the claimed specifications," said Alexander Potapov, Director General of UralVagonZavod. **/M&NG/**



№01, 22 августа 2021 года

# Главный форум!!! The Main Forum!!!



Сегодня в подмосковном КВЦ «Патриот-ЭКСПО» начинается свою работу Международный военно-технический форум «Армия» — безусловно, главный форум в жизни российского оборонно-промышленного комплекса и Вооруженных Сил страны. Форум в очередной раз собрал воедино новейшие и лучшие образцы вооружений и военной техники, ведущие пред

# International military-technical forum 'ARMY-2021' August 22-28, 2021

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

Official information analytical edition of the forum – newspaper show-daily 'ARMY-2021'

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

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

**Show-daily ARMY-2021, United Industrial Publishing**  
+7-495-778-14-47, 729-39-77, doc@promweekly.ru

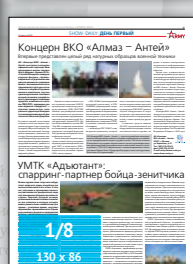
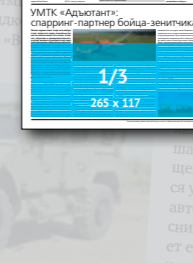
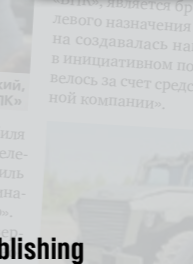
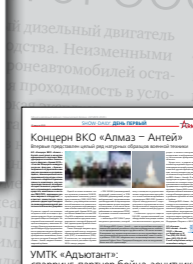
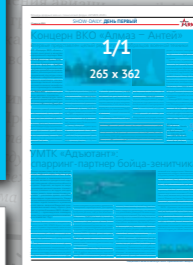
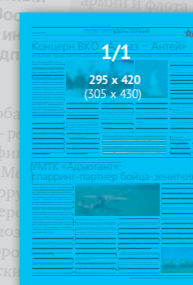
# Дорогие друзья!

Dear friends!



Just as in previous years, this major event offers an opportunity to review the latest defence technology, bringing together leading Russian and foreign experts. It is also an important platform for discussing matters related to military-technical cooperation. It goes without saying that the forum facilitates partnerships among defence agencies from various countries. After all, it is only by working together and with mutual trust that we can counter our common challenges and threats, and ensure stability and security.

The collage features a large, dark image of a missile launch with a bright plume of fire and smoke. Overlaid on this is a smaller, lighter image of a missile mounted on a rail launcher. In the bottom right corner, there is a screenshot of a website. The website has a red header with the text 'СМИ И ОБЩЕСТВО' and 'Антей'. The main headline on the website reads 'Концерн ВКО «Алмаз - Антей»' in large, bold letters. Below the headline, there is a sub-headline in blue: 'Создание ракетно-космической системы'. The website also features several smaller images and text blocks, including a photo of a missile launch and a photo of a missile on a rail launcher.



# DEVELOPER OF UNIQUE PRECISION WEAPONS

Scientific and Production Enterprise Region (GNPP Region), a Tactical Missiles Corporation company, is Russia's leading developer and supplier of sea- and air-launched precision weapons. The company regularly presents latest examples of effective weapon systems on international markets. It has created the K08BE 500-kg high-explosive glide bomb with a satellite-aided inertial guidance system, a brilliant example of the enterprise's special capabilities and unique competences.

## Enterprise's special defence role

The renowned Russian enterprise's history began in 1969, with the creation of the Research Institute of Applied Hydromechanics (abbreviated to NII PGM in Russian) as a developer of guided weapons for the Navy. Back in those days the institute was mainly involved in the development of high-speed underwater missiles and air-launched anti-ship missiles.

In 1980 NII PGM was reorganised into NPO Region (currently known as GNPP Region). Its key innovative products include precision guided and glide bombs, active protection systems for sea-surface ships and submarines, autonomous mine defence solutions, etc.

## Innovative glide bomb

GNPP Region's development of the K08BE 500 kg high-explosive glide bomb with a satellite-aided inertial guidance system is a brilliant example of the enterprise's special capabilities and unique competences. In late 2019, GNPP Region manufactured the first bomb prototypes and ran a series of successful flight tests.

