RUSSIAN AVIATION & MILITARY GUIDE

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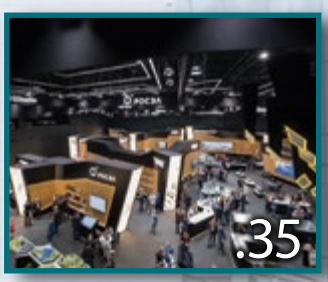

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ARMY 2020
SPECIAL PARTNERSHIP

Международный военно-технический форум

ARMY 2020

OFFICIAL SHOW-DAILY

ДЕНЬ ПЕРВЫЙ

№01, 23 августа 2020 года

ОФИЦИАЛЬНОЕ ЕЖЕДНЕВНОЕ ИЗДАНИЕ ФОРУМА

Главный форум

Инновационный союз ОПК России и Вооруженных сил РФ

«С 22 по 27 августа Министерство обороны Российской Федерации проводит Международный военно-технический форум «АРМИЯ-2017». Это третье по счету масштабное мероприятие, в котором примут участие крупные отечественные и зарубежные предприятия оборонно-промышленного комплекса, ведущие конструкторские бюро и научно-исследовательские институты.

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

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

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

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Russia at the Forum Army-2020

Political situation in the world makes nations once again reconsider their defense possibilities. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and nonending crisis – all of this leads to an unstable and dangerous situation. One can predict raise of defense means market in times like this. But together with developing of defense technologies in order to secure people's safety, rivalry among sellers of weapons and defense systems increases in order to achieve such goals as increasing profits and market share.

World experience shows that it is not about how many weapons you have, but quality and possibilities of every single one of them is what leads to victory on the battlefield. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hitech technology, solid aftersales service and proven reliability of products, Russia is honest and friendly partner for all countries, ready for mutual work. And everything that is presented at the International militarytechnical forum ARMY-2020 is showed that Russia ready to cooperate for interest of international security.

Valeriy Stolnikov

Dear friends!

The 6th edition of International Military-Technical Forum 'Army-2020' will be held in August. This event will gather not only experts in military field but also all people interested in high-tech developments of Russian defence industry.

Large-scale demonstration of defence industry achievements will enhance technical reequipment of the Armed Forces, strengthen Russian within global arms market as well as reinforce the image of Russian Army.

As always, we are preparing intensive demonstration, congress and cultural programs to be held at Patriot Expo, Patriot Park and all the military commands and the Northern Fleet. We will pay our special attention to thematic exhibition 'VICTORY', special exposition 'INNOVATIONS DAY' and our Aviation Cluster. Particularly we will organize unique program of combating UAVs at Ashuluk training grounds.

Forum 'Army-2020' will be held simultaneously with International Army Games – which is the main distinguishing feature of the Forum this year. Two key events of the Ministry of Defence will increase the potential of each other.

The impression of dynamic display of the equipment will be strengthened by the thrill of competition between teams. The number of international delegations will increase, as well as the opportunities of holding official negotiations and meetings will expand.

I wish to all the participants and organizers very efficient work, inexhaustible enthusiasm and strong performance, and all the guests are welcome to be in a good mood and have unforgettable emotions.

Sergei Shoigu,
Minister of Defence of the Russian Federation, General of the Army

FORUM ARMY-2020

Dear friends!

I am pleased to welcome the organisers, participants and visitors of the Army-2020 International Military-Technical Forum.

Now in the sixth year of existence, the forum has grown to become a respectable international platform for discussing various aspects of military-technical cooperation. In addition, the Russian Defence Ministry annually presents a spectacular demonstration programme featuring variegated examples of advanced military technology.

I am pleased to say that, despite the coronavirus pandemic, about 70 countries of more than 130 invited have confirmed their intention to participate in this year's event.

For the first time in history, the 2020 exhibition will coincide with the International Army Games.

The area occupied by the static display grows every year, and will exceed 320,000 square metres in 2020. More than 700 pieces of armament and military hardware are being showcased this year, and over 400 will be taking part in dynamic displays with live fire practice.

Among the most interesting new developments are the Antey-400 surface-to-air missile system, the Strela light armoured vehicle prototype, the BTR-82-AT armoured personnel carrier with a new remote-controlled combat module, and the Taifun-PVO MANPADS operator vehicle.

I hope that advanced Russian-made examples of military equipment will once again arrest foreign experts' attention, and that Army-2020 will be a dynamic and colourful event.

I am wishing all of you fruitful work at the forum; I am convinced that this event will help with strengthening and expanding military-technical cooperation. Let us do our best to hold successful and effective talks despite the existing external factors.

Dmitry Shugayev,
director of Russia's Federal Service for Military-Technical Cooperation

RUSSIAN PRODUCTS FOR ALL SEGMENTS OF THE GLOBAL ARMS MARKET

Rosoboronexport JSC (part of the Rostec State Corporation) will present to its foreign partners weapons for all segments of the global arms market at the Army-2020 International Military-Technical Forum, which will be held on August 23 to 29, 2020 on the premises of the Patriot Convention and Exhibition Center of the Armed Forces of the Russian Federation at Kubinka near Moscow.

'This year, the Army Forum will be the first major event for the global defense industry following the lifting of restrictions caused by the COVID-19 pandemic. The Forum will provide a signal to the global arms market to recover and, I am sure, will give an impetus to the further development of military-technical cooperation with foreign countries. This is a great opportunity for Russian defense companies to show their readiness to increase deliveries of high-tech products and expand their geographic footprint,' said Rostec CEO Sergey Chemezov.

For several years, the Army Forum has become not only one of the most representative Russian exhibition projects, but also one of the most authoritative international venues for discussing issues of military and military-technical cooperation. Rosoboronexport is one of the main sponsors and active participants of the event.

Among the key features of the Army Forum are the exceptional visibility and comprehensive nature of the exhibition. The combination of static displays and live demonstrations makes it possible to better assess the advantages of the presented weapons, military and special equipment, and civilian products. For this purpose, three Land Forces, Naval and Air Force demonstration clusters are used.

'The list of products that Rosoboronexport will show at the Army Forum sites in 2020 covers all segments of today's market of weapons, military and special equipment. Among the key pieces of military equipment of the Land Forces, we are preparing to show our partners the T-14 MBT and the T-15 tank support fighting vehicle built on the Armata platform, the Kurganets-25 new-generation tracked infantry fighting vehicle, the Boomerang-series wheeled armored vehicles, the Iskander theater missile system, the new 9K515 multiple rocket launcher system, the 152 mm 2S35 Koalitsiya-SV inter-service self-propelled artillery system, the 82 mm 2S41 Drok mortar, a family of Tigr-M, Typhoon and other armored vehicles built on Ural and KAMAZ chassis. Among the air defense systems are the Vityaz SAM system, the 57 mm Derivatsiya-PVO AA artillery system, and a counter-drone system,' said Alexander Mikheev, Director General of Rosoboronexport.

