RUSSIAN
AVIATION & MILITARY
GUIDE

Special analytical export project of the United Industrial Publishing

6(74), December 2023

The best innovations for Egypt, Africa and global market

SPECIAL PARTNERSHIP

UIP
UNITED INDUSTRIAL PUBLISHING

'Russian Aviation & Military Guide'
6(74), December 2023

Special analytical export project
of the United Industrial Publishing

Registered in the Federal Service for Supervision of Communications, Information Technology and Mass Media (Roscomnadzor)
09.12.2015 PI № FS77-63977

The magazine 'Russian Aviation & Military Guide', made by the United Industrial Publishing, is a winner of National prize 'Golden Idea 2016' FSMTC of Russia

General director
Editor-in-chief
Valeriy STOLNIKOV

Chief editor's deputy
Elena SOKOLOVA

Commercial director
Oleg DEINEKO

Head of international projects
Alexander STOLNIKOV (s.xander@bk.ru)

Managers
Tatiana SOKOLOVA
Natalia SHVETSOVA
Andrey PARAMONOV

Designed by
Svetlana SELIVERSTOVA

There are materials from the information agencies and from the press services of the federal authorities of the Russian Federation used in the project.

Edition is 3 thousand copies

Editorial office:
Malaya Gruzinskaya St., 39
Moscow, 123557
Tel.: +7-495-505-76-92, 778-14-47, 729-39-77

Media postal address:
Moscow, Russia, 123104, mailbox 29

doc@promweekly.ru
promweekly@promweekly.ru
www.promweekly.ru

The materials marked with R published on a commercial basis

© 'United Industrial Publishing', 2023

CONTENTS

OFFICIAL GREETINGS

The best military innovations for any tasks

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.

EDEX 2023 presents in Cairo the best Russian military innovations for Egypt, African states and global market. Most of all that there are the undisputed world leaders on price and quality in their segments.

This exhibition shows that quality and capabilities are what really matter and the amount of weapons and military technics are not as significant, because quality and capabilities of every single one of them are exactly what leads to victory.

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, which ready for mutual work.

Taking part in EDEX 2023 Russia continues the policy of open partnership with the Africa's countries. Russia has a wide military and security product line that meets all the needs of this region and ready to propose the best technology and the best price offers.

Valeriy Stolnikov

IOT BASED PLATFORM

Rostec's Ruselectronics holding has developed an IoT software solution designed to control the status of armament, special-purpose machines and military objects – from ships and vehicles to hospitals and garrisons, and to generate their digital twins. Introduction of the system will increase the military equipment and facilities performance and the speed of decision-making process. The solution contains a new IIoT. Istok Industrial Internet of Things platform – IIoT.Istok.Military – designed by RPC Istok named after Shokin as part of Ruselectronics holding. The software acquires data from sensors built in the equipment and sends the data to the control center. The module allows to arrange a process control and monitoring system and to generate a digital twin of armament, special-purpose machines, engineering infrastructure or process units. Due to big data acquisition and processing, the solution is able to ensure equipment operation transparency, identify operation trends, predict equipment condition and plan maintenance activities. 'Being a part of the IoT platform, IIoT.Istok.Military module will provide online monitoring of various equipment and, thus, will improve the safety and reliability of military machines and facilities, data availability and integrity, and speed of decision-making,' said Vitaly Aleksandrov, Director of Digital Transformation of RPC Istok.

MICROWAVE EQUIPMENT

Ruselectronics holding has started supply of microwave equipment for 30 spacecraft. The customers will receive various types of traveling-wave tubes and microwave switches within three years. The products ensure radio signal power amplification by a factor of hundreds and energy transfer with minimum loss. Research and Manufacturing Company Almaz as part of Ruselectronics is engaged in spacecraft furnishing with traveling-wave tubes and microwave switches within the Federal Space Program in favor of Roscosmos State Corporation and Gazprom companies. Supply of the switches has already started. Microwave switches interconnect microwave equipment on board satellite telecommunications platforms and allow energy transfer with minimum loss. The traveling-wave tubes serve as microwave power amplifiers to allow reliable radio signal delivery to users. 'Our products have high reliability and long service life in space conditions. In addition to already signed contracts, negotiations on future work till 2035 are underway. This will form a technological reserve for further development of microwave equipment,' pointed out Mikhail Apin, General Director of Almaz.

'All-Seeing' Camera

Rostec's Ruselectronics holding has produced the first all-purpose infrared video camera prototypes capable of 'seeing' in any weather conditions at any time of the day for tens of kilometers.

The new equipment is included in NRI Electron's (as part of Ruselectronics) video camera family designed for poor visibility conditions. A variety of versions may be used in drones, ground surveillance systems, as part of airborne surveillance and tracking systems for various aircraft, for example, during rescue operations.

The camera is designed for 0.95μm to 1.65μm near infrared range and can be synchronized with laser illumination. Photons reflected from the detected objects are read by a dedicated sealed TV sensor that houses a radiation-sensitive photocathode and electron-sensitive matrix in vacuum. This know-how designed by NRI Electron's personnel allows to decrease noise and increase the camera resolution.

Since the laser illumination received at fixed time is the main signal recorded by the device, foreground and background of a frame are suppressed. When laser illumination is used, the device detects objects at a distance up to 20 km and generates a high-resolution image even in total darkness, fog, rain, dust storm conditions, etc.

Another Batch of Armored Vehicles

On the eve of its birthday, Uralvagonzavod has delivered another railway train with armored vehicles to the military. The Russian Armed Forces have received new T-90M Proryv and T-72B3M with additional protection from the tank manufacturer.

It was the first time that the special vehicles delivered to the customer on the eve of the memorable date had been loaded on 13-192-01 type flat wagon designed by Urals Rail Car Design Bureau and manufactured by Uralvagonzavod. Two large-scale equivalent operations have been run at the factory in Nizhny Tagil over more than 80 years: freight rolling stock and battle tanks and special vehicles. Uralvagonzavod has particular achievements in each of these business areas. Thus, UVZ has produced about 1.2 million wagons since 1936, and more than 100,000 battle tanks have rolled off the legendary tank conveyor since 1941, that is an absolute world record in tank manufacturing.

Despite the special challenges facing the Nizhny-Tagil-based company team, production of freight wagons is continued. 13-192-01 flat wagon is the main rolling stock product in UVZ's order portfolio. It is a general-purpose wagon designed to carry long-length, single-piece, packaged and bulk goods, timber and steelworks, though it has been primarily designed to carry tracked and wheeled military vehicles. This product has wood flooring and folding sides. The wagon can carry vehicles weighing up to 65 tons. In addition, installation fittings are available on 13-192-01 flat wagon making it suitable for placement of 20' and 40' containers.

Manufacturing of ZHUK-1 Tourniquet

Concern Radio-Electronic Technologies has developed and started pilot production of domestic ZHUK-1 tourniquet designed to rescue wounded soldiers in combat and emergency conditions. This was announced to news media by Aleksey Melnikov, Director of Civil Product and National Project Development of KRET, at the Biotechmed-2023 forum in Sochi.

'Our product is made from high-quality domestic materials and may substitute foreign counterparts. A batch of ZHUK-1 tourniquets was delivered to volunteers for testing. We have received positive feedback. Now we are collecting the feedback in order to further improve the ZHUK to the highest standard,' he said.

ZHUK general-purpose tourniquet is designed to stop upper and lower extremity hemorrhage. Easy-to-use – the tourniquet can be easily applied with one hand and is suitable for self-help. The tourniquet is an effective way to stop bleeding even when it is applied above winter clothing. The annual Biotechmed forum was held in Sochi from 9 to 10 September. The forum is an authoritative federal platform where the professional and expert community can work out coordinated solutions for pharma, biotechnology and healthcare improvement.

Modern aircraft

The President of the State Affairs of the Democratic People's Republic of Korea Kim Jong Un continued his official visit to the Russian Federation in Komsomolsk-on-Amur. The engineering center and production shops of Komsomolsk-on-Amur Aircraft Plant named after Yury Gagarin (KoAAP), branch of United Aircraft Corporation, and the production site of UAC Yakovlev civil division parent company were shown to the honored guest. The Leader of DPRK was accompanied by Denis Manturov, Deputy Prime Minister, Minister of Industry and Trade of the Russian Federation.

Engineers of KoAAP Design Department demonstrated to the delegation the digital technologies used to design modern aircraft. Kim Jong Un and Denis Manturov visited the fighter accessory assembly facilities and Su-35 and fifth-generation Su-57 final assembly shop. The straight-line production system ensures the maximum efficient process and minimizes assembly time.

The delegation also visited the process facilities which had been upgraded within the modernization and technology upgrade program – machining shop and special coating shop.

The guests were able to see the production areas involved in the cooperation project for manufacturing the import-substituted Superjet 100 (SJ-100) – KoAAP is the fuselage modules and wing components manufacturer. Then the delegation visited the SJ-100 final assembly shop at another company's site – production center of UAC Yakovlev civil division parent company. The SJ-100 with Russian systems is now undergoing the test there and the aircraft with Russian PD-8 engines is being prepared for airfield trials. The first commercial jets are at the assembly shop now and will be delivered to airlines in a fully Russian appearance. At the end of the program, the Leader of DPRK and the Deputy Prime Minister, Minister of Industry and Trade of Russia, appreciated the demonstration flight of Su-35 multifunctional fighter.

'We have demonstrated one of our major aircraft manufacturers to the Leader of the Democratic People's Republic of Korea. There is potential for cooperation in aircraft engineering as well as in other industries – this is particularly important for our countries,' pointed out Denis Manturov.

New Floks Artillery Guns

Rostec has proceeded the batches of new Floks 120mm self-propelled artillery guns. The gun is mounted on a mine-resistant ambush-protected high-mobility vehicle to provide fast gun displacement after a series of shots. The armored cab and ammunition boxes ensure improved crew and ammunition protection in transit and during gun displacement.

The rate of fire enables the Floks to fire in the multi-round simultaneous impact mode, when multiple shells are fired successively at different gun elevations and achieve the same target simultaneously. Changeover between travel and fire positions takes less than a minute, while the load on the chassis induced by firing is reduced.

'Delivery of the Flokses to the Ministry of Defence is a part of our major efforts to provide state-of-the-art artillery systems to the army. This gun combines a cannon and mortar, because it is able to use both projectiles and bombs. The Floks has improved mobility and protection, efficiently balanced manual and automatic operations, and the crew efforts are simplified as much as possible,' said Bekhan Ozdoev, Industrial Director of the Weapons Cluster of Rostec.

The Floks is designed to be used by artillery batteries to engage enemy personnel, weapons and vehicles in the squadron area of responsibility. The gun is compatible with the Vena type gun ammunition to ensure the use of more powerful ammunition and to increase the firing range.

THE NOVEL POWER UNIT

United Engine Corporation showcased a 500kW hybrid power unit demonstrator at the Technoprom 2023 International Forum. The project is based on future VK-650V engine for light helicopters.

The demonstrator contained the key functional components of the future product. It has been assembled by UEC-Klimov. All components – turbine generator, motors, power electronics units for electrical machines, battery and control system – have been already manufactured and delivered by the Corporation to Saint Petersburg.

In future, vertical take-off fixed-wing aircraft may become one of the application platforms for the hybrid power unit. Two 500kW hybrid power units will be used to take off such aircraft with a weight of about 3 tons allowing to carry goods up to 500kg.

The hybrid power units will have a set of advantages over traditional gas turbine power units. The expected features include lower fuel consumption, environmental friendliness, higher flight safety due to two power sources instead of one, vertical takeoff, takeoff from short runways and improved maneuverability.

SUCCESSFUL START

Series-produced RD-107A/RD-108A rocket engines made by Samara-based company of United Engine Corporation ensured successful start of Soyuz MS-24 manned spacecraft with Space Missions 70 and 71 crew to the International Space Station.

On September 15 at 18:44 Moscow time, Soyuz MS-24 manned spacecraft was launched from launchpad No.31 at Baikonur Cosmodrome and delivered to orbit by Soyuz-2.1a space rocket. RD-107A/RD-108A first-stage and second-stage sustainer engines made by UEC-Kuznetsov worked without any failures. Soyuz MS-24 crew includes the members of long space missions 70 and 71 to ISS – Oleg Kononenko and Nikolai Chub from Roscosmos and Loral O'Hara from NASA. UEC-Kuznetsov service center personnel prepared the space rocket for the start and also tracked the engine operation conditions. Stages I and II of all R-7 type carrier rockets (including Soyuz type carrier rockets) have been furnished with RD-107A/108A propulsion modifications since 1958.

RUSSIAN GLAZING

Obninsk Research and Production Enterprise Technologiya named after Romashin has launched commercial production of import-substituted components for SJ-100 airliners – cockpit glazing and external lights protection. The glazing uses 100% Russian materials, is fitted with heating to allow flights in any weather conditions and has successfully passed all ground tests, including the bird strike test. Such products were previously supplied for the Superjet from abroad. Structural optics is provided for the SJ-100 prototype, which currently undergoes the flight test.

A set per airliner includes six cockpit glazing components that remain functional at temperatures from −62 to +85 °C. Windscreens and direct vision windows form a sevenplex: four silicate glasses bonded together by three polymer film layers. They withstand bird strike at a speed higher than 570 km/h without depressurization. Side cockpit windows are a triplex made of durable oriented organic glass. Signal and other lights protection on wings, fuselage and tail assembly is made of organic glass. The SJ-100 is a regional narrow-body jet designed within the system and component import substitution program. The airliner will become another member of the currently operated Superjet type aircraft family. The aircraft with Russian airborne systems has performed its maiden flight on 29 August 2023.

THE QUALIFICATION TEST OF SVCH

The Chukavin sniper rifle (SVCh) made by Kalashnikov Concern has successfully passed the qualification test that confirmed its high quality and reliability. After the test, SVCh will be launched into commercial production at the weapons division. 'SVCh is a next generation of weapons that fully meets all customer requests,' explained Alan Lushnikov, President of Kalashnikov Concern. 'All modern types of accessories may be attached to the rifle: silencers, laser designators, thermal, night and infrared sights'.

The 7.62x54mm Chukavin sniper rifle has improved ergonomics and is compatible with any Russian and foreign sighting systems. Moreover, SVCh has retained the reliability of the Dragunov rifle (SVD) that is well-known in Russia and worldwide.

The weight of the Chukavin rifle without magazine is 4.8kg. Its total length (with extended stock and flame arrester) is 1170mm, the barrel length is 620mm. SVCh has a reliable gas vent mechanism with short gas piston travel and a three-position rotary gas regulator.

Superjet's Maiden Flight

Russian SJ-100 regional jet prototype manufactured by Yakovlev Production Center, United Aircraft Corporation, has made its maiden flight. The tests confirmed stable operation of all domestic systems, aircraft flight control and stability.

The flight lasted 54 minutes at altitudes up to 3,000 m and speeds up to 343 km/h. According to the flight mission, the crew tested the aircraft flight control and stability, cabin pressure control system and also performed landing through clouds and a missed approach operation.

A total of 40 systems and units have been substituted on the import-independent Superjet.