The K08BE bomb is an air-released self-homing munition with a highly efficient high-explosive charge. It is intended against weapons, military equipment, military and civilian infrastructure facilities with known coordinates. The bomb can be used against fixed targets from front-line aircraft equipped with satellite navigation receivers, day and night, in any weather. It could also be used in conjunction with unmanned aerial platforms.

The bomb has an elongated cylindrical shape with a spherical nose fairing, stabilisers and wings. Structurally, the K08BE comprises the main, combat, instrument and tail sections.

K08BEs can be used against individual or group targets; when released in a series, the release intervals stand at not less than 0.1 second. The probable deflection error does not exceed 10 m.

The K08BE has superior release altitude, speed and effective range than the equivalent Western GBU-32 JDAM glide bomb.

In addition, thanks to the rational use of the aerodynamic properties and the optimal choice of detonation principle the K08BE is significantly more effective against hardened and buried targets.

## Objectively the best in its generation

The K08BE belongs to the third generation of air-released bombs. The technical concept of such munitions first emerged in the early 21st century based on the following main specifications:

- increased autonomous flight range;
- expanded envelope of release altitudes and airspeeds
- round-the-clock, all-weather multichannel application;

- launch-and-leave concept;
- minimal time spent by the platform in the vicinity of the target.

Thanks to the technical solutions implemented in the bomb its gliding paths allow for much longer effective ranges than in the case of classic ballistic trajectories, resulting in an expanded release envelope. The K08BE's area of permitted releases is several times bigger than those of earlier production munitions. This provides the platform with a broad spectrum of application opportunities and significantly reduces the probability of the platform finding itself within the range of enemy air defences.

The bomb's autonomous inertial guidance system is augmented by satellite navigation, which allows for

**Mass and dimensions:**  
length – not more than 2,840 mm  
diameter – not more than 355 mm  
mass – 505 kg  
launch altitude – up to 15 km  
range – up to 40 km  
circular probable error – up to 10 m

round-the-clock, all-weather use of individual bombs and salvos against spread targets based on the launch-and-leave principle.

The bomb's detonator can be operated by the aircraft pilot from the cockpit (with the instant and delayed detonation options), thus allowing for in-flight selection of the most optimal settings depending on the target to be attacked. /IM&NG/



**State Research and Production Enterprise Region JSC**

Tactical Missiles Corporation JSC

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E-mail: gnppregion@sovintel.ru

Website: <http://gnppregion.ru/>

# NIMI AT IDEX 2021

At IDEX 2021 trade fair in Abu Dhabi, UAE, JSC NIMI named after V.V. Bahirev (Technodinamika subsidiary of Rostec Corporation managed by Tecmash Concern) is presenting a broad range of ammunition for tank, field and naval artillery.

**A** special place in the exposition will be traditionally occupied by two new tank rounds with armour-piercing submunitions, both debuting in the UAE: the 125-mm 3VBM23 Svinets-2 round and the Mango-M, an experimental upgrade on the 3VBM17 round. As compared to the 3VBM17 round, two new products feature 20% higher armour penetration performance, which allows for engaging virtually all types of foreign armour and military equipment from more than 2 km away.

In addition the 57-mm 53-UOR-281U round with a fragmentation tracer debuting at IDEX. The round is intended against aerial targets, unarmored vehicles, exposed personnel, open weapon emplacements, light-weight fortifications and sea-surface targets.

This round can be used in conjunction with the new 57-mm cross-service weapon system in which a common combat module is mounted on both ground vehicles and naval ships.

Says Director General Nikolay Semenenko: 'The UAE historically demonstrates an interest in our prod-

ucts, not least because the country's army operates a significant number of Russian-made infantry fighting vehicles. With military equipment becoming increasingly sophisticated and its protective characteristics increasing, upgrading and improving the ammunition is a critical objective. We offer our foreign clients both ready-to-operate products meeting their demands and production localization options. We are also prepared to extend the service life of previously supplied systems by way of assessing their condition and carrying out repairs as required.' /IM&NG/