The exhibition will enable the Forum guests to appreciate Rosoboronexport's comprehensive approach to ensuring the military security of the countries concerned. The Company offers its partners to build a balanced system that com-

Dear colleagues and friends!

On behalf of Rosoboronexport, the major Russian exporter of military, special-purpose and dual-use products, I would like to welcome and congratulate you on the beginning of the 6th edition of the Army-2020 International Military-Technical Forum.

The Forum provides a high-profile international platform for discussing military and military-technical cooperation. Celebrating its 20th anniversary this year, Rosoboronexport, a Rostec subsidiary, has become one of the main sponsors and active participants of the Army Forum since its successful launch in 2015. We are especially glad to see an unusually high pace of development of the Forum, which is rapidly achieving new levels of quality of organizational work every year.

2020 is a special year for Army. This is the first major event for the global defense industry after the lifting of restrictions related to the COVID-19 global pandemic. We are confident that the Forum will give enormous impetus to the further development of military-technical cooperation in the world. And we are very pleased that the signal to the world arms market to get out of the regime of large-scale restrictions will be given from Russia, from Patriot, the Main Exhibition Center of the Armed Forces of the Russian Federation.

Weapons and military equipment, as well as dual-use equipment, developed and manufactured in Russia, including at Rostec enterprises, that are on display here attract special attention of specialists from many countries. It is safe to assume that the exhibit being prepared by Rosoboronexport this year will evoke genuine interest among exhibitors and guests of the forum.

The key features of the Army Forum are the exceptional visibility and comprehensiveness of its exhibit. Static displays supplemented with live demonstrations make it possible to more fully assess the advantages of the presented weapons, military and special equipment, and civilian products. For this purpose, three Land Forces, Navy and Air Force demonstration clusters are used.

At Army-2020, Rosoboronexport presents a wide range of Russian products covering all segments of the modern arms and military/special equipment market. Rosoboronexport specialists as well as developers and manufacturers' design engineers, technologists and executives will be able to competently respond to any questions concerning the technical aspects of the products offered.

This year we have taken unprecedented steps to maximize Rosoboronexport's presence at the Forum and to be within easy reach for our partners all the time. The company is permanently housed in 4 locations. Traditionally, our stands are located in Pavilion B and Rostec's

pavilion. In addition, an exhibit was organized at Rosoboronexport's chalet opposite Pavilion A, where the best small arms models from leading Russian manufacturers are presented on one site. Also, this time, the company's new presentation and negotiation area is located at the airfield in Kubinka.

I would like to wish all the participants and guests of the Army-2020 Forum a rich business program, interesting and useful acquaintances, pleasant and fruitful negotiations, new contracts and agreements. We are glad to meet you every time in the Patriot Park!

Alexander Mikheev
Director General
of Rosoboronexport

'Five past Army Forums have confirmed that Russian weapons and military and dual-use equipment attract particular attention of specialists from many countries. It's safe to assume that the exhibit, which Rosoboronexport is preparing this year, will arouse genuine interest of professionals – participants and guests of the Forum. We note that it is through military and military-technical cooperation with Russia that many States see the path to ensure their security and sovereignty. The level of cooperation with our foreign partners shows a steady positive trend and suggests an optimistic outlook.'

Alexander Mikheev

bines various types of weapons and military equipment, modern communications/control/robotics technologies, situation control and information protection systems.

'Five past Army Forums have confirmed that Russian weapons and military and dual-use equipment attract particular attention of specialists from many countries. It's safe to assume that the exhibit, which Rosoboronexport is preparing this year, will arouse genuine interest of professionals – participants and guests of the Forum,' added Alexander Mikheev. 'We note that it is through military and military-technical cooperation with Russia that many States see the path to ensure their security and sovereignty. The level of cooperation with our foreign partners shows a steady positive trend and suggests an optimistic outlook.'

Rosoboronexport, as a state-controlled special exporter of military products, participates in many international arms exhibitions. In 2019, the Company participated in 8 Russian and 17 foreign exhibitions. Its participation in Army is of particular importance for all Russian defense-industrial enterprises.

Last year, Rosoboronexport held more than 50 meetings and negotiations with foreign delegations from 36 countries at the Forum. In addition to delegations from the defense ministries, the Company's exhibit was visited by heads of other law enforcement agencies, Chiefs of General Staffs, commanders-in-chief of the armed forces, and representatives of the defense industry of many countries. The negotiations facilitated the signing of a number of contracts and agreements with foreign partners.

During the Army 2019 Rosoboronexport has signed a number of contracts with foreign customers for the supply of Russian small arms and close combat weapons.

'The Russian industry produces the entire range of close combat weapons, which have proved indispensable in real combat situations, earning excellent reputation and respect around the world. The new contracts not only demonstrate consistently high demand for small arms and grenade launchers and their ammunition being developed by Russian arms makers, but also indicate a global trend towards a growing demand for effective means to counter terrorism and crime. Rosoboronexport is ready to meet this demand fully,' said Alexander Mikheev, Director General of Rosoboronexport.

In addition, Rosoboronexport has been conducting active marketing efforts to export Russian-made civilian and service weapons: dozens of commercial proposals related to the ORSIS T-5000 rifles, Saiga-9, Saiga-12 carbines, many other designs and their ammunition are under consideration by potential foreign buyers. There is also interest among foreign customers in the Vepr carbines and civilian versions of the Tigr sniper rifles. It's because of the high demand that a new section on Russian-made civilian and service weapons has started to be set up by Rosoboronexport on its website.

'Rosoboronexport already has concrete results of its efforts to promote civilian and service weapons: in 2018, we signed the first export contract for the supply of Russian hunting sniper rifles and ammunition. Today we have new serious customers from the countries of the Asia-Pacific region and the Arab East, there are requisitions from them. Moreover, Rosoboronexport is ready not only to supply finished products to the world market, but also to assist foreign partners in the joint development and production of Russian weapons. For example, in March 2019, a joint venture to produce Kalashnikov assault rifles of the latest AK-200 series was launched in India,' the head of Rosoboronexport said.

At the ARMY 2019 International Military and Technical Forum, Russian defense manufacturers was showcase all the bestsellers of the world arms market, including new additions to Rosoboronexport's catalog. Military equipment of the Land Forces was presented in the form of exhibits in the static display area. In addition, its running and combat characteristics were demonstrated in action at the Alabino Proving Ground.