'Today's flight of the Superjet with Russian systems is the result of great common efforts of the design team and factory personnel, who designed, assembled and got off the ground actually a new plane in short time even in terms of global aviation industry,' said Yury Slyusar, General Director of United Aircraft Corporation. 'We have proved, primarily to ourselves, that we can design and make modern civil aircraft independently without involving foreign technologies.'

In order to accelerate the test program, the first jet prototype uses Franco-Russian SaM146 engines. The second prototype will start the flight test program already with domestically built PD-8 engines.

TV7-117V helicopter engine

St.Petersburg-based UEC-Klimov, United Engine Corporation, has increased the service life rates of TV7-117V helicopter engine. Upon completion of work, the Federal Air Transport Agency has approved the major modification.

UEC-Klimov has increased the number of engine cycles as planned to support the Mi-38 helicopter program of Russian Helicopters holding, testing and further commercial operation.

In addition, the Federal Air Transport Agency has lifted the restrictions on engine operation with only air bleeding enabled to provide air conditioning in the cockpit. Power unit operation and fluid dynamics variables were also checked during flight testing of the helicopter. 'TV7-117V engine is designed for Mi-38 type utility helicopters. The approvals of major modification of the type design obtained this month are aimed at the extension of the TV7-117V operating conditions. We use the helicopter modification improvement experience in our work on the TV7-117ST-01/02 airliner modifications intended for domestic regional airliners,' pointed out Vsevolod Eliseev, General Designer of UEC-Klimov.

The approved modifications are the next stages of the performance improvement plan for the TV7-117V and all engines from the TV7-117 family. UEC-Klimov professionals have already successfully implemented the emergency power rating on the TV7-117V where a power of 3,750 hp was achieved, which is the best indicator in terms of take-off power obtained for the engine family and on the market.

Fulfilling the obligations

Kalashnikov Concern has fulfilled its obligations for 9M333 guided anti-air missile delivery in 2023 ahead of schedule. The products included in the list of highly-demanded weapons and military equipment have been manufactured and shipped to the customer under two public contracts ahead of schedule.

Photo: Kalashnikov Concern

9M333 guided anti-air missile is used together with Strela-10 surface-to-air missile system and its versions. The missile is designed to engage low-altitude planes and helicopters in any season in air-dropped, parachuted and modulated optical jammer application conditions, as well as unmanned aerial vehicles and cruise missiles.

The key advantage over other missiles of a similar class is in that the missile homing head has more than one operating mode.

Kalashnikov Concern has carried out in-depth modernization of the missile. Batches of products have been delivered to the customer since 2021.

A NEW RUSSIAN MOBILE ANTI-UAV 'DEFENCE' SYSTEM IS INVISIBLE TO OTHER RADARS

The Russian systems for detecting and countering the unmanned aerial vehicles (UAVs) developed by the Vector Research Institute (a part of the Vega Radio Engineering Corporation) for the first time are presented at the Egypt Defense Expo-2023 International Defense Exhibition.

The development of the UAV industry not only opens up the new opportunities for the development of various spheres of life and the economy, but also creates the new threats. 'The developments and knowledge available at the Vector Research Institute in the field of protection against UAVs made it possible to create in the shortest possible time a comprehensive system for detecting and countering drones, ensuring reliable protection of protected objects. The company offers solutions in the field of monitoring, detection , identification, tracking and neutralization of UAVs', the company's official website (www.nii-vektor.ru) says.

The devices are designed to protect various large and small objects – hydro and nuclear power plants, oil and gas pipelines, airports, sea and river ports, law enforcement agencies; detects and counters intruder drones in a sector from 30 to 360 degrees, which, in contrast from dome systems, allows it to be used for targeted suppression of specific intruder drones in a preidentified frequency subrange. This is one of the key advantages that allows the system to be used at sites where drones are used.

To create a comprehensive protection of an object from the possible penetration of an intruder drone, the various devices are used in a complex manner, namely: passive radars (PARLS), radio monitoring equipment (RM) and a suppression device of the SERP-VS line.

A unique feature of PARL and RM detection devices is that they are invisible to other radar stations, since they operate in passive mode – they have no active radio emission.

PARL can detect the approach of aircraft, including radio-silent ones, at a distance of up to 11.3 km. The principle of its operation is to detect and process digital signals reflected from a target from a television and radio tower.

The RM is able to determine what is approaching the protected area – an airplane, a helicopter or a quadcopter. Radio monitoring equipment takes direction finding of UAV control signals from the operator's console and can record its location.

The SERP-VS5 suppression system, presented at the exhibition, provides suppression of signals from satellites and the control panel at frequencies from 900 MHz to 1.5 GHz. The manufacturer also offers an option with an extended counter-UAV range up to 430 MHz in the SERP-VS6 version.

A work is underway to increase the range to 8 GHz, which will expand the system's ability to detect control channels.

The SERP-VS5 has a sectoral suppression function with independent operating modes depending on instructions received from detection devices, which allows the use of other drones and communications equipment, if necessary, during the operation of the complex.

All systems are compact – they fit in several portable cases and are put into operation in 30 minutes. 'Defence' system can be convenient for protecting various street events.

The specialists from the Vector Research Institute are also carrying out work to equip the armored vehicles with the anti-drone systems. 'We are carrying out work related to the use of anti-UAV systems on a wheeled chassis, including armored ones,' the General Director of the enterprise, Sergei Skorykh earlier noted in an interview with the TASS news agency.

The Vector research Institute is one of the leading Russian enterprises in the development and production of products in the field of radio engineering and radio electronics. Founded in 1908. Since 2009, it has been part of the Vega Radio Engineering Corporation. Engaged in the development and production of various systems for detecting and countering UAVs, also among the developments are a system for ensuring ornithological flight safety and a 'Penicillin' sound-thermal reconnaissance system.

/RA&MG/

VLADIMIR PUTIN and ABDEL FATTAH EL-SISI

Relations between Russia and Egypt demonstrate stable principles of friendship and partnership in all spheres, including economic, political and military-technical cooperation. And this remains the case also in the very tense international situation that we are currently experiencing. An important component of the good relations between our countries is the frequent contacts between the leaders of the countries – President of the Russian Federation Vladimir Putin and President of the Arab Republic of Egypt Abdel Fattah el-Sisi.

For example, on July this year there was meeting President of Russia Vladimir Putin with President of the Arab Republic of Egypt Abdel Fattah el-Sisi at the Constantine Palace on the sidelines of the second Russia-Africa Summit.

At that meeting Vladimir Putin said: Mr President, I am delighted to welcome you to Russia and to St Petersburg. Thank you for accepting our invitation to come to Russia for the second Russia-Africa Summit.

I would like to remind you that in 2019 you chaired the African Union and were actually the founding father of that format. Today you are supervising a project for Africa's economic development. I have no doubt that there are issues we can discuss in this sphere as well.

In a month we will mark the 80th anniversary of diplomatic relations between our countries. Over that period, over those decades, relations between Russia and Egypt have acquired a special meaning and status. Mr President, a great deal has been done towards this end under your guidance.

We have large and ambitious projects, including in energy. I am referring to the well-known nuclear power plant project. Our plans are proceeding according to schedule. Last year, our trade increased by 28.8 percent, according to our statistics. Over the first five months of this year, it went up by another 7 percent year on year. Egypt accounts for one third of Russia's trade with Africa.

This year, we are holding events as part of the Year of Cultural Cooperation between Russia and Egypt, which will certainly further increase rapprochement between our nations.

President of Egypt Abdel Fattah el-Sisi said: Mr President, I would like to begin by thanking you for the successful organisation of the upcoming event and for the invitation you have kindly sent to me. Thank you for a warm welcome and for your hospitality.

We have a positive attitude to all initiatives and invitations, including from you, when they concern multilateral cooperation and interaction in Africa.

Of course, we also pay attention to bilateral cooperation. It goes without saying that we intend to advance it as far as possible. Mr President, as you have pointed out, the El Dabaa Nuclear Power Plant is a project that is fundamental to our cooperation, and we will carry it through. Another element is the establishment of the Russian Industrial Zone. There are also other endeavours and projects which we will be able to discuss in detail today.

Mr President, I would like to mention the special nature of relations between our countries. I am confident that substantial results will be achieved at the Russia-Africa Summit. I was honoured to chair the previous Russia-Africa Summit held in 2019. Once again, thank you for a warm welcome today.

Very often there are telephone conversations Vladimir Putin with Abdel Fattah el-Sisi, topical issues of Russian-Egyptian cooperation are discussed. Every time the two leaders praise the level of comprehensive partnership and strategic cooperation between their countries, which are being developed in various spheres. A special focus is placed on trade and economic ties, above all the implementation of large joint projects such as the construction of the first nuclear power plant in Egypt based on Russia's model and the creation of a Russian industrial zone near the Suez Canal.

The two leaders note the importance of further coordination of their steps on the international arena, including the settlement of various crises in the Middle East and Africa.

Mr Sisi also expressed his gratitude for the effective joint work in the context of ensuring aviation security at Egyptian airports, which enabled all regular flights between Russia and Egypt to be restored as of August 2021.

It was stated many times that the Agreement on Comprehensive Partnership and Strategic Cooperation between Russia and Egypt, which entered into force in January 2021, furthers enhance bilateral cooperation in various fields. In this context, the progress in the implementation of large joint projects in trade, the economy and energy, as well as coronavirus response measures, including the supply of Russian vaccines and the localisation of their production in Egypt, were discussed.

Also, the parties are discussed current issues of further development of the Russian-Egyptian strategic partnership, including cooperation in industry, nuclear energy, and joint efforts in fighting the coronavirus infection.

Other items on the international agenda, including the developments in Syria and the Persian Gulf region, were also discussed. Current issues pertaining to bilateral relations, first of all, cooperation in the nuclear power industry, were also touched upon. Both presidents reaffirmed their intention to further develop the multifaceted Russian-Egyptian cooperation. It was agreed to maintain contact at various levels.

In October 2019, before the COVID-19 epidemic broke out in the world, in the run-up to the Russia-Africa Summit in Sochi, Vladimir Putin met with President of the Arab Republic of Egypt, African Union Chairman and Co-Chairman of the Russia-Africa Summit Abdel Fattah el-Sisi.

In opening that meeting, Vladimir Putin noted: 'At the beginning of our meeting, I would like to thank you for your support during our preparations for the summit's events that involve the heads of

state and government from African states and Russia, and which are scheduled to take place today and tomorrow. We are hosting such a large-scale event for the first time, and your support was vitally important and timely.

As for our bilateral relations, they continue to develop very successfully. In 2018, our trade increased by 14 percent and reached $7.7 billion. We continue to implement ambitious projects that have been coordinated by us, including a nuclear power plant and an industrial zone in Egypt. We are working very actively in these areas, and we are planning to invest $190 million in infrastructure development projects and to attract up to $7 billion.

By the way, I have recently visited our common friends in the United Arab Emirates. They became extremely interested in our joint project and will also think of how to become involved in our joint industrial development plans. We have many infrastructure and transport projects.

Mr President, we maintain constant personal contacts: this is our third meeting in 2019. Cooperation between our foreign ministries and security services includes a broad range of issues on the international

agenda, the fight against terrorism and organised crime. We are very happy to see you. Welcome.'

President of Egypt Abdel Fattah el-Sisi said: 'Thank you very much, Mr President. First of all, I would like to express my sincere gratitude and appreciation for your hospitality and the warm welcome I have been given in this wonderful city of Sochi.

Mr President, I would like to thank you for holding the first Russia-Africa Summit. Our relations have a long history in many fields and spheres, starting with Russia's support to the liberation movement in Africa. I would like to say that we are interested in coordinating our efforts with Russia so as to ensure the success of both the summit and the forum. We strongly hope that thanks to the contribution from many African countries we will attain practical results in the interests of all countries and parties based on mutually beneficial cooperation.

I would like to point out that we view Russia as a reliable partner of the African continent. We hope very much that Russia will be working in Africa in all spheres and fields, including in that of the development, as well as in the financing of infrastructure projects on the continent and in particular in energy and road construction.

As for bilateral relations, Mr President, I would like to assure you of our high appreciation of our bilateral relations, which are developing in various formats, especially after we signed a comprehensive cooperation agreement. We sincerely hope that our relations will continue to develop in all fields and spheres.

I would like to speak about the spheres where we will be working together. Speaking about the Russian Industrial Zone, we have a strong interest in accelerating the implementation of this project in the Suez Canal Economic Zone. We also want to settle all the outstanding problems, so that Russian companies and enterprises come to Egypt, register and start working in this zone.

We highly appreciate our bilateral relations in the sphere of railway lines and the manufacturing of train carriages in Egypt. We hope very much that the Russian company concerned will be able to work in Egypt,

especially after it has delivered 1,300 carriages to the country.

As for the nuclear power plant, we set a high value on our bilateral cooperation. We strongly hope that all topics related to this project will be settled without delay so that we can start implementing the project in accordance with the signed contract.

Mr President, I would like to invite you to visit Egypt once again so as to be able to attend the groundbreaking ceremony of this vital project and also to attend the signing of the contract on the Russian Industrial Zone in Egypt.

Mr President, we also hope that the Russian side will provide support to nuclear energy facilities in Egypt so that we can work and act in accordance with the approved schedule.

As for military cooperation, we have a strong interest in promoting our cooperation in this sphere, because we know that Russia has been a traditional partner in the field of military technical cooperation for many decades.'

In June of that year, a meeting was held in Osaka on the sidelines of the G20 summit. Vladimir Putin said at the time in particular: 'I am happy to meet with you. I would like to start our conversation by saying that relations between Egypt and Russia

are developing dynamically, and we have plans to elevate them to a new and more advanced level, since this is the objective of the Treaty on Comprehensive Partnership and Strategic Cooperation, which we signed during your visit to Russia in October 2018. Mr President, we appreciate your work as co-chair of the Russia – Africa Summit to be held in October in Russia. I hope we will both contribute to creating a new impetus for developing relations between Russia and Africa. I am also very pleased to have this opportunity to discuss our bilateral relations and the overall situation in the region.'

President of the Arab Republic of Egypt Abdel Fattah el-Sisi said: 'I also want to stress the special importance I attach to our relations, as well as to highlight our readiness to foster and enhance our bilateral relations at various levels, including at the strategic level. We are always committed to cooperation and developing relations in all areas, especially in the economy, trade, and also in countering terrorism. Thank you very much for the opportunity to take advantage of Russian's knowledge and expertise.' /RA&MG/

BROAD LINE-UP OF RUSSIAN SECURITY SOLUTIONS

In the Second Russia-Africa Economic and Humanitarian Forum, which was held on July 27-28, 2023 at the Expoforum Exhibition Center in St. Petersburg, Rosoboronexport JSC (part of Rostec State Corporation) offered a wide range of tools and solutions to ensure the security of the state and society.

'The Russia-Africa Summit gives the greatest incentive to strengthen comprehensive and equal cooperation between Russia and African countries in all its dimensions: politics, security, economy, science and technology, cultural and humanitarian spheres. For Rosoboronexport, the Summit is a unique event enabling us to find new growth points in cooperation with partners. Following the first summit, we saw an extremely high prolonged conversion from the talks in Sochi. Since 2019 to the present, we have signed over 150 contract documents with African partners and increased our order book by more than $10 billion. During this time, we have expanded our presence adding five new countries on the continent,' said Alexander Mikheev, Director General of Rosoboronexport before the Second Russia-Africa Economic and Humanitarian Forum.