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**Nikolay Semenenko**

# ANNUAL PHOTO ALMANAC FOR MILITARY-TECHNICAL COOPERATION

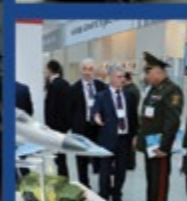


Achievements and prospects



## RUSSIAN MILITARY TECHNICAL COOPERATION ANNUAL PHOTO REPORT

Main partners and projects



Special directions of development



New export products

# DEFENSE MASTERPIECES

## Russian High-Precision Weapons Holding

In February this year, the High-Precision Weapons Holding (a part of the Rostec Corporation) was celebrated the 12th anniversary of its work on the global market. Years by years Holding plays an increasingly important role on the world arms market. The holding is the Russian largest developer and manufacturer of the most modern and innovative high-precision weapons. The importance and potential of the Russian holding increase worldwide as well: On a scale of the top 100 weapons manufacturers in the world, the Stockholm International Peace Research Institute (SIPRI) rates the 'High-Precision Weapons Holding' from Russia at 39.

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

by an overall production and supply increase rate.

The High-Precision Weapons Holding was founded in 2009. The holding consists of a number of largest leading defense enterprises that are well known on the world arms market. It is sufficient only to mention such brands as the Shipunov KBP Instrument Design Bureau, the Kovrov Electromechanical Plant, the Plant named after V.A Degtyaryov, the VNII 'Signal', the Kurganmashzavod, the Central Research Institute of Automation and Hydraulics and others. Most of them are national and international leaders in their segments.

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

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



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





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The holding invests much into the development of promising designs of weapons and military equipment, enhances and augments its development and production potential, and invests in the development of models of tomorrow.

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

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



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

Middle East states are always been and remains the most important strategic partner of the High-Precision Weapons Holding. The participation of the holding's enterprises in IDEX-2021 is an important stage of friendly and mutually beneficial cooperation in defence area.

/IM&NG/

***High-Precision Weapons Holding' belongs to the top 10 world's defensive rankings by an overall production and supply increase rate.***

***The holding invests much into the development of promising designs of weapons and military equipment, enhances and augments its development and production potential, and invests in the development of models of tomorrow.***



# RUSSIAN WEAPONS THROUGH THE EYES OF THE MIDDLE EASTERN MEDIA

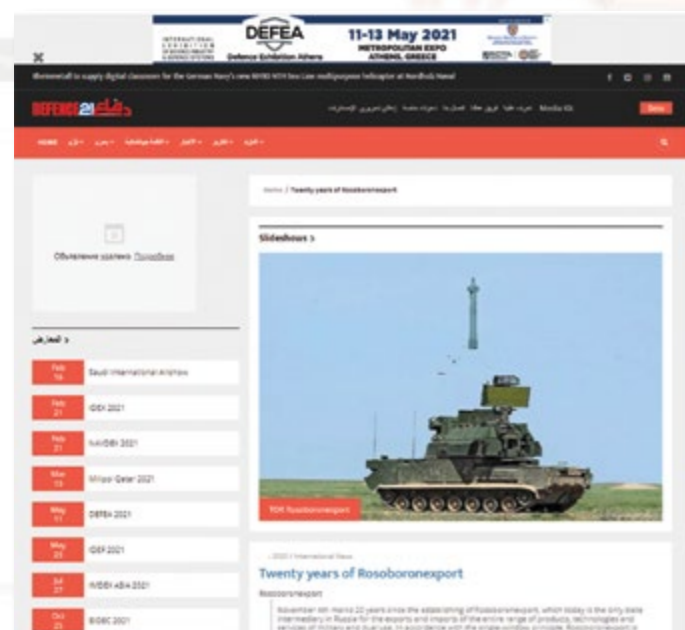
The region of the Middle East and North Africa traditionally has been very important for the Russian arms export. The major regional defense expos – IDEX and Dubai Airshow – often become the grounds for the premiere of the latest additions to the Russian arms export catalog. For example, IDEX 2019 saw the first foreign demonstration of the Pantsir-ME naval air defense missile/gun system, as well as of the latest Kalashnikov AK-200 series assault rifles (AK200, AK203, AK204 and AK205). At Dubai Airshow 2019 Rosoboronexport showcased the brand-new Russian systems, designed for the counteraction to unmanned aerial vehicles of all types. The crucial developments of the Russian military industry are being constantly covered by the leading military media of the Middle East and North Africa. Here is an overview of some highlights of the coverage.