Among the exhibits, the T-90MS main battle tank (MBT), the BMPT Terminator tank support fighting vehicle, the BT-ZF armored personnel vehicle, the Kornet-EM anti-tank missile system, and the 57 mm AU-220M lightweight remote weapon station were of particular interest to foreign customers. Kalashnikov assault rifles of the latest AK-200 series and next-generation Tigr-2 special vehicles, being displayed at Army for the first time, were draw their attention.

Air Force representatives was interested in the Su-35 super-maneuverable fighter, the MiG-29M multi-functional frontline fighter, the Ka-52 reconnaissance/attack helicopter, the Mi-171SH military transport helicopter, the Il-76MD-90A(E) military transport aircraft, and the Ka-226T and Ansat light utility helicopters.

Of air defense and electronic warfare systems, there is high demand for the S-400 Triumph air defense missile system, the Buk-M2E, Tor-M2E (including its wheeled and containerized versions) SAM systems, the Pantsir-S1 air defense missile/gun system, the Igla-S and Verba MANPADS, and also novelties, such as the Viking and Tor-E2 SAM systems, the Gibka-S MANPADS squad combat vehicle, and UAV countermeasures systems.

As to naval materiel, promotional materials for and presentations of the Project 22160E patrol ship, the Project 22356 frigate, the improved Project 20382 Tigr corvette, a modernized Rubezh-ME tactical coastal missile system and others were provided.

The partners also showed interest in promising models that will occupy high positions in their segments of the world market after the relevant paperwork is done. Among them are the T-14 MBT and the T-15 tank support fighting vehicle based on the Armata platform, the B-11 and K-17 IFVs based on the Kurganets-25 and Boomerang platforms respectively, the 82 mm Drok self-propelled mortar and the 57 mm Derivatiya self-propelled AA gun.

'This year, the Army Forum will be the first major event for the global defense industry following the lifting of restrictions caused by the COVID-19 pandemic. The Forum will provide a signal to the global arms market to recover and, I am sure, will give an impetus to the further development of military-technical cooperation with foreign countries. This is a great opportunity for Russian defense companies to show their readiness to increase deliveries of high-tech products and expand their geographic footprint.'

Sergey Chemezov

'We are witnessing the interest of partners to develop or establish their own defense industry as the key trend of the global arms market. Rosoboronexport has already implemented a number of technology partnership projects and has the necessary competencies in the area. We have set up joint ventures to manufacture the Ka-226T helicopters and Kalashnikov AK-203 assault rifles in India, the Nashab rocket-propelled grenade launchers in Jordan, have built and continue to build factories to make Kalashnikov rifles in a number of countries. Together with foreign partners we carry out a variety of R&D projects in the field of arms. Projects in South-East Asia, the Middle East, North Africa, and Latin America are in development,' said Alexander Mikheev.

Through the presence of a wide range of experts from the Russian Ministry of Defense, industry and related organizations, the ARMY Forum is the most effective platform for discussing and launching the latest technology projects in the field of military-technical cooperation. /RA&MG/

INTERNATIONAL MILITARY-TECHNICAL FORUM ARMY-2020 PRESENTS

WORKING CONDITIONS

At the Army-2020 International Military and Technical Forum, the necessary conditions will be created for the fruitful work of foreign partners. This was stated by Major General Andrei Goncharov, Head of the Main Directorate for Research Activities and Technological Support of Advanced Technologies (Innovative Research) of the Russian Defence Ministry, at a briefing for the military-diplomatic corps of foreign states.

'We highly appreciate and support the established business relations with foreign countries and intend to continue to develop international cooperation,' Major General Andrei Goncharov said, stressing that during the forum, sanitary and epidemiological control measures will be strengthened in order to prevent the spread of the new coronavirus infection.

Within the framework of the Forum, negotiations and meetings of the heads of defence departments of foreign states with the leadership of the Russian Ministry of Defence, other federal executive bodies of the Russian Federation and representatives of the Russian defence industry are expected.

To date, 72 states have confirmed the participation in the forum of their delegations, of which 10 are high-level delegations (Armenia, Belarus, Brazil, Vietnam, Iran, Kazakhstan, Lebanon, Rwanda, CAR, South Ossetia). Five countries (Belarus, Brazil, India, Kazakhstan, Pakistan) will present their national expositions at the forum, where our foreign partners will demonstrate the most promising designs and developments.

Briefing for representatives

On August 6, General Andrei Goncharov, Head of the Main Directorate for Research Activities and Technological Support of Advanced Technologies (Innovative Research) of the Russian Ministry of Defence, spoke about the main events of the Army-2020 International Military and Technical Forum for representatives of the military-diplomatic corps of foreign states.

The briefing was attended by over 50 military diplomats accredited in the Russian Federation from more than 50 countries of Europe, the CIS, the Middle East, Africa, the Asia-Pacific region and Latin America.

Andrei Goncharov reminded that the Army-2020 international military-technical forum will be held from 23 to 29 August.

The ARMY Forum is expanding its boundaries and this year the Ashuluk training ground will be added to the traditional sites of the Patriot Congress and Exhibition Centre, Kubinka airfield, Alabino training ground, all military districts and the Northern Fleet, where a unique program of countering unmanned aerial vehicles will be shown.

The forum will be held at the same time as the International Army Games. Such format will provide guests and participants of both events with a unique opportunity to effectively organize their work and attend a spectacular demonstration program.

Traditionally, emphasis will be placed on the quality of events in the scientific and business program, where it is planned to discuss the most important issues of world politics and interstate interaction in the field of global security, solving problems in the spheres of defence, and developing international military-technical cooperation. Well-known public figures, leading scientists, experts and general designers were invited as moderators of the events of the scientific and business program.

The exhibition part of the Forum aviation cluster at the Kubinka airfield has been significantly expanded and updated, within which specialized expositions of promising, modern and historical aviation equipment, as well as weapons, unmanned aircraft and aviation components will be presented.

In the multifunctional firing centre of the Patriot Park, it is planned to demonstrate the capabilities of modern and promising small arms, as well as to hold the International Army Games Guardian of Order competition.

The outside area of the Patriot Congress and Exhibition Centre will host the Fan Club for 30 competitions of the International Army Games.

In addition, the participants and guests of the Forum will be able to visit the Main Cathedral of the Armed Forces of the Russian Federation and the Memory Road Multimedia Historical and Memorial Complex.

Samples of equipment

The Office of the Head of Engineering Troops of the Armed Forces of the Russian Federation will take an active part in the preparation of the VI International Military and Technical Forum.