The Russia-Africa Summit helped Rostec State Corporation, Rosoboronexport and other Russian companies to maintain and strengthen ties with traditional partners, find reliable customers and start developing new market segments.

'Rosoboronexport's mission at the Second Russia-Africa Summit is to elaborate concepts of addressing the main challenges to the global African security architecture, together with delegations from more than 30 countries of the continent which have arrived in St. Petersburg. The Company will demonstrate tools developed and tested in Russia to counter terrorism, organized crime, cyber threats, protect the constitutional system and public order, provide border and critical facility security and surveillance,' Alexander Mikheev noted.

At the Summit, Rosoboronexport offered the guests of the event the products of Russia's companies exhibited in the Expoforum's pavilion, as well as in an outdoor display area. The Company's booth wass divided into thematic zones dedicated to counterterrorism equipment and intelligent digital technologies.

Among counterterrorism equipment, the Company presented special small arms, combat gear, tactical optics, non-lethal weapons, screening and explosive detection equipment, perimeter security systems and satellite communication systems.

In the Intelligent Digital Technologies zone, Rosoboronexport showed IT solutions developed by Russian companies, tested in the domestic market and adapted for use in African countries. These included a comprehensive Smart City project, a national-level cyber security platform, as well as Internet monitoring, information protection and legal data interception systems.

In the outdoor exhibit, Rosoboronexport and a number of Russian companies demonstrated military, dual-use and civilian products designed to counter various security threats that are most in demand on the African continent. The outdoor exhibit was also divided into thematic sections.

In the UAV zone, the Orion reconnaissance/strike UAV, Orlan-10E and Orlan-30 reconnaissance UAVs, Kub-E loitering munition and other battle-proven UAV systems were showcased. Counter-UAV systems, including RB-504P-E, Serp-VS5, Saphir and a number of others, were exhibited in close proximity to the drones. Spartak, Tiger-Raid and Strela MRAP vehicles were on display in the armored combat vehicles zone.

In the exhibition area of Russian Helicopters, a Rostec company, the guests also were able to get acquainted with Russian helicopters having high export potential. The Mi-8MTV-1 in the medical version, Mi-171E and Mi-38 in VIP configuration, Ansat and the first Russian Mi-171A3 offshore helicopter were on display at the Summit.

/RA&MG/

RUSSIA IS SUCCESSFULLY DEVELOPING THE MILITARY-TECHNICAL COOPERATION WITH THE AFRICAN COUNTRIES

At the Dubai Airshow-2023 held in November this year, the theme of developing cooperation with Africa was one of the key ones. Alexander Mikheev, General Director of JCS Rosoboronexport (part of the Rostec State Corporation) in his interviews and speeches spoke, among other things, about the effectiveness, successes and prospects for Russia's development of the military-technical cooperation with the African countries.

Alexander Mikheev confirmed that the Dubai International Aviation and Space Exhibition, which consistently ranks among the top 5 largest international aerospace salons in terms of size and importance, is considered by Rosoboronexport as one of the main foreign platforms for the promotion of Russian aviation equipment and air defense systems, including to the African countries.

According to Mr. Mikheev, 'Rosoboronexport's portfolio of orders remains stably at a high level – about $50 billion. Today, the company is actively working on concluding long-term contracts, among other things, to ensure the utilization of Russian enterprises after the needs of the domestic market are saturated. Middle Eastern countries traditionally occupy a significant share in Rosoboronexport's order portfolio, amounting to 40 to 50% of the total volume. We expect its growth primarily not in share, but in absolute terms, taking into account active work in other regions of the world. Primarily in Africa and the Asia-Pacific region.'

The head of the company noted that 'Rosoboronexport's order portfolio will grow; today the demand for Russian weapons is greater than before the special operation. There is great interest – more than before, because in the conditions of the special military operation the Russian equipment, aviation and air defense systems, small arms and high-precision weapons have shown excellent results.'

As Alexander Mikheev emphasized, work with African countries on military-technical cooperation intensified after the Second Russia-Africa Summit held in St. Petersburg in July 2023. The potential partners are aimed not only at purchasing Russian weapons, but also at localizing their production and service, he noted.

'The previous summit in 2019 in Sochi brought us more than $11 billion in signed and paid contracts. This year in St. Petersburg we held very serious consultations, both with heads of state and with defense ministers, which continued after the summit. There is a very high demand for various types of equipment,' stated Alexander Mikheev. 'Each country has its own vision: some are more interested in marine technology, some in air defense systems, some in small arms solutions, including the trend of localizing production and creating joint ventures for service.'

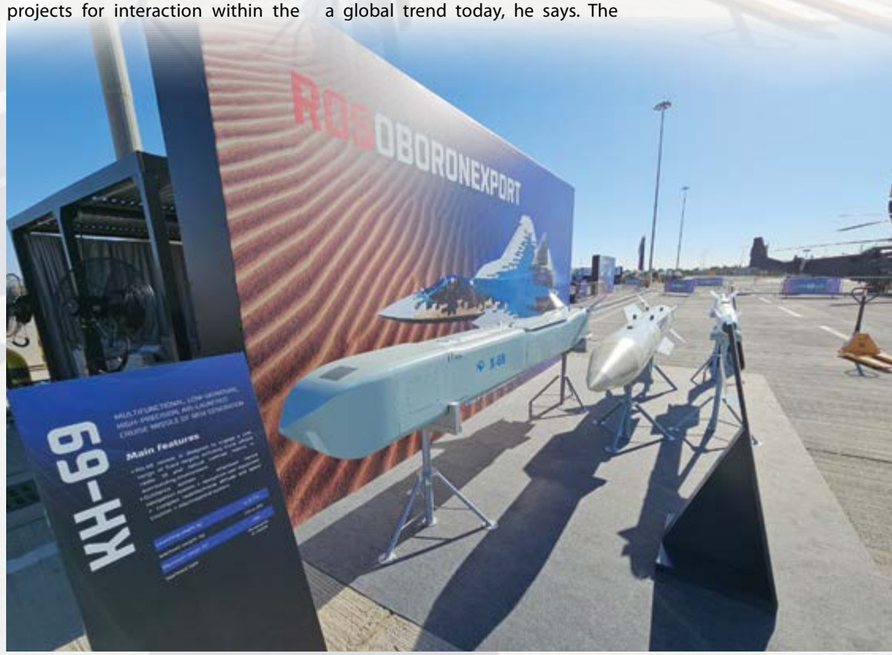
The head of Rosoboronexport clarified that during the Second Russia-Africa Summit, the leading Russian company held displays and presentations of modern Russian military products for representatives of the military-political leadership of 30 countries in the African region. This is a huge foundation for future work and the identification of new points of growth for interaction.

'We are currently continuing cooperation on existing contracts and conducting consultations on new projects. In 2023, exports to the African countries account for more than 30% of the total volume of deliveries made. Moreover, in 2023, contract documents worth more than $4.5 billion were signed, and we plan to conclude new contracts by the end of the year.'

As Alexander Mikheev noted, the African countries are developing their economies, leaving the prejudices of colonial times in the past: 'Africa is actively developing economically, because many countries have acquired independence, and therefore there is a need to reconsider their capabilities in terms of the combat readiness of their armed forces. For Rosoboronexport, they are important and reliable partners; we are also discussing a number of projects for interaction within the framework of joint development and production of weapons and military equipment.'

The head of Rosoboronexport clarified that in terms of localization of production we are talking about ammunition, the possibility of participation on our armored platforms with the involvement of local companies that produce components and assemblies, have casting, machining, and their own industrial competencies. Everyone wants to have added value, they want to prevent unemployment.

The technological cooperation is a global trend today, he says. The



governments of India, the Middle East, Africa and states in other regions want to develop their own industries. We are ready to help them with this. At the same time, naturally, products produced with the participation of Russian technologies will be protected from unauthorized re-export by relevant treaties and agreements.

Speaking about the current tasks for the development of military-technical cooperation with the African countries, Alexander Mikheev emphasized: 'We are working hard to implement the preliminary agreements outlined during the Second Russia-Africa Summit. We have big plans to expand cooperation with the African countries.'

According to him, an important direction in increasing the volume of military-technical cooperation with the African countries is the supply of the latest models of the Russian weapons, including those produced by the enterprises of the Rostec State Corporation, including armored vehicles, multifunctional and combat UAVs, electronic warfare equipment and other types of defense equipment that have proven themselves in real combat conditions. Only from 2020 to the present day, Rosoboronexport has signed contracts for the supply of BK-10 and BK-16 boats, Mi-28NE and Mi-35P helicopters, combat and combat training aircraft, as well as modern air defense systems, including the 'Pantsir-S1' and electronic warfare systems.

The company is currently developing a number of projects in the format of industrial cooperation with the African countries in the field of licensed production of small arms and ammunition, as well as armored vehicles and high-speed combat vessels. The total cost of such projects exceeds 50 billion rubles. There are big plans for the future to develop joint ventures for the production and maintenance of armored vehicles, aviation and automotive equipment, and small arms.

Alexander Mikheev especially noted that Rosoboronexport resolved all the logistics and financial problems created by external sanctions that impeded the development of military-technical cooperation. 'Despite the fact that we have been working without SWIFT, without the dollar and without the euro for a long time, we have learned today to carry out joint settlements. All logistical and financial problems have been resolved. And I believe that we, in principle, have chosen the trend, those decisions that allow us to continue cooperation for many years, including with African countries,' he said. **/RA&MG/**

HELD UNDER THE PATRONAGE OF HIS EXCELLENCY, PRESIDENT ABDEL FATTAH EL-SISI
THE PRESIDENT OF THE ARAB REPUBLIC OF EGYPT,
THE SUPREME COMMANDER OF THE EGYPTIAN ARMED FORCES

EGYPT DEFENCE EXPO
4-7 DECEMBER 2023
EGYPT INTERNATIONAL EXHIBITION CENTRE

EGYPT'S LEADING TRI-SERVICE DEFENCE EXHIBITION

EGYPT INTERNATIONAL EXHIBITION CENTRE
4-7 DECEMBER 2023

@egyptdefenceexpo /egyptdefenceexpo @visitedex www.egyptdefenceexpo.com

Platinum Sponsor Hanwha
Media Partner Russian Aviation & Military Guide
Organised by Arabian World Events
Supported by
Ministry of Defence
Egyptian Armed Forces
Ministry of Military Production

THE AUTONOMOUS COMBAT MODULE TOR-M2KM IS THE BEST CHOICE FOR AIR DEFENCE OF STRATEGIC FACILITIES AND INFRASTRUCTURES

Almost from the very beginning of military aviation, it was used for strikes against large cities and other strategic facilities. Already at the beginning of World War I, German Zeppelins bombed London and British Avros bombed Friedrichsgafen. In World War II, strategic bombing reached a colossal scale – a number of raids simultaneously involved more than a thousand aircraft. Along with the development of means of attack, defence measures were also strengthened. It was during World War II that the idea of creating special blockhouses to house anti-aircraft artillery – the German 'flaktrum' – was born and realised.

Problems of air defence of strategic facilities and infrastructures and ways to solve them

When creating air defence of large cities, German specialists faced a number of problems. Location of anti-aircraft guns along the perimeter of the city required a large number of guns. At the same time, only a part of them – those that were on the direction of the strike – participated in the battle. But even they could not work on the bombers that broke through the air defence line – the city centre remained unprotected. When the air defence was placed directly in the city quarters, the guns were hampered by houses and even trees and, as a consequence, they could fire only narrow sectors, which again – either left part of the object unprotected, or required a multiple increase in the number of barrels, most of which again remained inactive. The 'Dusky Teutonic genius' found a solution to this problem in the creation of special anti-aircraft towers, on which the guns were raised almost in line with the roofs of city houses and had the possibility of circular firing.

This decision was forgotten for many years after World War II due to the changed tactics of air attack on strategic targets. After the creation of the nuclear bomb, it became the main threat. And its carrier was the high-flying strategic bomber. The fight against which was technically more difficult, and organisationally – easier. For example, to provide air defence for such a large industrial centre as Izhevsk, it was not without reason that one or two positions of ADM system-75 placed a kilometer away from the outskirts of the city were considered sufficient – the missile approached the high-altitude target at a high angle, gained altitude over a clear field, quickly leaving the urban area far below, and the range was sufficient to intercept the target on the approaches to the opposite outskirts.

Today, however, the situation has changed again. In practice, the main threat is posed by low-flying air assault weapons– cruise missiles and UAVs. Detection and interception of such targets can be seriously hampered by houses and trees, which makes one think of the idea of raising air defence systems above urban areas. Moreover, it is not at all necessary to build special warehouses – Russian designers have created an ADM system that can be placed on the roofs of standard houses.

On the roof of one's house

The Izhevsk Electromechanical Plant Kupol has proactively developed an autonomous combat module of the ADM system Tor-M2KM. Abandoning the chassis allowed to significantly reduce both the cost and weight of the product. The weight of the module is more than half of the basic caterpillar version and is only 15 tons. According to one of the mandatory regulations, the same weight of snow a flat roof of a 100 m^2 house should be able to withstand in areas with average snow load. That is, Tor-M2KM can be placed on the flat roof of any house built in accordance with the rules and regulations (perhaps – the simplest system of weight distribution is required, and of course – regular snow removal is necessary). The Tor-M2KM can be lifted to the roof by a Mi-26 helicopter or a loading crane of appropriate lifting capacity. Wired communication between the combat modules and with the battery command post (it is located on the ground) can be provided by means of conventional masts and towers, including those built on the roofs of neighboring houses. Thus, there are no serious difficulties in implementing the old idea of flaktrums on a new technical level.

Taking into account the damage radius of the Tor-M2KM autonomous combat module (up to 15 km), the heading parameter (±8 km), and the ground track parameter between the modules and the Battalion command post (5 km), it is easy to calculate that an object/city with a radius of 10 km can be reliably covered by just one battery of ADM system Tor-M2KM. At the same time, the damage radii of individual modules will partially overlap each other (including in 'dead' sectors), and within 3-5 km from the object, all the battery's combat modules will be able to work on targets simultaneously.

There may be concerns that it would be difficult for ADM system to intercept a target below, but there is no reason for such concerns. Taking

The Izhevsk Electromechanical Plant Kupol (part of Almaz – Antey Air and Space Defence Corporation, JSC) is one of the leading enterprises of the Russian military-industrial complex, the leading designer and manufacturer of the Tor system of air defence missile systems. The plant also manufactures airborne equipment for surface-to-air missiles, provides maintenance services to operating organizations, and repairs and upgrades previously delivered ADM system.
ADM system produced by the Izhevsk Electromechanical Plant Kupol is in service with the Russian Army and coastal units of the Navy, as well as with the armies of two dozen countries on three continents The Izhevsk Electromechanical Plant Kupol continuously searches for ways to further improve the effectiveness of its air defence systems, which allows them to successfully counter modern and advanced air attack weapons.

into account the curvature of the Earth's surface and the fact that ADM system of Tor family are capable of firing at targets in the lower semi-sphere (up to -5°), the possibility of firing at low-flying air assault weapons is fully preserved or even increased. For example, when the combat module is raised to a height of 100 m, the short-range interception limit for targets flying at a height of 10 m is about 1 km – i.e. the usual 'dead' zone does not grow.