## 20 Years of Rosoboronexport

November 4th 2020 marked the 20th anniversary of the Russian Rosoboronexport, which today is the only state intermediary in Russia for the exports and imports of the entire range of products, technologies and services of military and dual use. In accordance with the single-window principle, Rosoboronexport is empowered to export and import not only military equipment for armed services, but also dual-use and civilian products.

The **Defence 21** in its large article 'Twenty years of Rosoboronexport' outlined the major features of the Russian arms export and the key products.

'In the background of the coronavirus pandemic, ROE not only fully fulfills all its obligations to customers, but also continues to regularly introduce to the global market new models of weapons, military equipment and civilian products, as well as expands the practice of industrial partnership. Thus, such advanced weapons

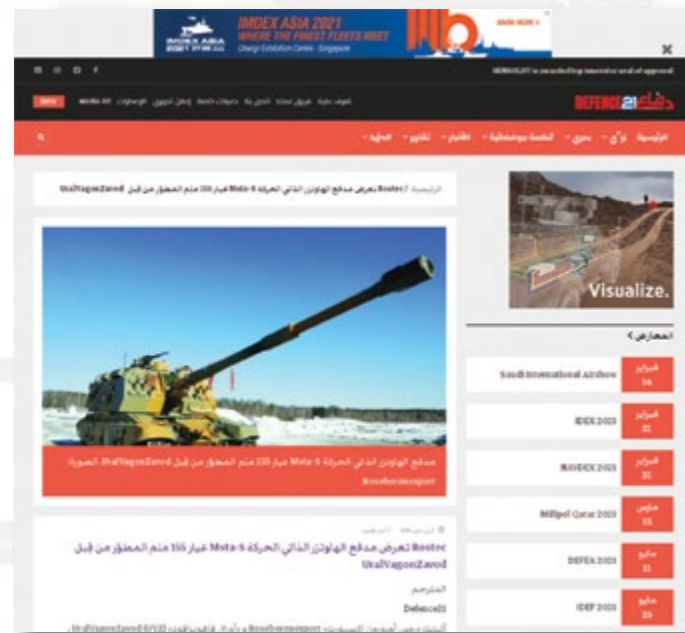


gun emplacements, armoured and soft-skinned targets and low-speed air targets, and does so from a halt, on the move and afloat in any weather, day or night. An eight-wheel-drive, independent suspension and a fuel-efficient 750 hp diesel engine facilitates the Boomerang's high level of mobility and smooth ride. As a combat vehicle, it can easily negotiate various obstacles at speeds of over 100 km/h on the highway and a cruising range of at least 800 km, – said the magazine, calling the Boomerang 'smooth and high mobile'.

In 2020 the **Nation Shield** also covered another major Russia's addition to its global arms market portfolio – the 155mm MSTA-S self-propelled howitzer.

'Rosoboronexport and UralVagon-Zavod (UVZ), both part of Rostec State Corporation, recently showcased the combat capabilities of the 155mm MSTA-S self-propelled howitzer. The demonstration of the self-propelled gun system to Middle Eastern customers took place at the Nizhny Tagil Institute of Metal Testing's (NTIM's) Staratel Proving Ground, Russia. During the tests, the MSTA-S SP howitzer hit all its targets and performed all planned maneuvers. The MSTA-S, developed at the initiative and with the participation of Rosoboronexport, uses a NATO standard 155 mm gun and is designed to destroy artillery and mortar batteries, tank columns, command & control and reconnaissance posts, – reported the **Nation Shield**.

The MSTA-S demonstration was also covered by the **Defence 21**.



## The Naval Pantsir

DEX 2019 saw the international premiere of the naval version of the Pantsir-ME air defense missile/gun system. In the autumn 2020 the Russian Ministry of Defense officially reported, that the Russian Navy had conducted from a ship live fire tests of the Pantsir-M system. The **Arab Defence Journal** reported on the issue.

'The distinctive feature of the system is the combination within a single turret mount of missile and artillery weapons and of the integrated radar-optical weapon control system, which increases its combat efficiency as compared to counterparts that have each type of weaponry separately, says the developer and producer KBP on the export-oriented Pantsir-ME modification. When repealing massive air raids of high precision weapons almost 100% kill probability



of the targets is ensured due to 4-channel guidance system as well as firing at targets at three zones of approach – twice by SAMs and once by the guns with SAM launch interval being 2-3 s., adds the developer. Time of SAM reloading – not more than 68 s, – wrote the **Arab Defence Journal**.