The exhibition of engineering troops will consist of existing and prospective samples of engineering weapons, which will be presented both at static expositions located in the pavilions and open areas of the 'Patriot' park, and during the dynamic display of special equipment at the facilities of the Alabino polygon.

In total, more than 60 samples of military engineering equipment, devices for searching and neutralizing explosive objects, sets of group and individual equipment of sappers, as well as other means used by engineer troops in conducting special tasks are planned.

The forum will demonstrate a whole range of existing and promising engineering intelligence tools. Including the latest means, the work of which is based on a combination of the physical principles of the search, detection and identification of explosive objects in various covering environments.

Teleconference for the guests

All sites of the Army-2020 International Military-Technical Forum in the Southern Military District, located on the territory of the regional branches of the Patriot Park, will be united by a teleconference.

The opening of the main annual event of public life of the Southern Military District will be broadcasted in real time from 14 constituent entities of the Russian Federation and the Patriot military-patriotic park of the Russian military base in Armenian Gyumri. Thus, the guests of the Forum will be able to see the opening ceremonies and dynamic demonstration of the combat capabilities of weapons and military equipment of each of the 15 regions, including Crimea, Sevastopol, Rostov, Volgograd and Astrakhan regions, Stavropol and Kuban, the republics of the North Caucasus and Armenia.

International Forum in Primorye

Army-2020 International military-technical forum will be held in the Primorsky Territory on August 27-29.

Five sites will be equipped for a demonstration of the forces of the Pacific Fleet, a static exhibition of weapons and military equipment, as well as an exposition of enterprises producing military and dual-use products.

Traditionally, the main forum site will be the 33rd pier of the Pacific Fleet on Korabelnaya embankment in Vladivostok. The opening and closing ceremonies will be held there. It is planned that at the berth there will be displayed warships and auxiliary vessels of the Pacific Fleet, an exposition of military equipment and special-purpose equipment of the Coastal Troops of the Navy, equipment, search and rescue service, in total up to 50 pieces.

The guests of the Forum will be able to familiarize themselves with samples of aviation equipment of the naval aviation of the Navy, planes and helicopters of the Air Forces and Air Defence Army of the Eastern Military District and DOSAAF aviation at the Tsentralnaya Uglovaya airfield in the suburbs of Vladivostok. It is planned to place fighters, anti-submarine aircraft and helicopters, as well as modern anti-aircraft missile systems on this site of the Forum.

In the branch of the Patriot Park on the Russky Island on the Voroshilovskaya Battery, it is planned to deploy an exposition of weapons from the Great Patriotic War and the post-war period.

The scientific and business program of the forum was planned on the basis of the Far Eastern Federal University and in the House of Navy Officers. Scientific conferences and round tables will be held there. At FEFU, specialists will be shown an updated exposition of products from a number of defence industry enterprises.

Survivability of the ships

As part of the events of the scientific and business program of Army-2020 International Military and Technical Forum, a round table 'Perspective ways of ensuring the survivability (fire safety and unsinkability) of the ships of the Navy' will be held.

The organizer of the round table is the Military training and research centre of the Navy.

The event will be attended by leading scientists from research institutes, specialists from research universities, as well as representatives of design bureaus of marine technology and research and production enterprises involved in the implementation of the Military Shipbuilding Program until 2050.

The agenda of the round table includes discussions on promising information support systems for ships of the 4th and 5th generations, the development of a methodology for automatic recognition of pre-emergency and emergency situations, as well as discussions on ensuring the required level of automation of systems for the Russian Navy.

The roundtable participants will discuss the improvement and prospects for the development of naval technology, including the choice of controlled parameters, determine the structures of submarine survivability systems, and assess fire safety criteria for various types of ship spaces.

It is expected that the results of the event will formulate the main directions of development in the field of ensuring the safe operation and fire protection of ships and ships of the Navy.

USE OF ARTIFICIAL INTELLIGENCE

On the sidelines of the Army-2020 International Military and Technical Forum at the Patriot Convention and Exhibition Centre, a briefing on 'Prospects for the use of artificial intelligence technologies in dual-use communication systems' will be held.

The agenda of the event involves the discussion of the prospects for the use of artificial intelligence technologies in dual-use communication complexes.

The event will be attended by specialists from the Russian Ministry of Defence, educational institutions and organizations, as well as representatives of the scientific community and business circles.

It is expected that the discussion will determine the directions for solving problematic issues arising from the use of artificial intelligence technologies.

THE ROUND TABLE

The technology for assessing the risks of man-made emergencies when creating automated decision support systems for controlling the forces (troops) of the Navy with elements of artificial intelligence will be the subject of a professional discussion at a round table at the International Military-Technical Forum Army-2020.

The organizer of the round table is the Military training and research centre of the Navy.

The event will be attended by leading scientists from research institutes, specialists from research universities, as well as representatives of design bureaus.

During the discussion, it is planned to discuss modern trends in the development and application of risk-oriented technologies in the development of artificial intelligence algorithms designed to create decision support systems for management in the Russian Navy.

The attention of specialists will be directed to modern methods of identifying, assessing and predicting the occurrence of dangerous states of complex organizational and technical systems for various purposes, as well as to developing methodological recommendations for taking into account the results obtained, assessing and predicting risks when creating artificial intelligence systems in the areas of management and safety of potentially dangerous fleet facilities.

The participants of the round table will be able to get acquainted with original, patent-promising useful models and organizational and technical solutions in this area, which in the future can become the basis for the creation of an integrated information and management system for decision-making support, both in the event of a threat of occurrence and during man-made emergencies.

ENGINEERING TROOPS AT THE FORUM

The Office of the Head of Engineering Troops of the Armed Forces of the Russian Federation will take an active part in the preparation of the VI International Military and Technical Forum. The exhibition of engineering troops will consist of existing and prospective samples of engineering weapons, which will be presented both at static expositions located in the pavilions and open areas of the 'Patriot' park, and during the dynamic display of special equipment at the facilities of the Alabino polygon.

In total, more than 60 samples of military engineering equipment, devices for searching and neutralizing explosive objects, sets of group and individual equipment of sappers, as well as other means used by engineer troops in conducting special tasks are planned.

The forum will demonstrate a whole range of existing and promising engineering intelligence tools. Including the latest means, the work of which is based on a combination of the physical principles of the search, detection and identification of explosive objects in various covering environments.

IMPROVING INFORMATION SUPPORT

Topical issues of development of information support and radio-technical means of air defence and missile defense will be discussed during a round table at the international military-technical forum 'ARMY-2020'.