Placement on rooftops does not hinder, but on the contrary, increases the effectiveness of ADM system. It increases the range of detection, reduces the influence of terrain and urban buildings, and, ultimately, moves the encounter point of the missile with the target to the far edge of the damage zone to the maximum extent possible. The latter is an important factor, given that even the debris of an intercepted aerial assault weapon can cause casualties and destruction.

Such characteristics of the ADM system Tor-M2KM autonomous combat module as low deployment time (3 minutes – a world record), which makes it possible to repel a surprise air raid, high speed of airspace surveillance (1 antenna rotation per second – the world's best record), which makes it possible to react quickly to the changing situation, low reaction time from target detection to SAM launch – 5-10 seconds, which is especially important when working against low-flying targets, which are detected later than low-flying air assault weapons, are also fully compliant with the tasks of providing air defence of strategic facilities and infrastructures.

The ADM system Tor-M2KM is capable of intercepting any aerodynamic targets flying at speed up to Mach 2 and above, with an effective dispersion surface of 0.1 m^2 or less.

The Tor-M2KM autonomous combat module is based on the ADM system Tor-M2U. In case the combat modules will be built on the basis of the newest version of Tor – ADM system Tor-M2 combat capabilities are significantly increased: the damage zone is extended to 1-16 km in range, 0.01-12 km in altitude and ±9.5 km in ground track parameter, the ammunition load is increased from 8 to 16 SAMs, etc.

Where there is a threat of high-flying bombers or ballistic missile attacks, the Tor-M2KM autonomous combat module can be coupled (including directly) with the ADM system Viking (a modular version of the ADM system Buk family) or with the ADM system S-300V4. In this case, the advantages of each of the combat vehicles, mutually complementing each other, will provide a reliable shield against any air assault weapons.

The Universal Soldier

Due to its peculiarities, the ADM system Tor-M2KM has a significantly expanded area of application. It can be installed on a railway platform or a ship deck, which will provide reliable air defence cover for the transport of valuable cargos. The ability of the new and latest ADM system of Tor family to operate at sea and from the shoreline against targets flying over the sea has been proven in practice. This has been achieved thanks to the introduction of new algorithms for the combat operation of the computer system, which allow levelling the impact of wave rolling.

The module can be moved from one position to another with relative ease. Transportation is carried out on any chassis (self-propelled or trailed) with a suitable load capacity (from 20 tons). Installation on the chassis and removal – by a 25-ton crane. Repositioning time – 10 minutes (at the same time, according to the total time spent on repositioning and deployment – 10+3 minutes, the system can be considered mobile by Western standards – modern Western ADM systems are deployed/redeployed in 10-15 minutes).

If necessary, the autonomous module can easily return to the air defence forces – the system can be easily integrated with any chassis of suitable payload capacity.

This breadth of applications makes the Tor-M2KM autonomous combat module a truly 'universal soldier' and provides wide maneuver of available air defence forces in accordance with emerging/disappearing threats.

/RA&MG/

WORLD DEFENSE SHOW
SAUDI ARABIA
4-8 FEB 2024

FOUNDED BY
الهيئة العامة للصناعات العسكرية
General Authority for Military Industries

CONNECTING WITH THE LARGEST DEFENSE MANUFACTURERS IN THE WORLD

EQUIPPED FOR TOMORROW

ANTIDRONE

ANTI-UAV TECHNOLOGIES FROM STC ‘LEMT’

Modern military conflicts are defined by the accelerated dynamics of the development of new technologies and technical solutions, as well as the ways of protection and counteraction. Unmanned aerial vehicles (UAVs) have become widespread due to their relatively low cost; they are easier to pilot and configure (compared to traditional aircraft) and can be equipped with a wide variety of payloads, such as:

- **sensor systems to determine the UAV’s own coordinates and the coordinates of the required targets;**
- **optical-electronic modules for intelligence data collection;**
- **target designation and data transmission systems;**
- **various types of armament (explosives, guided and unguided ammunition, small arms and missiles);**
- **engineering equipment, tools and special equipment.**

The range of UAV types which are currently in use is quite wide – full-fledged combat unmanned aircraft and helicopters, various types of reconnaissance and combat gliders, multi-rotor (4, 6, 8 rotors) small-sized drones, portable reconnaissance microdrones, etc. The use of UAVs also implies the tactical ability to covertly carry out reconnaissance and sabotage missions, preserve the safety of the UAV itself, and also avoid detection of the Operator's location. In general, this technology has proven itself to be a highly effective tool of collecting information and causing damage to enemy personnel, infrastructure, and military equipment, which only increases their importance in the near future. This fact leads to creation of appropriate solutions to counter threats from UAVs and the effective integration of these solutions into systems for protection of both military and civilian objects.

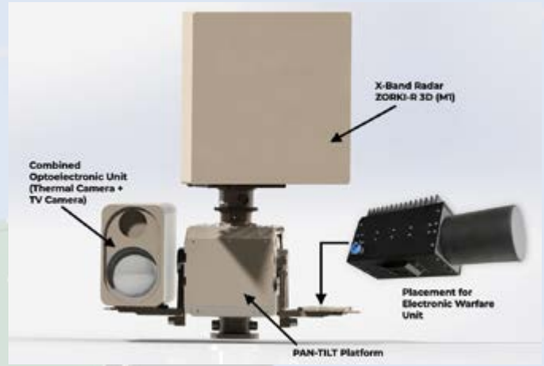
Modern anti-UAV defense systems combine use of an extensive number of technical means for reconnaissance, perimeter control, jamming and destruction of UAVs in different environmental conditions. The LEMT Scientific and Technical Center has been studying unmanned aircraft for several years and now developing a series of products designed for effective UAV detection and counteraction.

Since 2016, LEMT has been producing various modifications of the ZORKI optoelectronic and radar complex, including configurations for detecting compact UAVs, both independently and as a part of more advanced systems. The complex is modular, which makes it possible to use individual elements for specific tasks and types of locations.

The most important task of the complex is the initial detection of a moving UAV – this process is carried out by the ZORKI-R 3D and ZORKI-R 3D M1 radars, which scan a whole area (360º) or a designated sector for the presence of moving objects. Specifics of these radars are their effective operation at short ranges (up to 15 km for ZORKI-R 3D and up to 30 km for ZORKI-R 3D M1), which is a ‘blind spot’ for long-range radar systems, as well as their focus on detecting small objects (UAV, person, vehicle) moving at low speeds. Radars are also capable of three-dimensional scanning, which makes it possible to determine the altitude of low-flying aircraft, calculate coordinates in accordance with their own geographical location and speed up the correct target designation for surveillance systems, jammers and hard-kill protective tools. At the same time, ZORKI-R radars can process data on the movement of at least 50 targets, which makes it possible to detect both single drones and the movement of a swarm of UAVs. The use of data processing algorithms and a filter system provides target identification based on target’s angular dimensions, velocity and the pattern of performed maneuvers. Based on the information received, the Operator decides on further actions of the countermeasures system to eliminate the emerging threat.

ZORKI-O optical-electronic modules are responsible for visual target recognition. The module includes a TV channel (options with variable fields of view and different resolutions), a thermal imaging channel (options with an uncooled high-resolution microbolometer and a cooled sensor are available), as well as a laser rangefinder for determining the distance to moving objects. The choice of the components of the ZORKI-O module makes it possible to optimize the configuration to perform tasks in the landscape conditions of a specific protected object, or to obtain a universal system for a mobile version with variable observation ranges. The operator simultaneously receives video streams from TV and thermal imaging channels, selecting the image with the highest quality of object display. All received information is sorted and archived in relation to data received from the radar. ZORKI-O modules are equipped with an automatic target tracking function. It is worth noting that the optical-electronic module can be used as a targeting system for subsequent elimination of UAVs, which expands the functionality of the system and the range of tasks solved by single complete set of equipment.

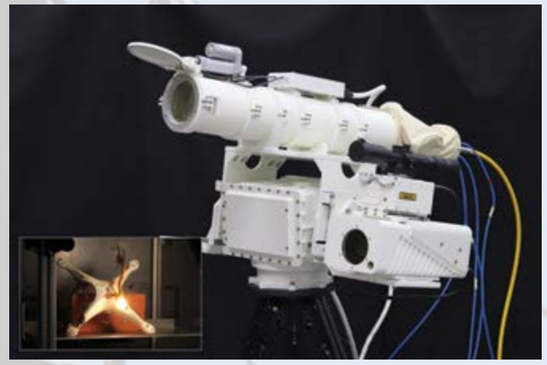
Currently, the Scientific and Technical Center ‘LEMT’ is exploring the possibility of equipping the ‘ZORKI’ complexes with mounted electronic warfare (EW) modules to effectively suppress UAV signals and other methods of influence at maximum detection ranges. In the present configuration, elements of the ZORKI complex are already included in a number of mobile anti-UAV defense



systems, such as GROZA, developed and produced by KB Radar JSC. The Belarusian portable anti-drone gun is also equipped with a thermal imaging sight developed and produced by the LEMT center. The integrated electronic warfare system is controlled by the Operator and aimed at the target using the ZORKI-O optical-electronic module. This kind of complex makes it possible to stop the majority of operator-controlled UAVs by setting up electronic jamming and blocking incoming and outgoing signals.

Since 2020, the Scientific and Technical Center ‘LEMT’ has been developing High-Power Laser Systems designed to ensure the physical destruction of potentially dangerous UAVs (operator-controlled and flying along a given route, especially kamikaze drones). At the moment, the creation of a system with a power of 6 kW and a mobile complex of laser weapons with a power of 3 kW has been completed, and work is underway on systems with a power of 30 kW and 50 kW. Laser weapon has high speed and precision of tracking moving targets using coordinates obtained from the radar and optical-electronic module; it is capable of tracking small targets in motion and causing sufficient damage to quickly disable the UAV due to the optimal combination of laser beam sizes and radiation power. The system has been tested on various types of construction materials used in manned and unmanned aircraft (aluminum, carbon fiber, various types of plastics, various types of reflective coatings). The main advantages of the systems are the low cost of use compared to more typical methods of destroying UAVs, independence from ballistic and detonation delay calculations, stability of laser radiation in a particular environment. Systems of this class are currently one of the most effective solutions in the set of Counter-UAV tools (against single and multiple drones, as well as combat UAVs at low and high flight altitudes).

/RA&MG/



BRAHMOS: ONE OF THE MOST SUCCESSFUL WEAPONS PROGRAM IN THE WORLD

One of the obvious trends in the global arms market is the growing success of the BRAHMOS missile. Indian and world media continue to report on the success of this program, and the beginning of exports of the new missile indicates the growing interest of many countries in this unique innovation. Last year, the Philippines signed a $375-million deal for three batteries of BRAHMOS missiles. The project to supply missiles to Thailand is also moving steadily. The BRAHMOS project's participation in the recent Dubai Airshow, where the missile became one of the main exhibits, was clearly triumphant. The BrahMos Aerospace corporation is also looking at exporting the missiles to other friendly countries.

Jointly designed and developed by DRDO of India and NPOM of Russia as part of a high-end military-technology partnership program, BRAHMOS with its deadly combination of speed, precision, firepower, versatility and maneuverability, remains an undisputed leader among precision strike weapons worldwide. The first launch of the missile took place on June 12, 2001 from a coastal launcher. Currently, along with further improvements, the rocket is beginning its global expansion.

The exact date of delivery of the supersonic BRAHMOS missiles to the Philippines has not been disclosed, but there are reports that the missiles will arrive as early as December this year. According to the Philippine military, the importance of these supersonic missiles for the Philippine armed forces cannot be overestimated. The delivery of the BRAHMOS missiles will significantly enhance the defense capabilities of the Philippines and will play a crucial role in protecting the country's territorial integrity and national interests, especially given the current regional security scenarios.

Information on the further development of this program actively contributes to the development of world interest in BRAHMOS missiles. So, in October this year, Indian media outlets reported that in a major success for the indigenous weapon systems, the Indian Air Force (IAF) has carried out a successful restoration of the air-launched version of the BRAHMOS supersonic cruise missile in the Bay of Bengal. The BRAHMOS air-launched version missile was test-fired from a Su-30MKI fighter jet which has the capability to launch the BRAHMOS cruise missiles that can hit enemy targets at long ranges. The aircraft had taken off with the missile from an air base in the southern peninsula and travelled over 1,500 km to successfully strike a target from a longer range than before.

This success is a continuation of India being working towards developing a very long-range version of the air-launched BRAHMOS cruise missiles. The Indian Air Force had recently carried out two trials of the land attack missile system and the results were very good as missiles hit bull's eye in the user trials.

And later in October, 2023 the Indian Navy successfully test-fired BRAHMOS supersonic cruise missile from a destroyer. The test was carried out from a destroyer based in the Navy's eastern fleet. The missile successfully destroyed its target with pinpoint precision. The Navy posted on the social media platform Twitter, stating, 'An Indian Navy destroyer of the eastern fleet carried out the successful firing of a BRAHMOS missile in the Bay of Bengal. The missile achieved all mission objectives.'

The extended-range variant, BRAHMOS-ER, can strike land and sea targets at a maximum range of 400 to 500 kilometres. The baseline version of the missile can strike targets at a maximum range of 290 kilometres, with a speed of 2.9 Mach, or 2.9 times the speed of sound. Since then, the missile has undergone iterative developments, enabling it to strike targets at ranges of more than 500 kilometres.

It is therefore not surprising that BrahMos Aerospace's stand at the Dubai Airshow 2023 was one of the most attractive. According to a BrahMos Aerospace representative Praveen Pathak countries from almost all regions of the world, including Africa, were interested in the BRAHMOS missiles.

As Mr. Pathak recounts, BRAHMOS's remarkable evolution from an anti-ship weapon to a multi-role, multi-platform system having the power to knock down a wide range of strategic ground and sea-surface targets from stand-off ranges has made it a formidable military asset. With its successful operationalization in Indian Army, Navy and Air Force, BRAHMOS has completed India's 'supersonic cruise missile triad'. The missile, during successful test firings, has also validated its precision strike capability in integrated network-centric warfare environments.

Supersonic cruise missile BRAHMOS – the 'unparalleled leader' among worldwide precision strike weapons – has strengthened its position over the years owing to its incredible features of speed, accuracy, deadly firepower, stealth and universality. A finest product of high-technology military cooperation between India and Russia,

BRAHMOS has charted a spectacular journey since its inception over two decades ago.

Initiated as a Joint Venture (JV) military programme between India's DRDO and Russia's NPO Mashinostroyenia (NPOM) on February 12, 1998, the tactical missile, designed and developed by the JV entity BrahMos Aerospace, has come a long way, charting milestones after milestones. Rightfully reckoned as the world's fastest, best and deadliest precision-guided missile, BRAHMOS has evolved from being an anti-ship weapon to a multi-role, multi-platform system that has proved its dexterity and formidability in innumerable test firings, having set the highest success rate no other weapon has ever recorded in the world.

Today, BRAHMOS has made India only nation in the world in possession of a supersonic cruise missile triad, ensuring the Indian Defence Forces' formidable capability to undertake modern-day, highly complex combat operations from across the spectrum of warfare. The tactical weapon has been successfully deployed by the Indian Army, Navy and Air Force on their frontline platforms.