The magazine pointed out, that the system provides the protection from all types of aerial threats, including low-flying anti-ship missiles and UAVs, and is capable of engaging aerial targets flying at a distance of up to 20 kilometers and at an altitude of up to 15 kilometers.

## The Russian Air Defense Triumph

The Russian air defense systems usually remain in the focus of the foreign media with the Middle Eastern major military media being no exception. The **Al Defaiya** in May 2020 posted an article on the recent S-400 Triumph long-range air defense missile system (ADMS) tests and its overall analysis.

'According to the open data at the web site of Rosoboronexport, Russian only state mediator in defense trade, the S-400 system is capable of hitting aerodynamic (aerial) targets at ranges of up to 400 km, as well as ballistic targets at ranges of up to 60 km, flying at speeds of up to 4.8 km/s (Mach 14). The system is capable to destroy aerial targets at altitudes from 10 m to 27 km, while ballistic missiles at altitudes from 2 to 27 km. The engagement range is reported as 3-250 km for aerial and 5-60 km for ballistic targets respectively. The system is capable to operate in a heavy electronically contested environment', – said the **Al Defaiya** in its 'Russian Triumph Proves its Name in Recent Test' article.

The **Al Defaiya** followed with the analysis, stating, that S-400 Triumph had a positive market outlook and an upper hand over the US-made Patriot PAC-3 ADMS in a number of parameters.

'The S-400 ADS could be even more attractive counting its cost-efficiency ratio', – concluded the authors of the article.

In July the **Al Defaiya** followed on with the analysis of the TOR short-range surface-to-air missile system (SHORAD). Quoting Lieutenant-General Alexander Leonov, Commander of the Russian Ground Forces' (Army) air defense troops, it reported, that TOR systems had shot down dozens of Unmanned Aerial Vehicles during their deployment in Syria.



'The Tor SHORAD was developed and serially produced by the Izhevsk Electro-Mechanical Plant (IEMZ) Kupol (the Almaz-Antey Corporation subsidiary). The system is to provide close range air defense for military and civil objects against all type of aerial targets including aircraft, missiles, guided weapons and UAVs at medium, low and extremely low altitudes in the heavy air and electronic countermeasures environment. During the engagement process, all the target detection and identification, lock-on and missile control operations are done automatically with minimum operator participation', – reported **Al Defaiya**.

It added, that Russia had been marketing the Tor-M2KM modular version which can employ a variety of vehicles as well as a stationary system. The Tor-M2KM's combat module can be transported by either a fixed-wing aircraft or a heavy helicopter.



## Enhancing MiG's capabilities

The **Arabian Defence** magazine in its 2021 'Combat capabilities of MiG fighters get a boost with new systems' article covered the latest technical innovation introduced by the Russian aerospace industry.

'Russian Aircraft Corporation MiG, which is a part of the United Aircraft Corporation, has patented two new systems which enhance the capabilities of MiG-35 and MiG-29M/M2 4++ generation fighter jets. According to MiG Corporation, the patented non-linear corrector system solves the problem of oscillations during the manual control of the aircraft in the modes of vigorous maneuvering. The new system improves flight safety and reduces the workload of the pilot in the cockpit. In addition, MiG Corporation announced the development of an advanced system for limiting the marginal flight envelope of an aircraft. It allows the pilot to remain within the permissible angles of attack while performing any action of the control stick and preserves the maximum permissible overload of an aircraft when maneuvering in all planes', – reported the **Arabian Defence**.



The magazine reminded, that earlier, in 2020, the MiG Corporation had announced receiving the patent for the landing approach automatic control system and the patent for the intelligent system for protection against surpassing critical G-loads.

'The landing system enhances safety of flying in adverse weather conditions, enables the pilot to hold the glide path in an automatic mode and in a shorter time and to continue descent till visibility appears. The G-load protection system enhances flight safety and allows the pilot to conduct intensive air combat, without paying attention to the instrument panel', – said the **Arabian Defence**.

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'GUIDE' №01 (54)	January 20th	<b>AERO INDIA 2021</b> (03-07.02.2021, India, Bangalore)
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'GUIDE' №03 (56)	February 25th	<b>CSTO, special project</b> (March 2021, Moscow – CSTO countries)
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