The discussion will be moderated by the honored military specialist of the Russian Federation, head of the department of anti-aircraft missile systems of the Yaroslavl higher military school of air defense, Colonel Nikolai Leshko. The event will be attended by specialists of the military administration, educational organizations of the Russian Defence Ministry and enterprises of the military-industrial complex.

During the discussion, the issues of improving the quality of air defense-anti-missile defence information tools through the use of co-operated and non-co-operated sources of radar illumination, as well as the development of the information subsystem of aerospace defense in order to obtain radar information about air and space attack means will be considered.

It is expected that the round table will identify priority ways to develop the information subsystem of aerospace defense, as well as develop proposals for scientific cooperation in order to strengthen the country's defense capability.

The reports presented at the round table will be published in leading peer-reviewed scientific journals.

Demonstration of tactics

On the basis of the Patriot Park branch and 'Russia – My History' multimedia interactive museum in Stavropol, the Army-2020 military-technical forum will be held on August 27-29, showing the combat capabilities of modern weapons and military equipment of the Southern Military District.

More than 30 pieces of military equipment will be used for static and dynamic display. In addition to the existing equipment in the Patriot park, GAZ 2330-14 Tiger, Rys', APC-82AM, BM-21 Grad, crew of MANPADS Igla, simulator for firing 1U40, sighting machine PS -51, simulator 1U37, mine detectors Korshun, IMPS, IMP-2 with a grapnel, training anti-tank and anti-personnel mines, a set of reconnaissance and demining equipment KR-E, ACS 2S9 Nona, AAV-2, R-149BM (based on APC-80), REM-KL and small arms in service.

A demonstration of the combat capabilities of the Tiger armored car and the APC-82AM will be organized at a specialized site for visitors.

The International Military Technical Forum Army-2020 in the Southern Military District will be held from August 27 to 29 on the territory of the branches of the Patriot military-patriotic park in 14 subjects of the North Caucasus and Southern Federal Districts, as well as at the Russian military base in Armenia.

The main objectives of the forum are to promote the technical re-equipment of the Armed Forces of the Russian Federation, strengthen cooperation between the SMD and industrial enterprises and federal executive authorities, increase the prestige of military service and patriotic education of young people.

Development of unmanned vehicles

During Army-2020 international military-technical forum at the Patriot Congress and Exhibition Centre, the prospects for the development of complexes with unmanned aerial vehicles, designed to solve problems in the interests of the Navy, will be discussed. The organizer of the round table is the Military training and research centre of the Navy.

The discussion will be attended by specialists from the Main Command of the Navy, research and educational organizations of the Russian Ministry of Defence, representatives of military administration and industrial enterprises. The participants of the event will discuss the requirements for complexes with unmanned aerial vehicles for naval purposes, the tasks to be solved and the features of their application, will conduct a detailed analysis of the scientific and technical backlog of enterprises of the military-industrial complex and existing developments.

As the organizers of the discussion noted, it is planned that the round table will become a platform where the main directions for the development and use of unmanned aerial vehicles for the Russian Navy will be determined, as well as proposals for interaction with interested organizations and industrial enterprises on their joint development.

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RUSSIAN UNITED AIRCRAFT PROSPECTS

In August, 2020 in the Kremlin, Moscow President of Russia Vladimir Putin held a working meeting with Director General of the United Aircraft Corporation Yury Slyusar. The United Aircraft Corporation includes six large, world-famous companies. At the meeting Vladimir Putin and Slyusar discussed the company's development in general, the plan for financial recovery, development of the company until 2035, the company's financial recovering.

At the meeting Director General of the United Aircraft Corporation Yury Slyusar said: 'Mr President, first of all, I would like to thank you and report on the implementation of the decisions you made at the meeting held on May 13. As you remember, they were anti-crisis and concerned both civilian and military issues.

Together with our colleagues from the Defence Ministry and the Ministry of Industry and Trade – many thanks to them – we quickly developed and approved a solution, which actually doubled the workload of our military enterprises and which provides for the advance delivery of aviation equipment.

We have a workload as finalists for enterprises, the entire cooperation has workload production, and accordingly, the Aerospace Forces receive a modern mass-production system.

I would especially like to note that our largest plant in Komsomolsk-on-Amur actually doubled its workload in the current period thanks to this decision, and now, through 2028, we have in effect a full workload at this plant.

If we also take into account the planned contacts as part of military technical cooperation: we believe the Su-35, as I have reported to you repeatedly, is the best aircraft. To be quite frank, its promotion to foreign market does involve a lot of difficulties, and our competitors often use what we see as unfair competition. I mean, apart from fair and competitive action, they also use direct pressure – political, sanctional and personalised pressure. But we are sure that our equipment is the best, and those countries that are buying this equipment now can certainly appreciate it. We believe that our aviation technology is the most competitive at present. And the example of the Komsomolsk factory shows how, in fact, in this situation, this decision [purchase of aviation equipment in advance] has influenced the workload of our military plants.

As for the civilian part, you have given instructions to use state guarantees for the supply of 59 Sukhoi Superjet aircraft. We have airlines as customers for the aircraft, including Aeroflot – the flagship carrier is buying 22 aircraft.

We are very grateful to our colleagues from Aeroflot, because we do really understand that the air transportation market has almost halved. Nevertheless, they are ordering new aircraft. They are ready to buy eight aircraft this year, and 14 next year.

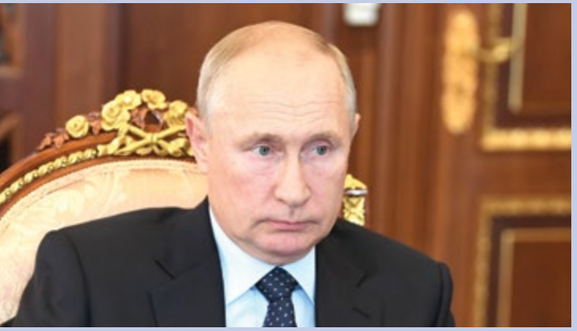
We even believe the 100-seater Sukhoi Superjet is the best option in this pandemic period. Destinations earlier served by 200-seater planes now use 100-seater planes. And it fits well into the concept of fulfilling your instruction to develop regional traffic bypassing Moscow, especially in the regions of the Far East and Siberia.

About our new strategy, I know that Mr Savelyev, the head of Aeroflot, has reported to you about the company's new strategy, which includes a spin-off of the Rossiya airline as a base company that uses domestic aircraft. We believe the Sukhoi Superjet is ideal for the development of this airline's business.