Since its maiden successful test firing conducted on 12 June, 2001 from a land-based launcher in anti-ship mode, to subsequently being developed and tested in land-to-land, land-to-sea, sea-to-land, sea-to-sea, subsea-to-land, air-to-sea and air-to-land configurations, the state-of-the-art BRAHMOS missile has completely redefined new-age

technology involving missile science and aeronautics.

Capable of cruising at a top speed of Mach 3, the 3-tonne missile can operate in hi-low trajectory and instantly hit on its target with very high precision without giving any time or scope to the adversary's air defence system to react. The immense kinetic energy released by the powerful weapon can completely decimate high-value enemy targets within a very short time. It has also established its 'salvo' launch capability wherein more than one BRAHMOS can be fired in quick succession in one or different directions to knock down single or multiple enemy targets and positions.

The Indian Navy in 2005 became the first force to deploy BRAHMOS on its large guided missile destroyers to undertake maritime combat missions. The naval variant of the weapon continued its evolution thereafter to further bolster and expand the Navy's strike capability and outreach from both littoral and high-sea zones. The missile offers wide-ranging strike options – sea-to-sea, sea-to-land, coast-to-sea and subsea-to-land – in modern, multi-threat maritime environment. Indian Navy has deployed the missile as the 'prime strike weapon' on its frontline destroyers and frigates.

In its anti-ship configuration, BRAHMOS can cruise at a very low trajectory above the sea-surface and can launch surprise attacks on enemy positions. Also deployed in land-attack configuration on Indian warships, the missile has proved its power to engage targets deep in-land from stand-off ranges. An underwater variant of the weapon system has also been successfully tested in 2013, thus validating its flexibility to be integrated onto conventional attack submarines in future.

On 22 November, 2017, the highly advanced air-to-surface configuration of BRAHMOS made a world-record feat when it was successfully test fired for the very first time from the Russian-origin Sukhoi-30MKI combat aircraft of the Indian Air Force (IAF) against a sea-surface target off India's eastern coast. This illustrious mission made India the first and only nation in the world in possession of a 'supersonic cruise missile triad.'

The highly coveted BRAHMOS air-launched weapon development programme was jointly undertaken by the scientists and engineers of India and Russia who modified the original anti-ship BRAHMOS configuration so as to integrate onto the Sukhoi-30 air combat platform. After validating its capability to engage naval targets from large, stand-off ranges in day & night and all-weather conditions, the formidable BRAHMOS-ALCM (air-launched cruise missile) subsequently proved its power to accurately engage and neutralise strategic land target during a successful test launch mission conducted by the IAF from India's Car Nicobar Islands on 22 May, 2019.

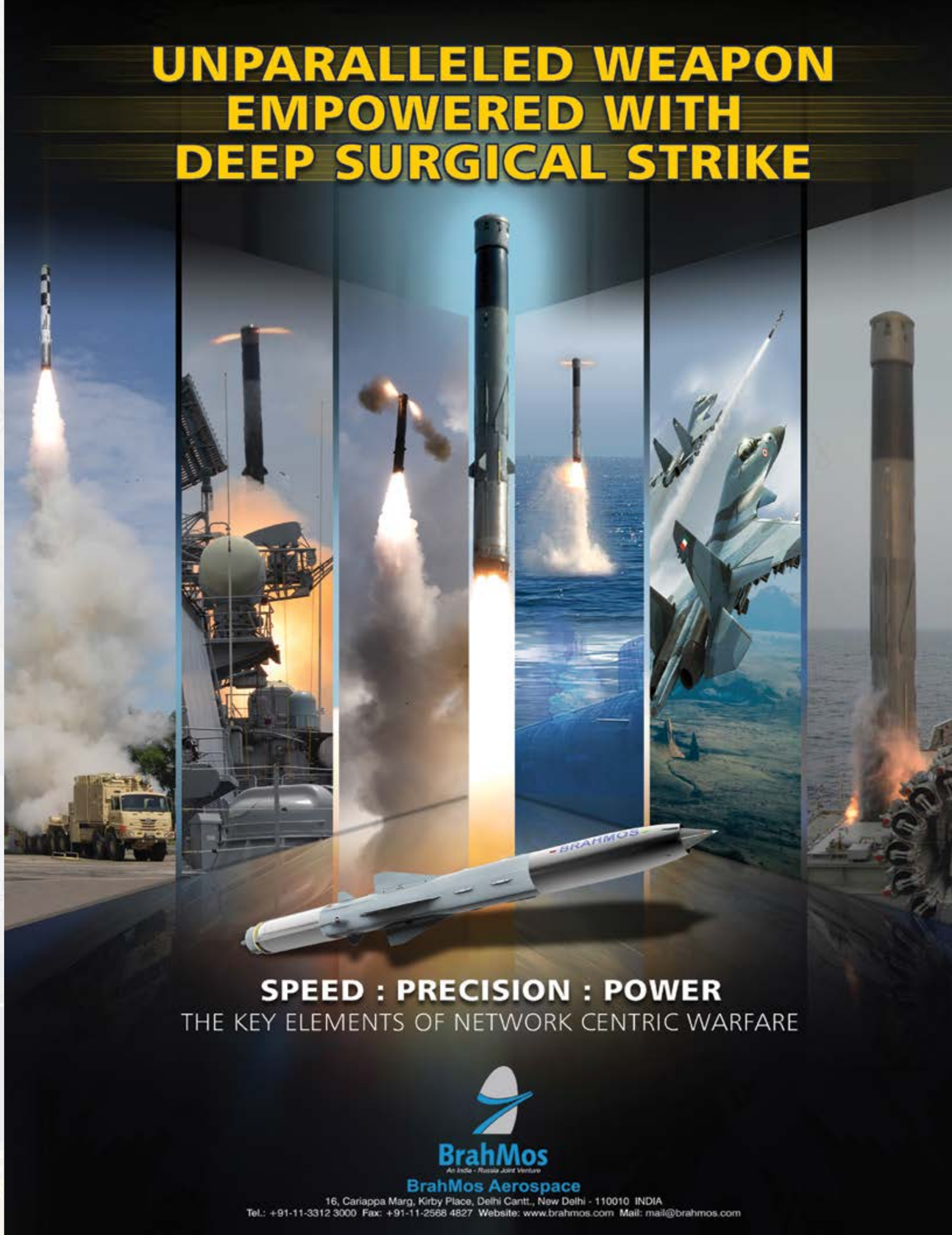
On 20 January, 2020, the IAF raised the 'TigerSharks' squadron consisting the BRAHMOS-armed Su-30MKI strike fighter to keep a 'strategic vigil' over the Indian Ocean Region (IOR) ensuring peace, tranquillity and prosperity. Today, BRAHMOS ALCM has become the world's most powerful conventional air-borne weapon system in terms of its outreach, lethality and combat capability.

Having recorded all these illustrious milestones to its credit, the 'universal' BRAHMOS has thus garnered a lot of interest among many nations across the world who are willing to acquire this powerful weapon for their military.

BrahMos Aerospace, meanwhile, has also initiated work on more advanced, futuristic variants of BRAHMOS, including a miniature version to be called BRAHMOS-NG (next-gen) which, owing to its smaller, smarter, stealthier dimensions, would be integrated onto a wider number of modern military platforms in near future.

BrahMos Aerospace, the JV entity between India and Russia developing, producing and marketing supersonic BRAHMOS, achieved its first export breakthrough in January 2022 when it signed a landmark contract with the Republic of Philippines to deliver shore-based BRAHMOS anti-ship missile batteries to the Armed Forces of Philippines.

'With this historic export deal, we have made our mark in the international market and now intend to expand our footprint further. As a state-of-the-art system combining cutting-edge technologies, BRAHMOS offers a very cost-effective solution for contemporary battles,' says Outstanding Scientist Atul D Rane, (DG, BrahMos, DRDO) and CEO & MD of BrahMos Aerospace. /RA&MG/



RUSSIAN ARTILLERY TODAY: EFFECTIVE AND PRECISE

Successful combat use contributed to the growth of international demand for a number of Russian equipment and weapons, including the latest artillery systems, said Vladimir Artyakov, First Deputy General Director of the Rostec State Corporation.

'If we talk about specific types that have received an increase in demand based on the results of combat use, these are, for example, Su-35 fighter jets, Ka-52 combat helicopters and guided airborne weapons, T-90 type tanks, the TOS-1A heavy flamethrower system, Msta-S self-propelled howitzer, Tornado-G and Tornado-S MLRS, Kub-E loitering munition, air defense and electronic warfare equipment, anti-UAV systems, small arms,' Vladimir Artyakov said in an interview with Rossiyskaya Gazeta.

Multiple Rocket Launchers

The 300 mm multiple launch rocket system (MLRS) Tornado-S (export designation – 9K515) is developed on the basis of the MLRS 9K58 Smerch and is intended for destruction of enemy troops to the depth of their operational formation; command and control points, communications points, air and missile defense systems, electronic warfare systems, as well as logistics facilities and elements of the military-industrial structure.

Improving the combat characteristics of the new 9K515 system in comparison with the Smerch MLRS while maintaining the overall weight and energy characteristics of the projectile and its warhead is ensured by increasing the aerodynamic quality of the projectile and controlling its movement along the entire flight path.

Thus, the firing range has been increased by 1.7 times (up to 120 km); the number of personnel has been reduced by 5 times; the time of readiness to fire from the moment of receiving data about the target has been reduced to 75 seconds; the deviation of the point of impact of guided projectiles from the target is less than the deviation of the point of impact of rockets from the Smerch MLRS – 3-15 times depending on the range. 9K515 provides the ability to fire from one combat vehicle at several targets without moving the launch tube pack. The time for a full salvo of guided missiles is 33 seconds.

For the Tornado-S guided rockets with a maximum firing range of 120 km have been developed. At the same time, the Tornado-S MLRS can fire all types of rockets used by the Smerch MLRS.

The 122-mm Tornado-G MLRS is designed, first of all, to destroy artillery and mortar batteries, air defense units, rear facilities, and enemy motorized infantry units in concentration areas.

The combat vehicle is equipped with an automated guidance and fire control system and preparation and launch equipment, providing: autonomous geolocation and orientation of the combat vehicle on the ground with display on an electronic map; automated calculation of firing settings; guidance of launch tube packs without the crew having to leave the cabin; automated input of data into the rocket fuse. Compact placement of the sighting device is ensured.

Self-Propelled Artillery

In the segment of self-propelled artillery, Russia has developed the 155 mm self-propelled howitzer Msta-S (2S19M1-155). It can be successfully used against fortifications and field warehouses, manpower and firepower at strong points and at deployment lines, against air defense and electronic warfare systems. The howitzer is capable of firing at naval targets within its reach.

Key advantages:

- Lightest weight in the 155 mm SPH class with a barrel length of 52 calibers;
- Ability to load the gun at any elevation angle;
- Ability to overcome water obstacles up to 5 m deep and up to 1000 m wide;
- Original mechanisms for feeding shells and charges from the ground ensure firing at a high rate without consuming transportable ammunition.

To determine the location of the self-propelled howitzer in a given coordinate system, satellite navigation equipment is used. The fighting compartment meets all modern ergonomic requirements.

The automated artillery guidance and fire control system installed on the Msta-S, in combination with fire control vehicles, ensures high efficiency during counter-battery warfare. /RA&MG/

ROSTEC PRESENTS LATEST RUSSIAN PARACHUTE SYSTEMS

For the first time in the Middle East, Rostec presented a line of the latest parachute systems. The Russian exposition at the international exhibition Dubai Airshow 2023 featured a wide range of products – from special-purpose parachute systems to cargo delivery systems and equipment.

Participants and guests of the exhibition were able to get acquainted with the special-purpose parachutes Dalnolet and Berkut 2.

The Dalnolet is intended for landing special forces with a set of necessary equipment. The system allows landing from altitudes from 900 meters to 8 km. Moreover, the flight range when jumping from 8 km, taking into account tailwinds, can reach 60 km. For a more comfortable long-term stay in parachute mode, the system provides a special 'seat'.

The Berkut 2 special-purpose parachute system can be used for landing from all types of aircraft. A wing-type parachute makes possible the landing of both individual paratroopers and a group of parachutists. At the same time, a cargo container weighing up to 50 kg can be attached to the suspension system, which allows landing with weapons and other necessary equipment. The parachute system has a block system, which enables, depending on the goal and design option, to perform a precise landing with landing on a limited area measuring one meter by one meter.

The Russian exposition also demonstrated two container systems for delivering cargo by paratroopers – UGKS-50 and SKG-50. The first one secures loads with a total weight of up to 50 kg when landing from altitudes up to 10 km. The load is attached to the parachutist from the front, and after landing the system can be used as a backpack. The weight of the cargo container is no more than 4 kg. The second, in turn, makes it possible to land a parachutist along with a cargo of non-standard geometric shape weighing up to 50 kg from altitudes up to 10 km.

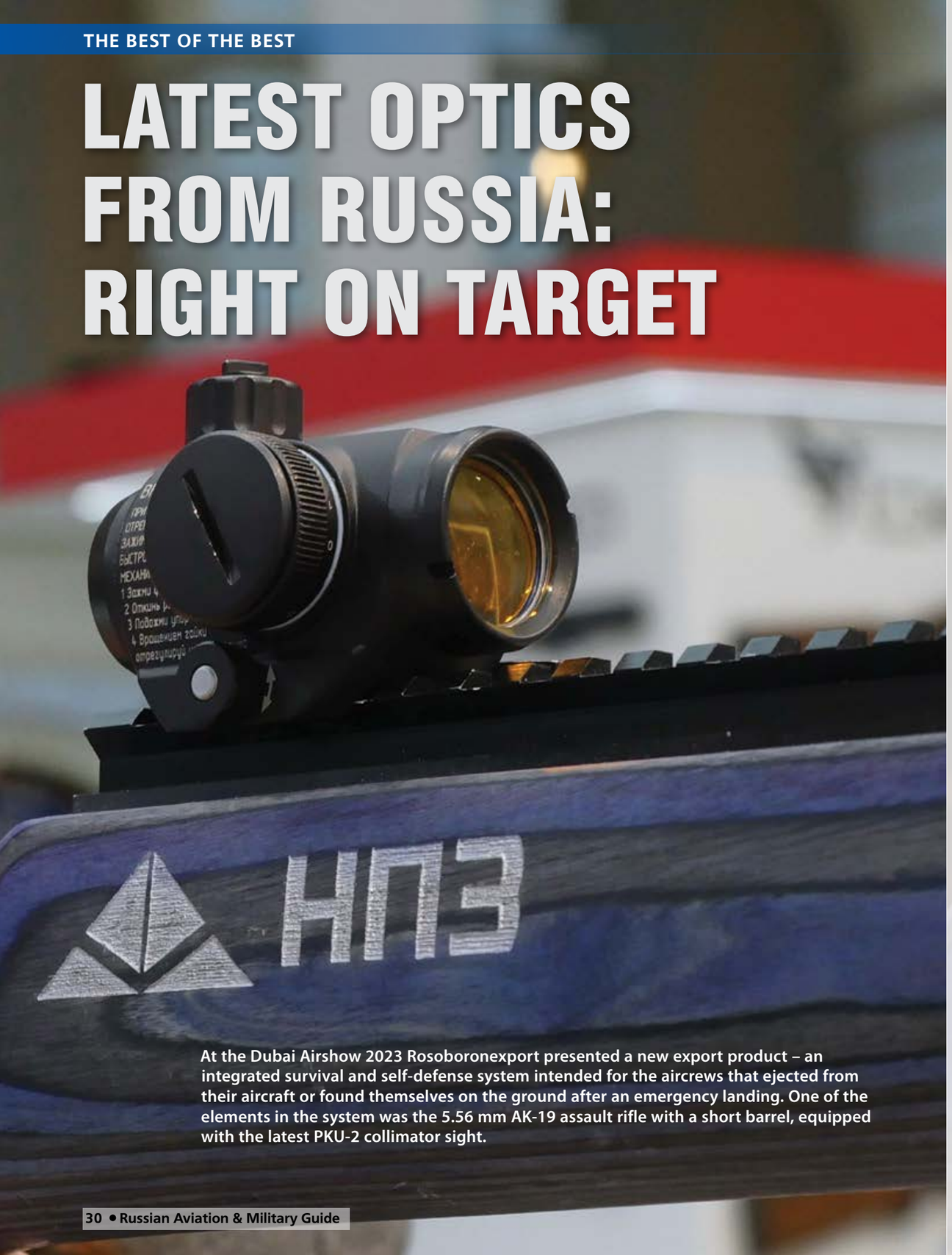
In addition, Rostec presented in Dubai the Tandem-400 two-seat special-purpose parachute system. With its help, one can perform training jumps and jumps on special assignments from altitudes up to 8 km. An experienced parachutist can perform a landing with an unskilled passenger, as well as deliver the necessary equipment and cargo.