As for aviation events, I would like to report to you on them. Over the past year, we have put three aircraft into operation. This is primarily the Il-112V aircraft in Voronezh, our light military transport aircraft, which is replacing the entire Antonov family of An-26 aircraft. Hundreds of these planes are now in operation; the

Tu-22M3M is a heavily upgraded aircraft based on the Tupolev Tu-22M3. This is a start, by and large, this is aerodynamic styling, a completely new plane, with a new set of onboard equipment, avionics, an onboard complex, and flying boom refuelling. That is, it is a fundamentally new aircraft with enhanced combat capabilities for our latest weapons.

The unmanned Okhotnik (Hunter), our attack heavy drone with unprecedented capabilities, having the largest combat flight range, the widest range of weapons, the broadest range of equipment. Planes of this class are only designed and manufactured by two countries, the USA and China. The Defence Ministry instructed us to speed up the design and test works, to move it 'to the left' as much as possible so that deliveries begin as early as 2024. Therefore, we are now actively working on this issue with our colleagues.



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planes were produced in the Soviet Union. Of course, the plane is in great demand.

For Voronezh – where we produce the Ilyushin Il-96 planes and earlier produced the Antonov An-148 planes, unfortunately, this programme was discontinued in 2018 – for them, this also means loading enterprises, because hundreds of such planes are needed in the coming years. Such a plane saw the sky last year. Together with the Defence Ministry, we have launched, we have already developed and are implementing a decision to launch a pilot batch, we are producing two more aircraft and will involve them in testing.

The second aircraft that was produced was the Tupolev Tu-22M3M. This is a heavily upgraded aircraft based on the Tupolev Tu-22M3. This is a start, by and large, this is aerodynamic styling, a completely new plane, with a new set of onboard equipment, avionics, an onboard complex, and flying boom refuelling. That is, it is a fundamentally new aircraft with enhanced combat capabilities for our latest weapons.

And the third plane that was produced last year, we showed you this plane – the unmanned Okhotnik (Hunter), our attack heavy drone with unprecedented capabilities, having the largest combat flight range, the widest range of weapons, the broadest range of equipment. Planes of this class are only designed and manufactured by two countries, the USA and China.

The Defence Ministry instructed us to speed up the design and test works, to move it 'to the left' as much as possible so that deliveries begin as early as 2024. Therefore, we are now actively working on this issue with our colleagues.

This year we have three product launches. The closest is the IL-114 you mentioned. The prototype has already been assembled and is undergoing ground trials, preparing for its maiden flight. I think that in September, we will fly it in Zhukovsky in the Moscow Region, according to our plans.

Alongside this, the bench trials and ground trials are also underway; an after-sales service system is being created, as well as a training facility for pilots and engineers.

This model will be in great demand because it is badly needed, specifically in remote regions. It is going to replace Antonov An-24s and foreign, Canadian, Q400s. Those carry 68 passengers. A turboprop aircraft with a speed of 500 kilometres per hour. It is an all-weather and easy to use model, can land on any terrain and does not require a large set of ground equipment to maintain it – it has a built-in maintenance system.

In addition to the civilian version, we plan to make another version for our special customers. This option will also enjoy high demand, because it replaces the old Ilyushin aircraft.

Those will be manufactured in Lukhovitsy where we are now making the MiG-35s, the entire MiG family, using a parallel production line in the same workshop, the most cutting-edge final assembly workshop. In fact, we plan to produce up to 12 aircraft a year there.

The second premiere is also expected in the near future. I hope that the long-awaited upgraded Tu-95 will take off in Taganrog by the end of August. The new version is not just based on the old airframe. We have also altered the airframe by reinforcing the wings and changing a few more airframe units.

It has a new set of weapons, new on-board electronic equipment, new modified engines, new propellers, so in fact, its combat capabilities have doubled after this modernisation. After the flight trials, other tests will continue, and we are planning a major upgrade of the entire fleet of long-range strategic missile carriers that will continue along this path.

Another major launch we also plan this year is the flight of the MC-21 with Russian-made PD-14 engine. We must complete the project by the end of this year. The new engines have already been installed on the aircraft in Irkutsk, and now they are undergoing the necessary trials, so in fact, the new MC-21 aircraft with the newest certified PD-14 engine will fly soon.' /RA&MG/

We are sure that our equipment is the best, and those countries that are buying this equipment now can certainly appreciate it. We believe that our aviation technology is the most competitive at present.

'WORLD LEADER' BRAHMOS CONTINUES TO CHART NEWER MILESTONES

The BrahMos Aerospace joint venture (JV) military programme involving two top-notch scientific and technology institutions – India's DRDO and Russia's NPOM – has produced a new-age tactical weapon having no parallels in the world. The project, which started in 1998 with an initial capital of $250 million having a 50.5% Indian share and 49.5% Russian share, today has become the most successful Defence JV programme in the world.

As a highly sophisticated precision attack missile with land, sea, sub-sea and air deployability and operability, BRAHMOS has redefined modern warfare tactics and strategies in the 21st century. Initially developed in anti-ship configuration, BRAHMOS has evolved over the years to establish its impeccable land-attack capability. Presently, it is the only weapon which can be fired in land-to-land, land-to-sea, sea-to-land, sea-to-sea, subsea-to-land, air-to-sea and air-to-land configurations. No other country in the world has been able to develop and field such an incredibly versatile, multi-role weapon for its military.

Flying at a top speed of Mach 2.8 and carrying a powerful warhead of up to 300 kg, the two-stage BRAHMOS has been designed to annihilate high-value land and sea-based enemy targets with impeccable accuracy, high speed and deadly firepower.

While the Russian scientists and engineers contributed in developing the critical propulsion system, including the ramjet engine and booster for the missile along with the warhead, the Indian scientists and technology experts played an equally important role by designing and developing the fire control system, electronic system, guidance system, avionics and materials for airframe among other components for the missile. In the initial phase, NPOM provided its facilities to test all the technologies needed to develop and configure the new weapon system.

Today, the Indian Navy has deployed the powerful BRAHMOS on a large number of its frontline surface warfare ships including guided missile frigates and large destroyers. Likewise, the Indian Army is the only ground force in the world that has operationalised the mobile land-attack variant of the supersonic cruise missile system.

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

The BRAHMOS air launched cruise missile (ALCM) programme achieved more successes in subsequent test firings conducted from the air combat platform in 2019 wherein the weapon spectacularly validated its capability to neutralise both land and sea-based targets with pin-point accuracy from stand-off ranges.