The line of parachutes for the delivery of large cargo included the robotic system Junker-DG-250. It ensures precise landing at a given point using satellite navigation signals (GLONASS). The landing accuracy in standard weather conditions is about 100 meters. The automated parachute system allows for the landing of cargo up to 250 kg from altitudes up to 8 km.

The D-6 series 4 parachute system was also presented at Dubai Airshow 2023. It can be used both for combat jumps performed with full service weapons and equipment from military transport aircraft, and for training jumps – from an altitude of up to 8 km.

'All presented samples are already in mass production. Here at the site, we note the significant interest of foreign specialists in Russian parachute technology,' said the Rostec's aviation cluster. /RA&MG/

LATEST OPTICS FROM RUSSIA: RIGHT ON TARGET



At the Dubai Airshow 2023 Rosoboronexport presented a new export product – an integrated survival and self-defense system intended for the aircrews that ejected from their aircraft or found themselves on the ground after an emergency landing. One of the elements in the system was the 5.56 mm AK-19 assault rifle with a short barrel, equipped with the latest PKU-2 collimator sight.

The aircrew survival and self-defense system, offered for foreign markets, is thematically divided into 4 clusters: functional personal items, individual protection and survival equipment, communications and surveillance equipment, as well as self-defense weapons.

The PKU-2M collimator sight significantly improves shooting accuracy. It is an advanced optical system that provides superior accuracy at a variety of shooting distances and conditions. The device has an extremely low parallax value, and the aiming point is reduced to two arc minutes, which increases the accuracy of aiming when shooting at small targets. Operating time – up to 10 thousand hours.

In addition, the sight is developed using high-contrast technology – the beam-splitter coating ensures high brightness of the aiming mark and does not distort the background color rendition.

The developer and manufacturer of the sight, Novosibirsk Instrument-Making Plant, regularly upgrades existing sighting optics, taking into account the needs and wishes of consumers.

The new equipment includes a PN21K night monocular. This device allows surveillance in illumination levels up to (3-5) x 10-3 and improves overall awareness and safety during night operations. The design of the monocular allows to combine two monoculars into one binocular night vision device with single or triple magnification. It is possible to place the monocular on the head or helmet, move it from one eye to the other, or mount it on a weapon using an adapter bracket on the picatinny rail. The device is also equipped with protection of the electron-optical converter from short-term flashes of light.

Thanks to the PN21K, it becomes possible to carry out effective operations in low light conditions. /RA&MG/

The new equipment includes a PN21K night monocular. This device allows surveillance in illumination levels up to (3-5) x 10-3 and improves overall awareness and safety during night operations. The design of the monocular allows to combine two monoculars into one binocular night vision device with single or triple magnification.

IL-78MK-90A

Tanker aircraft

Versatile platform – inflight and on the ground refuelling or transportation of cargoes

Simultaneous inflight refueling of one heavy or up to 2 tactical aircraft and up to 4 aircraft on the ground. Apart from its main mission it can be converted into a transport aircraft or for execution of other missions.

IL-78MK-90A tanker is intended for in-flight refueling of different types of aircraft by means of three aerial refueling pods and can perform fuel distribution on-ground.

The aircraft may perform the take-off and landing from/on the paved and unpaved airfields.

In operation conditions during few hours the IL-78MK-90A can be converted and be employed as a transport aircraft for transportation and airdropping of vehicles, cargoes and paratroopers.

Main characteristics

- Max takeoff weight, t 210
- Transferable fuel inflight at a distance of 1000 km, t 78
- Inflight refueling speed, km/h 450-600
- Refueling pod transfer capacity inflight, l/min ..... up to 2.500
- Maximum payload in transport version, t 60
- Flight range (with 60 t payload), km 4.000
- Number of transported troops / in a double deck version (in a transport variant) 145/225

IL-76MD-90AE

Military transport aircraft

Bestseller on the heavy transport aviation market

Multifunctional aircraft is capable to perform intercontinental transportation of cargoes, military equipment and servicemen. It can be operated from unpaved airfields and employed in various geographic conditions, day-and-night.

The IL-76MD-90AE military transport aircraft is designed to airlift troops, cargo, military equipment and weapons, as well as to conduct airdropping and airlanding of personnel, cargo, military equipment and weapons.

The IL-76MD-90AE can be converted into ambulance or fire-fighting versions.

The aircraft provides capability of autonomous deployment and operation on unprepared airfields (including loading/unloading operations).

The IL-76MD-90AE aircraft equipped with PS-90A-76 engines meets all the international ecological ICAO navigation, flight safety, noise and emission requirements and thus it can be operated all over the world.

Main characteristics

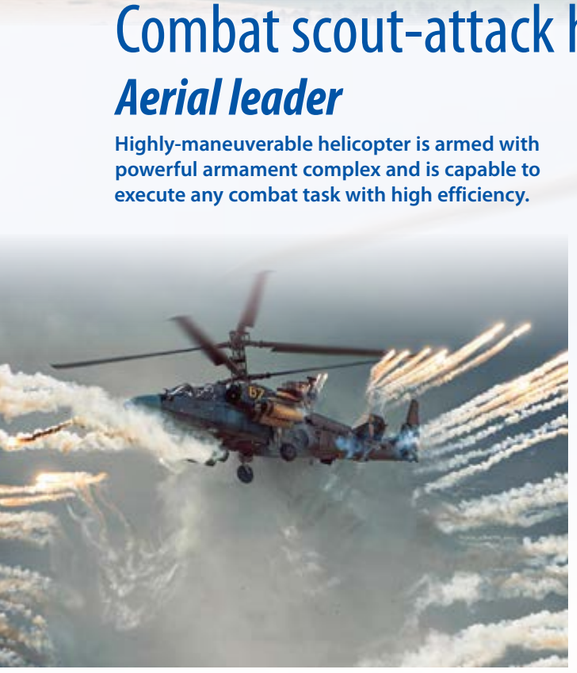
- Max takeoff weight, t 210
- Max payload weight, t 60
- Maximum speed, km/h 800
- Service ceiling, km 12.2
- Flight range (60 ton payload), km 4,000
- Number of transported troops (in a single / double deck versions) 145/225

Ka-52E

Combat scout-attack helicopter

Aerial leader

Highly-maneuverable helicopter is armed with powerful armament complex and is capable to execute any combat task with high efficiency.



Ka-52E Combat Scout Attack Helicopter is designed for destruction of tanks, armored and non-armored vehicles, enemy's manpower and adversary helicopters in the front line or in tactical depth. The helicopter provides transfer of target reconnaissance, target distribution and target designation data to interacted helicopters and command posts of Ground Forces.

Ka-52E has a high combat survivability and combat power, it can be operated round-the-clock, it has a wide range of aerial weapons that can be mounted on 6 hardpoints and it is the only helicopter in the world that is equipped with the Ejection & Shock absorbing System.

Moreover, there is a ship-based version of the helicopter with 4 hardpoints, blade-folding and a wing-console section pivoting mechanisms for basing on decks or in hangars of ships.

Main characteristics

- Normal takeoff weight, kg 12,200
- Max speed, km/h 300
- Maximum climb-rate, m/s 16
- Service ceiling, m 5,500
- Hovering ceiling, m 4,000
- Range (with internal fuel tanks), km 460
- Maximum payload, kg 2,942

Mi-171Sh

Military transport helicopter

Up-to-date configuration of the legendary helicopter

The most modern version of the Mi-17 military helicopter with the improved flight and operational characteristics, high survivability and flight safety as well as powerful unguided and guided armament complex.

Mi-171Sh military transport helicopter is designed to perform delivery of manpower, transportation of cargoes and materials inside the cargo cabin or on the external sling as well as for airdropping of tactical troops, airlanding of reconnaissance and sabotage groups and destruction of ground objects.

The helicopter can be operated for medical evacuation, delivery of the emergency medical healthcare onboard, provision of the search and rescue missions in combat conditions. Mi-171Sh features high transport capabilities, it can be effectively employed in special operations, it is self-sufficient and has an out-of-hangar storage capability.

Main characteristics

- Max takeoff weight, kg 13.500
- Max external payload weight, kg 4.000
- Max speed, km/h 280
- Service ceiling, m 6.000
- Range, km:
  with main fuel tanks 610
  with two internal additional fuel tanks 1065
- Cargo cabin volume, m^3 23
- Paratroopers carried in cargo cabin 37

Repellent-Patrul

Complex for counteracting small-sized UAVs

Highly-effective covering infrastructure objects and columns from small-sized UAVs

Possibility of multichannel suppression of UAV communication channels and effective counteraction to a UAV swarm

Designed to detect small-sized UAVs and suppress their communication channels (control and navigation channels) in sector and circular modes.
The system provides for:

- detection, bearing and identification of UAV signals;
- generation and emission of signals for jamming of UAV command and satellite navigation channels.

Can be supplied in both mobile and stationary versions. Has advanced capabilities for identifying and countering commercial UAVs.

Main characteristics

- Range of electronic reconnaissance of UAV communication channels, km 25
- Range of suppression of UAV communication channels in sector mode, km 20
- Range of suppression of UAV communication channels in circular mode, km 4

’Verba’

Man-portable air defense system

Easy-to-use. Efficient. High jamming-protection

Unique MANPADS with high protection against modern types of interference and the implementation of the ’shoot-and-forget’ principe.

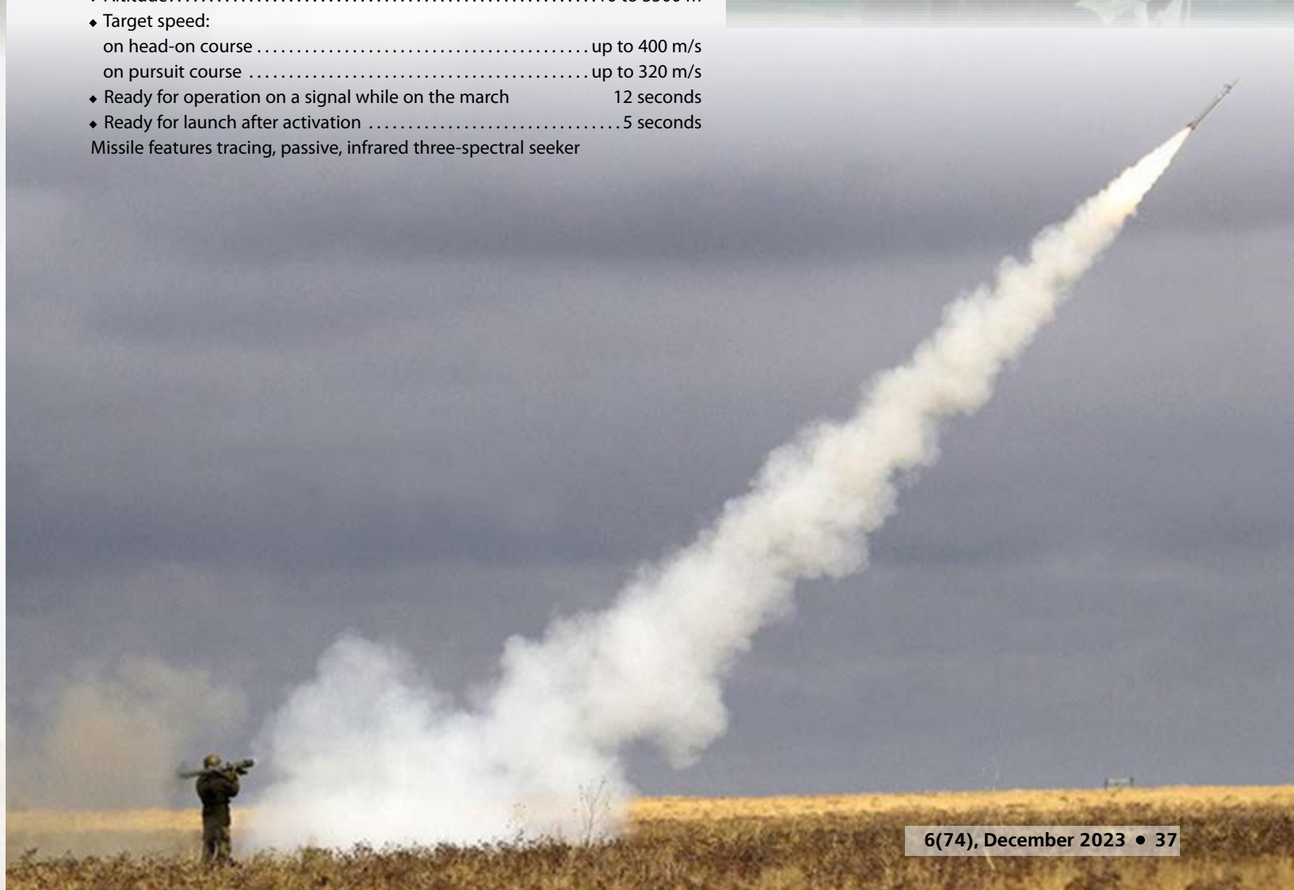
’Verba’ MANPADS is the latest Russian MANPADS with enhanced capabilities when firing at targets with low levels of thermal radiation and a reduced consumption of missiles when destroying various targets.

’Verba’ man-portable air defense system is designed to defeat visible fixed– and rotary-winged aircraft, unmanned aerial vehicles, and cruise missiles on head-on and in pursuit courses under intensive optical interference.