On January 20, 2020, the Indian Air Force activated the formidable 'TigerSharks' squadron consisting of the BRAHMOS(A)-Sukhoi-30MKI weapon-platform combination in Southern India, thus emboldening India's strategic position in the Indian Ocean Region (IOR). Achieving yet another important milestone, BRAHMOS-A received the fleet release clearance (FRC) certification from Bangalore-based CEMILAC in June 2020, which paved the way for the pilots of Indian Air Force Squadrons to use the missile during combat operations.

According to Dr. Sudhir K Mishra, Director General BrahMos, DRDO: 'BRAHMOS is a well-proven system. 74 flight tests (of the missile) have been conducted so far from different platforms, and we have recorded the highest rate of success no other country has ever achieved in the world. BRAHMOS has emerged as the most powerful deterrent system in present times.'

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

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

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

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

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

Consequently, India and Russia have also initiated work on more advanced variants of BRAHMOS, including the BRAHMOS-NG (next-generation) and hypersonic BRAHMOS-II (K), paving the way for the 'world's best and fastest cruise missile project' to continue retaining its legacy position of 'market leader' well into the distant future. /RA&MG/

FULFILLMENT OF THE STATE DEFENSE ORDER

Progress Arsenyev Aviation Company, part of Russian Helicopters Holding Company (part of Rostec State Corporation), continued the fulfillment of the state defense order; the works were being carried out on schedule and at full scale. In April the effort involved over 4,000 company employees.

During April, basing on the accord with the regional administration, Progress Arsenyev Aviation Company was gradually increasing the number of employees involved. As they continued their work, the plant team observed all requirements and sanitary and epidemiological standards imposed by the Russian Federal Service for Surveillance on Consumer Rights Protection and Human Wellbeing (Rospotrebnadzor).

At the entrance check-point, the employees sanitized their hands with disinfectant agents and received personal protective equipment. In addition, thermographic cameras were being installed at the entrance check-point for fast and non-contact measurement of the employees' body temperature. During the day, the employees sanitized their hands with antiseptic and kept the recommended 1.5 meter distance at their workplaces. Premises were treated with disinfecting solutions. The plant's radio regularly broadcasted reminders of the necessity to strictly observe the preventive measures.

During the self-isolation period, the company's sewing facility produced 9,000 protective reusable masks. In addition to that, the employees also received disposable masks and gloves.

The works on the fulfillment of the state defense order were carried out on schedule and at full scale. Therefore, no annual output forecast or financial target was being revised, neither was it considered to defer any payments under the company's credit liabilities. Production-related issues were constantly monitored by the Managing Director.

According to the local office for prevention of the coronavirus infection, as of 16 April, no COVID-19 cases were registered in Arsenyev.

The first Ansat helicopter for EMERCOM

Russian Helicopters holding company (part of Rostec State Corporation) supplied the first Ansat helicopter for EMERCOM of Russia. The rotorcraft was handed over to the Fund supporting the development of state authorities in civil defense, emergencies and elimination of consequences of natural disasters (the Fund). The helicopter has already been handed over to the North-Western Aviation and Rescue Center of EMERCOM of Russia, and is located on Kasimovo Airfield.

Kazan Helicopters and the Fund signed the contract for supply in March 2019. Ansat was handed over to the customer in a universal version; the cabin has places for installing a medical module, and there are seven passenger seats. In the North-Western Aviation and Rescue Center of EMERCOM of Russia, Ansat will be used for transporting staff, cargo and equipment in the cabin or on an external sling, and to tackle special tasks.

Currently, the helicopter is in pilot operation in the Center. During drills, pilots train to perform landing in various ways, piloting at low and extremely low altitudes, and master a new flying technique in various flight modes.

'Ansat is supplied to EMERCOM of Russia for the first time, and we are convinced that the agency specialists will appreciate it. The use of Ansat helicopters for air medical services has shown that their light weight, maneuverability, and agility, as well as a high degree of readiness

for take-off, allow addressing a wide variety of tasks, including those in an urban environment. Due to cooperation of Rostec holding companies, the rotorcraft is constantly being improved, and new capabilities are being added: certificates for the emergency floatation system, and for installation of a complex for transporting newborn babies have recently been received, and other modules for Ansat have been designed,' said Yuri Pustovgarov, Managing Director of Kazan Helicopters.

As part of a program to develop air medical services, about 30 helicopters have been supplied to customers, and they are being used for transporting patients from hard-to-reach areas to medical facilities. Ansat helicopters save people in the Moscow Region, the Volgograd Region, the Kurgan Region, the Kirov Region, the Kostroma Region, the Tver Region, the Pskov Region, the Nizhny Novgorod Region, the Chelyabinsk Region, the Astrakhan Region, in the Republic of Tatarstan, etc. The number of regions where the helicopters are being used is constantly increasing.

In late 2019, two Mi-8MTV-1 helicopters made by Kazan Helicopters were also handed over to EMERCOM of Russia. Under the contract with the Fund, one of the helicopters is equipped with an external sling, which allows transporting large cargo weighing up to four tonnes. The second Mi-8MTV-1 helicopter is to be handed over to the Zhukovsky Aviation and Rescue Center. Multipurpose Mi-8MTV-1 helicopter can be used for rescue operations, medical evacuation, search for people who have suffered disasters, firefighting, reconnaissance and monitoring of terrain, and air transportation.

The airframe for IL-96-400M

In May the works upon building up the long-haul widebody IL-96-400M aircraft were carried on at the final assembly shop on VASO aviation plant in Voronezh.

The new aircraft was developed as a modification of the mass-produced IL-96-300 with a fuselage 9.35m longer than its predecessor with the additions for the original type certificate. The newly built was to maintain high reliability specifications as its famous forerunner. Work on the programme was on schedule.

'At the moment, the main parts of the airframe for the first flight prototype are being connected. The process of affixing the wing to the fuselage is completed. At the next stage, we are going to set the empennage and the pylons. Our specialists are carring out the installation of the main aircraft systems. The aircraft is intended to be finished before the end of 2020, at which point it will be sent to the flight test station', – said Alexander Yarchevsky, acting Managing Director of VASO.

IL-96-400M will be equipped with modern Russian-made flight-control navigation and radio communication equipment, which will allow fulfilling the current and upcoming requirements of the international aviation authorities.

Based on the requests of potential customers, different passenger cabin layouts are represented. Three main design concepts are available: three-class configuration for 305 seats, two-class configuration for 350 seats and a single-class configuration for 402 seats.

POSITIVE QUALIFICATION OF THE ANSAT SIMULATOR

Kazan Helicopters of the Russian Helicopters holding company (part of Rostec State Corporation) has received positive qualification of Ansat helicopter training simulator's compatibility to international standards. The evaluation was carried out by the Central Aerohydrodynamic Institute named after N.E. Zhukovsky (TsAGI).