Main characteristics

- Range ..... 500 to 6000 m
- Altitude.....10 to 3500 m
- Target speed:
  on head-on course .....up to 400 m/s
  on pursuit course .....up to 320 m/s
- Ready for operation on a signal while on the march 12 seconds
- Ready for launch after activation .....5 seconds

Missile features tracing, passive, infrared three-spectral seeker



Bastion

Coastal missile system

Instant strike

Mobile costal frontier

- Supersonic speed of missiles;
- High mobility;
- Large impact area;
- The system can deliver strikes from the depth of the territory. It is also possible to disperse system's combat units on a large area;
- Capable of engaging land targets.

A salvo of Yakhont missiles can overcome the air defence system of nearly every ship.

Thanks to the long range of fire and high velocity of Yakhont missiles Bastion is capable of delivering sudden strikes against distant sea-surface targets.

Usage of flexible program-controlled flight path allows missiles to overcome the air defence system and to approach targets from the unexpected directions.

Mobility of the system provides for its high maneuverability and covertness of the combat use.

Bastion coastal missile system ensures reliable defence of large water areas from sea-surface ships.

Main characteristics

- Maximum range of fire, km 300
- Missile's velocity, m/s 680-750
- Angle of after-launch turn, degrees 360
- Number of missiles in a salvo (for 6 launching units), un. 12
- Time of deployment, min 5

Rubez-ME

Coastal tactical missile system

One – vehicle army

Missile ship on wheels

- Substantial fire power;
- Compact;
- Possibility to have various configuration and composition;
- Mobile;
- Substantial maneuverability;
- Grate survivability, covertness and resistance to countermeasures.

Target designation and combat systems are installed on one platform so that Rubez-ME can be used either as a single combat unit or as a group of up to 8 vehicles.

Thanks to the composition of the system, current tactical situation and assigned combat task, various configurations of armament and technical equipment with flexible fire control can be formed.

Rubez-ME coastal defence system can effectively combat against surface ships in littoral areas using minimized composition of armament and technical means.

Main characteristics

- Mass of the launcher unit, t. 26
- Maximum speed, km/h 75
- Crew, men 2
- Range of fire, km 260
- Ammunition load, missiles 4
- Missile's speed, M 0,85
- Target detection range:
  by an active radar, km ..... up to 100
  by a passive radar, km ..... up to 450

Viking (9K317ME)

Multichannel, highly mobile multi-functional medium-range air defense missile system

Full confidence in protection

The latest ADMS is ideal for providing air defense for troops (military installations) in various types of military operations, administrative and industrial facilities and territories of the country.

'Viking' ADMS is capable of hitting aerodynamic targets, tactical ballistic missiles and ground (surface) radio-contrast objects. The system has the possibility of autonomous use of self-propelled firing systems (radars with launchers).

'Viking' medium-range ADMS is designed for air defense of military facilities and troops in the theatre against massive air strikes of prospective means of air attack in contested electronic and fire-intensive environment.

Main characteristics

- The system provides for engagement of the aircraft with radar cross-section area of 2 sq. m:
  - on slant range ..... up to 65 km
  - on altitude ..... up to 25 km
- The slant range against tactical ballistic missiles ..... up to 25 km
- Range against cruise missiles ..... up to 20 km
- Helicopter / hovering targets
- engagement range ..... up to 60/12 km

Msta-S

Modernized 155mm self-propelled howitzer

The modernized 155mm Msta-S self-propelled howitzer is designed to engage (neutralize) enemy artillery and mortar batteries; tanks, anti-tank and other armored vehicles; manpower and fire means, control points, air defence, missile defence and electronic weaponry; destroy field fortifications and other defensive structures; deny the enemy's ability to maneuver its infantry and armored reserves.

Advantages of the self-propelled howitzer:

- lowest weight among 155mm/52-caliber SPGs;
- the gun can be loaded at any angle of elevation and a traverse through 360 degrees;
- automatic laying and laying recovery after each shot;
- capability to cross water obstacles up to 5 meters deep and up to 1,000 meters wide;
- original mechanisms feeding projectiles and charges from the ground provide high-rate firing without using the carried ammunition load;
- gun laying and firing are possible in emergency in the event of power failure.

An automated laying and fire control system (ALFCS) installed on the self-propelled howitzer, combined with artillery fire control vehicles, provides highly effective counter-battery fire. The use of the ALFCS reduces the emplacement time 1.5-2 times, shortens the time to open fire by 25-30%, and doubles the survivability of the 2S19M1-155 self-propelled howitzer on the battlefield.

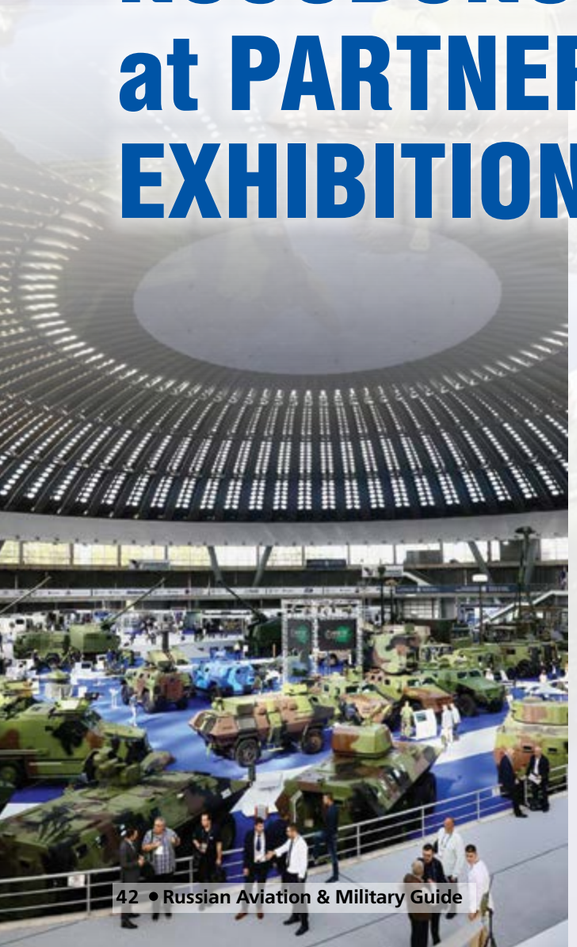
The self-propelled howitzer can deliver both indirect and direct fire only at the halt without the preliminary preparation of firing positions. Laying method is automatic, semi-automatic, manual.

Main characteristics

- Weight, t 43,0
- Length, m 12,42
- Width, m 3,38
- Height, m 2,98
- Barrel length, caliber 52
- Ammunition employed ..... NATO standard, Bofors, ERFB, Krasnopol-M guided projectile
- Max range of fire, km:
  - HE projectile 30,0
  - base-bleed HE projectile 41,0
- Carried ammunition load, rds 45
- Rate of fire, rds/min 6-8
- Time to open fire after receiving the target coordinates, min 0,5
- Laying angles, deg:
  - elevation ..... -4...+70
  - traverse 360
- Loading ..... automatic loading of projectiles and charges (charges are fed manually)
- Operational range, km 500
- Max speed, km/h 60
- Crew 5

ROSOBORONEXPORT at PARTNER 2023 EXHIBITION IN BELGRADE

Rosoboronexport JSC (part of Rostec state corporation) presented wide line of russian military and security innovations at the Partner international defense exhibition 2023 in Belgrade, Republic of Serbia.



'Rosoboronexport highly appreciates the warm relations between Russia and Serbia, which have historically been culturally close states. The cooperation of our fraternal peoples is strategic in nature, proven by time and a variety of external factors. Today Serbia consistently pursues a state policy to protect its own interests in Europe and the world. Russia has always contributed to Serbia's aspirations to strengthen the country's sovereignty and independence,' said Alexander Mikheev, Director General of Rosoboronexport.

For needs of the ground forces, Rosoboronexport presented Russian-made weapons that are most in demand in the market, including the T-90S and T-90MS MBTs, TOS-1A heavy flamethrower system, 9K515 (Tornado-S) multiple rocket launcher system, the upgraded Msta-S self-propelled howitzer featuring the 155mm caliber, BMPT tank support fighting vehicle, as well as Kornet-E and Kornet-EM ATGM systems. The company also offered diverse engineer equipment – obstacle-clearing vehicles, mine-clearing vehicles, bridge-laying vehicles and mechanized bridge systems.

Great interest was in Russian small arms. Rosoboronexport showcased the latest products from Kalashnikov Group and High Precision Systems, both are subsidiaries of Rostec: Kalashnikov AK-308 and AK-19 assault rifles, Kalashnikov PPK-20 submachine gun, 6P68 and 6P67 Kord balanced-action assault rifles.

Rosoboronexport also presented Su-35, Su-30SME and MiG-35 fighters, Yak-130 combat trainer, IL-76MD-90A(E) military transport aircraft and Il-78MK-90A tanker aircraft to Air Force representatives. Considerable interest was in the Ka-52E scout/attack helicopter, Mi-17 military transport and the Mi-35M transport/attack helicopters. The company exhibited a wide range of air weapons.

Given the high interest of the world market in unmanned aerial vehicles, the Orion-E reconnaissance/strike unmanned aircraft system, Orlan-10E and Orlan-30 reconnaissance UAVs were display at the company's booth.

To build a layered air defense system, Rosoboronexport offered anti-aircraft missile systems of various ranges, including Viking, Buk-M2E, Tor-M2KM, Pantsir-S1M SPAAGM system, and Verba and Igla-S MANPADS. The presented air defense assets can be effectively used not only to defeat a wide class of air targets, but also to counter heavy and medium UAVs.

Rosoboronexport also demonstrated electronic warfare systems at the exhibition, including those countering PGWs and UAVs.

Naval delegations were be shown high-speed assault boats BK-10 and BK-16E.

During the business program of the exhibition, Rosoboronexport acquainted its partners with the broad opportunities for cooperation within the framework of industrial partnership, opportunities for joint development and production of weapons and military equipment, including in the interests of third countries.

/RA&MG/

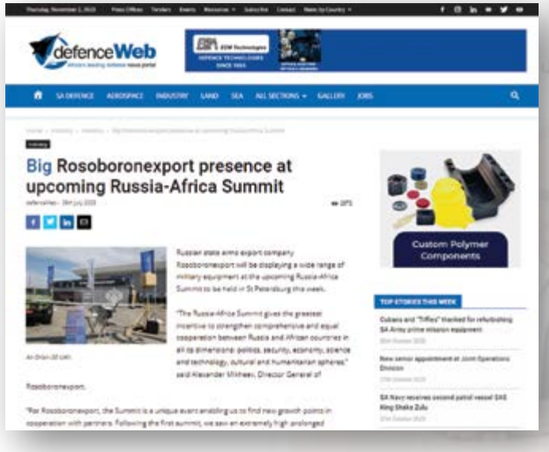
RUSSIAN WEAPONS IN AFRICA: SECURITY FOR CONTINENT

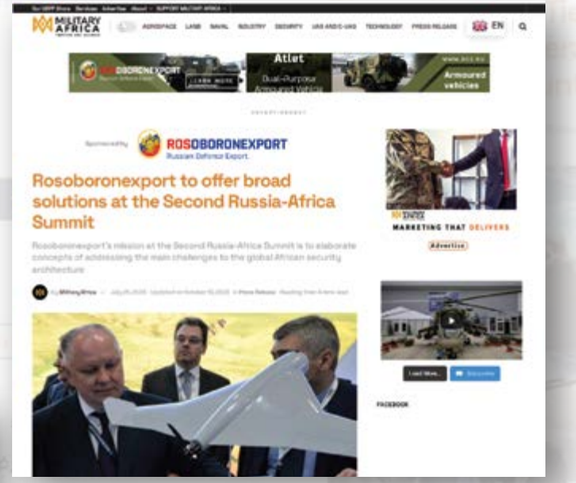
Russian weapons (fighter jets, helicopters, armored vehicles, missile systems, small arms, etc.) ensure the security of many African countries and are used in the fight against terrorism on the continent. Not surprisingly, Russian weapons have always been interesting for African media. Below we offer an overview of African media publications on a wide range of topics – from Russian participation in defense exhibitions on the continent to new products of the Russian military-industrial complex.

St.Petersburg-2023: solutions for Africa's security

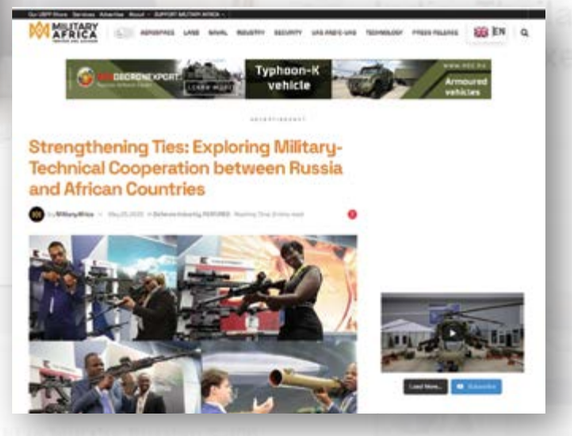
Rosoboronexport actively participated in the Russia-Africa Summit, held on 27 and 28 July in St.Petersburg, and showcased the latest Russian defense and security solutions.

As the South African **DefenceWeb** reported, among counterterrorism equipment, small arms, combat gear, tactical optics, non-lethal weapons, screening and explosive detection equipment, perimeter security systems and satellite communication systems were presented. In the Intelligent Digital Technologies zone, Rosoboronexport showed IT solutions developed by Russian companies, tested in the domestic market and adapted for use in African countries. These included a comprehensive Smart City project, a national-level cyber security platform, as well as Internet monitoring, information protection and legal data interception systems.





'Over the past decades, Russia has significantly expanded its military-technical cooperation with various African countries. This collaboration encompasses a wide range of areas, including arms sales, military training, joint exercises, and defense industry partnerships. The partnership between Russia and African nations has not only fostered strategic relationships but has also presented opportunities for technological advancement and regional security. This year, Russian defense exports are celebrating an important date: the 70th anniversary of the system of military-technical cooperation (MTC) with foreign countries,' wrote **Military Africa** in its large **'Strengthening Ties: Exploring Military-Technical Cooperation between Russia and African Countries'** analysis article.

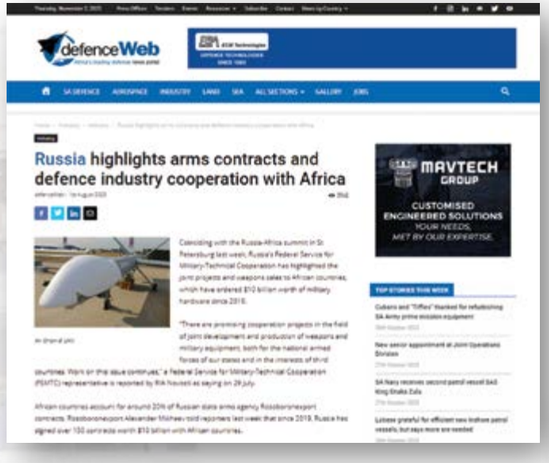


The Russian weapons' outdoor exhibit was divided into thematic sections. In the UAV zone, the Orion reconnaissance/strike UAV, Orlan-10E and Orlan-30 reconnaissance UAVs, Kub-E loitering munition and other battle-proven UAV systems was showcased. Counter-UAV systems, including RB-504P-E, Serp-VS5, Saphir and a number of others, were exhibited in close proximity to the drones, reported the Nigerian **Military Africa**. Spartak, Tiger-Raid and Strela MRAP vehicles were displayed in the armoured combat vehicles zone. In the Russian Helicopters exhibition area forum's guests were able to get acquainted with Russian helicopters models, including the Mi-8MTV-1 medical version, Mi-171E and Mi-38 in VIP configuration, Ansat and the first Russian Mi-171A3 offshore helicopter.

Over the years, the MTC has allowed Russia to become one of the leading suppliers of weapons and military equipment to the world market, noted the media.

Military Africa: 'One of the key aspects of military-technical cooperation between Russia and African countries is arms sales and the provision of defense equipment. Russia has established itself as a major supplier of military hardware, offering a diverse range of weaponry, including aircraft, tanks, naval vessels, and small arms. African countries, often seeking to modernize their armed forces or address security challenges, have turned to Russia for cost-effective solutions'.

Russia-Africa summit in St.Petersburg was an opportunity to maintain and strengthen ties with traditional partners, find reliable customers and start developing new market segments, concluded **DefenceWeb**.



ARMY-2023 expo

Russia's International Military-Technical Forum ARMY is organized and fully supported by the Ministry of Defence of the Russian Federation and combines the exhibition and dynamic demonstration of military equipment capabilities with extensive congress program and strong participation of international audience represented by foreign exhibitors, delegations and visitors.

African media made a detailed coverage of the ARMY-2023 expo.

Military Africa: 'The Army-2023 International Military-Technical Forum, renowned for its comprehensive representation of cutting-edge defence technologies and advancements, continues to stand as a testament to Russia's prowess in the realm of defence innovation. With the successful signing of lucrative contracts and the establishment of collaborative ties, the forum marks a pivotal juncture in the evolution of international military-technical cooperation. Since its commencement on August 14, the Army-2023 Forum has captured global attention as a focal point for military-technical engagement. The week-long event has seen representatives from over 80 foreign enterprises converging at Kubinka's Patriot Russian Army Exhibition Park to establish collaborative relationships and solidify agreements with their Russian counterparts'.

The media payed special attention to the Mi-28NE gunship helicopter.

'The display of the Mi-28NE gunship helicopter was the most prominent figure at the Army 2023 due to its success in the ongoing military operations. The Mi-28NE is also known as Night Hunter due to its impressive firepower, agility, and high combat survivability in the air'.

Egyptian **Al-Akhbar** also covered the ARMY-2023 expo.

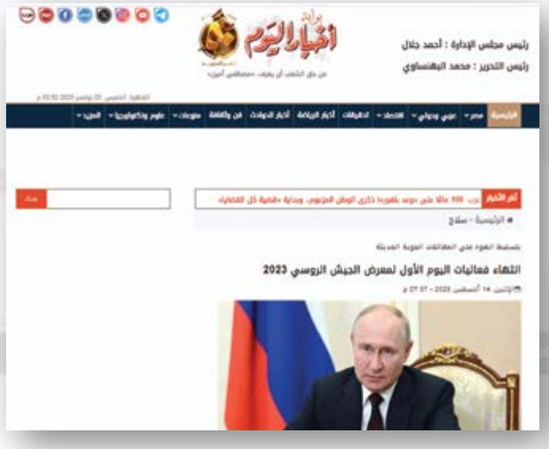
'During the forum, details of the most prominent and latest Russian aircraft, equipment and warships will be revealed. The Russian arms manufacturer Rostec announced the display of the most prominent types of Russian military equipment in the form of imaginary robotic monsters. Rostec explained that the Su-57 fighter will appear as a falcon robot, while the Pantsir missile anti-aircraft system will appear in the form of a powerful mechanical rhino, and the T-90 tank will appear in the form of a bear,' wrote **Al-Akhbar**.

Al-Akhbar: 'The Ninth International Military Technical Exhibition, Army 2023, concluded its first day of activities… The UAC Experimental Center presented a multimedia exhibition describing combat, transport, strategic and special aircraft manufactured by the company's enterprises in the form of Su-34, Su-35, Su-57, Su-30SM, Yak-130, Yak-152, Il-78MK-90A, Il-76MD-90A…'

Russia in South Africa: AAD

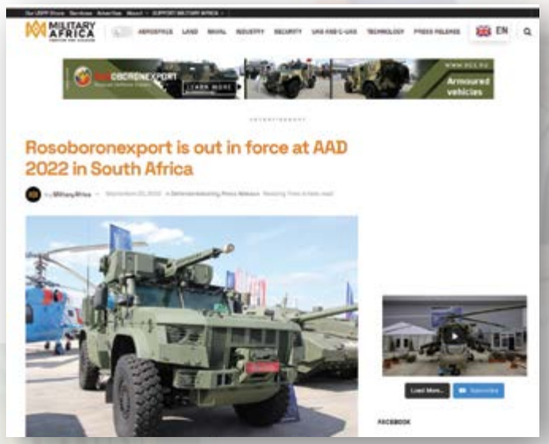
Africa Aerospace and Defence (AAD) exhibition is often referred to as one of the most significant and eventful defense exhibitions in the world.

Russia has traditionally been one of the leading participants. The year 2022 was no exception with Russia also being 'in force' in South Africa. **'Rosoboronexport is out in force at AAD 2022 in South Africa'** was the heading of **Military Africa** story.



Military Africa: 'AAD is considered as the most important marketing event that gathers together representatives from most countries of Sub-Saharan Africa. Rosoboronexport expects delegations from various law enforcement agencies of South Africa and regional states to visit its booth where they will be provided with information on Russian-made weapons and military equipment that are being promoted on the world market'.

Russia showcased a wide range of automotive and special-purpose vehicles, engineer and road-building equipment, and tactical vehicles for personnel transportation, added **Military Africa**.



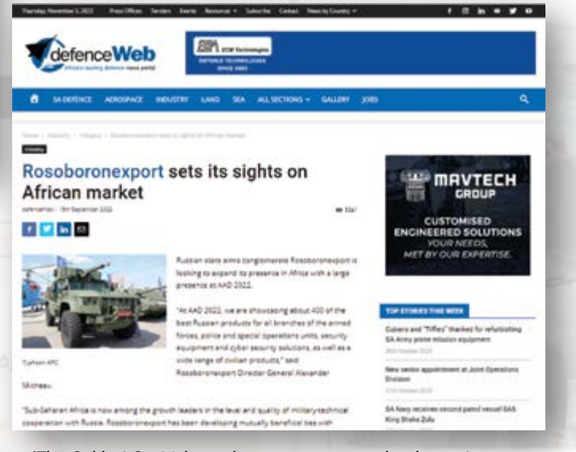
Rosoboronexport, as **DefenceWeb** reported, showcased Russian-made hardware for land forces including the T-90S main battle tank, TOS-1A heavy flamethrower system, Smerch multiple rocket launcher system, Msta-S self-propelled howitzer with a standard NATO 155 mm gun, BTR-80A and BTR-82A armoured personnel carriers, various versions of the Tigr and Typhoon wheeled armoured vehicles, as well as the Kornet-EM anti-tank guided missile system. Small arms, including Kalashnikov AK-100-, AK-200– series, AK-12, AK-15 and AK-19 assault rifles, and body armour were also on display.

'Russia has been taking part in AAD since 2000 and views it as an important part of strengthening its positions in Africa. With many countries on the continent having been long-time Soviet clients, and having vast experience in operating soviet and Russian-made defence systems, the Russians still favour themselves to win many new contracts,' reported **DefenceWeb**.

Russian weapons – evaluation by African media

Specialized military-technical media of African countries in recent years have published a lot of materials on the features of modern Russian weapons of all types.

Military Africa in its 2017 story **'Most capable fighter jets in Africa'** highlighted MiG-23, MiG-29, MiG-25, Su-27 and Su-30 (topping the list).



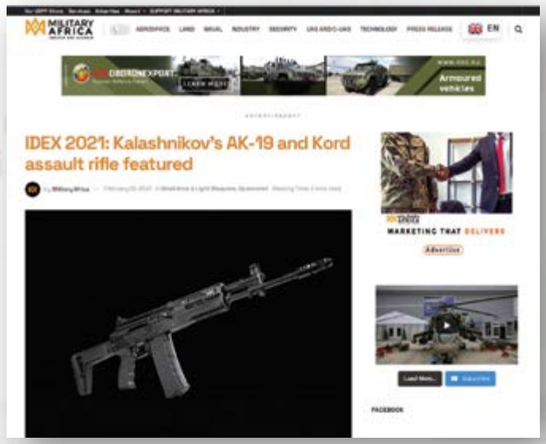
'The Sukhoi Su-30 has a large weapons payload carrying capacity. In WVR engagement, the Su-30 is very agile with a fast turn rate and smaller turn radius utilizing thrust vectoring technology. In an International Air Combat Exercise, Indian Air Force Su-30MKI defeated the Eurofighter Typhoon 12-0 in Within Visual Range (WVR) exercise,' wrote **Military Africa**.

'Why the Kalashnikov AK-47 Rifle is so popular in Africa' – the heading of this Military Africa's story speaks for itself.

'The Kalashnikov AK-47 has been in all conflict in Africa since the 1950s. Mozambique even went further and immortalized it on their flag. The AK-47 has seen battles from the urban cities to the dense Central African jungles, the harsh North African desert down to the Southern Savannah. Despite being in circulation in Africa for years, the Kalashnikov and its variants remain the most widely used rifle compared to their Western counterparts due to its reliability under harsh conditions, simplicity and low production costs amongst others. It can be found in virtually every geographic region in the continent'.

In 2021 **Military Africa** made a big story on of the latest products of Kalashnikov – the AK-19 assault rifle.

'The legendary Kalashnikov AK platform has further evolved into the long-anticipated AK-19 assault rifle in the world market, chambered for 5.56x45mm NATO. The AK-19, like any Russian Kalashnikov assault rifle, gives confidence in every shot. With its telescopic stock and other technical solutions that improve ergonomics, the weapon is extremely handy to a soldier of any army in the world, regardless of his anthropometric data'.



The Egyptian **Defense Network** in recent years has covered almost all product segments of Russian military-industrial complex. In 2019 story **'Russian armored vehicle designed to destroy tanks'** it analyzed capabilities of Kornet anti-tank guided missile system installed on the Typhoon chassis.

'Russia has a distinctive armored vehicle dedicated to confronting enemy tanks and is described as a tank destroyer. This vehicle, known as the K-53949, is equipped with the Kornet anti-tank missile system, and can effectively deal with modern enemy tanks. It was repeatedly displayed during military parades held by the Russian Armed Forces in Moscow's Red Square'.

Terminator tank support combat vehicle became another theme for **Defense Network**.

'Terminator is a multi-purpose armed and armored anti-tank platform that features powerful weaponry, advanced fire control and high maneuverability. The Terminator is capable of hitting lightly armored targets, tanks and infantry fighting vehicles, and works jointly with air defense systems on the battlefield'.

Defense Network also covered the successes of Russia in projects of military-technical cooperation with its partners, for example, Kalashnikov AK203 project with India.

'The deal would make India the first foreign country to produce the AK-200 series of the world-famous Kalashnikov assault rifles', reported in 2021 **Defense Network**. /RA&MG/

INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES IN 2023–2024

'GUIDE' №06 (74)	November 20th	**EDEX 2023** (04-07.12.2023, Egypt, New Cairo)
'GUIDE' №01 (75)	January 05th	**DEFEXPO INDIA 2024** (January 2024, India)
'GUIDE' №02 (76)	January 18th	**World Defense Show 2024** (04-08.02.2024, Saudi Arabia, Riyadh)
'GUIDE' №03 (77)	March 01th	**ArmHiTec 2024** (March 2024, Armenia, Yerevan)
'GUIDE' №04 (78)	March 20th	**Eurasia Airshow 2024** (April 2024, Turkey, Antalya)
'GUIDE' №05 (79)	March 20th	**DSA 2024** (06-09.05.2024, Malaysia, K.Lumpur)
'GUIDE' №06 (80)	March 20th	**International Exhibition of National Security and Resilience 2024** (21-23.05.2024, UAE, Abu Dhabi)
'GUIDE' №07 (81)	May 05th	**KADEX 2024** (23-26.05.2024, Kazakhstan, Astana)
'GUIDE' №08 (82)	May 10th	**MAKS-2024** (July, 2024, Russia, Moscow)
'GUIDE' №09 (83)	July 01th	**ARMY-2024** (12-18.2024, Russia, Moscow)
'GUIDE' №10 (84)	August 15th	**Egypt International Airshow** (02-05 September, Egypt, El Alamein)
'GUIDE' №11 (85)	August 31th	**Africa Aerospace and Defence 2024** (18-22.09.2024, South Africa, Pretoria)
'GUIDE' №12 (86)	September 06th	**ADEX 2024** (24-26.09.2024, Azerbaijan, Baku)
'GUIDE' №13 (87)	September 15th	**SOFEX 2024** (October-November 2024, Jordan, Amman)
'GUIDE' №14 (88)	October 15th	**INDO DEFENCE 2024** (06-09.11.2024, Indonesia, Jakarta)
'GUIDE' №15 (89)	October 22th	**Airshow China 2024** (12-17.11.2024, China, Zhuhai)
'GUIDE' №16 (90)	October 25th	**IDEAS 2024** (19-22.11.2024, Pakistan, Karachi)
'GUIDE' №17 (91)	November 15th	**ExpoNaval 2024** (03-06.12.2024, Chile, Valparaiso)
'GUIDE' №18 (92)	November 18th	**IRAN Airshow** (10-13.12.2024, Iran, Kish Island)
'GUIDE' №19 (93)	November 20th	**Vietnam Defence 2024** (18-22.12.2024, Hanoi, Vietnam)

The 'Russian Aviation & Military Guide' is English-language international magazine distributed all over the world.

The 'Russian Aviation & Military Guide' magazine subscription can be ordered after any issue of the magazine with the delivery anywhere in the world. The price of any one issue of the magazine is $8,88 plus the cost of postal delivery.
Send your requests for invoicing for the subscription at the address ramg@ramg.info or rus.avia.military@gmail.com. The number of copies, period of the subscription, the address for invoicing and for delivery and your contacts, including information about the person who pays for the subscription, should be in the request.

The editing office send only paid subscription.

doc@promweekly.ru
promweekly@promweekly.ru
www.promweekly.ru
www.ramg.info
Media postal address:
Moscow, Russia, 123104, mailbox 29, Industrial Publishing
© 'United Industrial Publishing', 2023

SPECIAL PARTNERSHIP

INTEGRATED SAFETY & SECURITY EXHIBITION
2024
29 May — 1 June
PATRIOT EXPO
ORGANIZER
EMERCOM OF RUSSIA
EXHIBITION OPERATOR
MKB
INTERNATIONAL CONGRESSES AND EXHIBITIONS
www.isse-russia.ru

ORGANIZER

MINISTRY OF DEFENCE
OF THE RUSSIAN FEDERATION

EXHIBITION OPERATOR

MKB

INTERNATIONAL CONGRESSES
AND EXHIBITIONS

ARMY

INTERNATIONAL MILITARY-TECHNICAL FORUM "ARMY-2024"

AUGUST 12–18
PATRIOT EXPO

www.rusarmyexpo.com