The comprehensive Ansat simulator was tested for its compliance with the requirements of the International Civil Aviation Organization (ICAO). Evaluated characteristics included the layout and design of the cockpit, simulation of flight and engine dynamics, controlling on ground, helicopter systems, acoustic, visual and vibration effects and navigation. The assessment result was positive.

'We consider the certification of the Ansat helicopter simulator according to ICAO standards as one of the important achievements of our company. Our Aviation Training Center is now waiting for the first intake of students to pass the simulator training in August 2020. The training will be organized to foreign customers: pilot training is included in the price of the helicopter in all export orders', pointed out Managing Director of Kazan Helicopters, Yuri Pustovgarov.

The simulator model was developed on the basis of helicopter flight test data provided by the design bureau of the Kazan Helicopters. The cockpit and interior of the simulator are completely authentic. Instrumentation is replaced with simulator devices, but their appearance and functionality fully correspond to the originals.

The Ansat simulator is equipped with a visualization system that provides full visibility from the pilot's seat. It can be used to reproduce two distinct areas: the city of Kazan along with the Kazan Helicopters flight test center, as well as the city of Sochi. A vibrating platform and audio system help to simulate the vibrational and acoustic effects of flight. Using the simulator, trained pilots will be able to maneuver the helicopter model in various conditions, including in dangerous and emergency situations.

The comprehensive Ansat simulator was designed and produced as part of the investment project 'Development Concept for for the Aviation Training Center of the Kazan Helicopter Plant of Russian Helicopters Holding Company'.

The KHP Aviation Training Center also has a comprehensive simulator for Mi-8MTV helicopter. The cabin of the simulator has been adapted to simulate training of pilots at night with night vision goggles. Besides, the simulator has a vibroacoustic unit which imitates vibration and sounds of a helicopter depending on the flight mode and conditions.

Rosoboronexport protects its trademark abroad

Rosoboronexport JSC (part of the Rostec State Corporation) has received a certificate of international registration of the ROSOBORONEXPORT trademark in 45 countries across the world within the framework of the Madrid System.

'From this time onward, we will have important legal leverage in key partner countries to prevent unlawful use of intellectual property, including by way of imitating our operations,' said Alexander Mikheev, Director General of Rosoboronexport. 'Registration of the principal trademark abroad will allow Rosoboronexport to showcase its presence in key markets across the globe and to pursue our efforts towards building a strong brand. It will have a positive impact on the promotion of Russian defense products and the services provided in the area of military and technical cooperation,' he added.

At present, the ROSOBORONEXPORT trademark is undergoing registration in 13 more countries across the world that have not joined the Madrid System, including some Persian Gulf nations.

Furthermore, in order to stop unfair competitive practices, two trademarks have been cancelled in the Republic of Colombia, which were confusingly similar to the ROSOBORONEXPORT trademark, which fact has been confirmed by a resolution of Colombia's Patent Office that took effect.

Legal protection and safeguard of Rosoboronexport's intellectual property abroad has been carried out by RT-Intellectexport LLC, Rostec State Corporation's competence center in the domain of intellectual property rights management.

'Rosoboronexport expresses its sincere gratitude to RT-Intellectexport LLC for its assistance in dealing with legal matters that concern protection of intellectual property abroad, for professional and prompt handling of complicated and nontypical issues in that area, and is hopeful for further collaboration to mutual benefit,' noted Vladimir Kudashkin, State Secretary of Rosoboronexport.

'We value our partnership with Rosoboronexport and the opportunity of carrying out joint projects. We are thankful for trusting us, and we rely on keeping up this cooperation and on implementing new joint plans in protecting the rights to intellectual products,' emphasized Valery Lyustik, General Director of RT-Intellectexport LLC.

Unique metal detector

Rosoboronexport JSC, a subsidiary of the Rostec State Corporation, has launched a new metal detector and stun gun combo called the EM-411 Cerberus into the global security equipment market.

The device is intended for use by security and law enforcement personnel at all facilities that require control of the carry of prohibited items and enhanced security measures: transport hubs, infrastructure and sensitive facilities, public gathering places.

A wide range of security equipment is available on the market today. However, the uniqueness of Cerberus is that it combines two products: a sensitive metal detector and a powerful stun gun. The product is unrivalled anywhere in the world.

Equipped with separate handheld metal detector and stun gun, a security officer is forced to waste time changing equipment in an emergency. During this time, a suspect may attack the officer, surrounding people or try to hide. The metal detector with built-in stun gun significantly improves security control and helps respond quickly to challenges to public security.

To switch Cerberus from metal detector to stun gun mode, you have to press one button. Even a short-term exposure is enough to cause a sensitive painful effect, while an exposure lasting 2-3 seconds will put the intruder in shock with a loss of orientation in space without causing irreversible harm to life or health. The stun gun is a non-lethal weapon and the effect of its use is temporary.

Rosoboronexport expects that Cerberus will attract close attention from law enforcement agencies of the partner countries, anti-terrorist structures, as well as security services at high-value transport and infrastructure facilities.

Modern electroshock weapons are an integral part of the armament of law enforcement agencies in many countries of the world. Today, Rosoboronexport is actively promoting the products of leading Russian enterprises on the world market.

TAIFUN-PVO: COMBAT SOLUTION FOR CLEAR SKIES

The experimental sample

TAIFUN-PVO: COMBAT SOLUTION FOR CLEAR SKIES

Kupol's new development set to improve effectiveness of air defences

Marina Gromova

The novelties being showcased at Army-2020 include the Izhevsk-designed prototype of the Taifun-PVO MANPADS operator vehicle. Apart from its objective technical merits of the vehicle, it is noteworthy that the project is being fully funded by Izhevsk Electromechanical Plant Kupol, an Almaz – Antey subsidiary.

The new vehicle is based on the KamAZ-4386 truck chassis and is a development of the Taifun-VDV system. According to open-source data, Kupol is indeed investing its own money in the project, which is intended for the Ground Troops' Air Defence Troops Directorate. The company is involving contributions by other Russian defence enterprises.

Until recently, mobility of MANPADS operators was mainly ensured by standard army transports, primarily armoured personnel carriers. This concept, however, has grown obsolete in the current battlefield realia. Besides, short-range SAM systems utilising MANPADS munitions are fairly expensive and cannot completely replace MANPADS in troops. Perhaps this was the reason for the development of the new vehicle that would be austere and highly mobile, while offering enhanced protection and operational functions.

The prototype being showcased at Army-2020 indicates that the vehicle has been virtually finalised. Open sources suggest that the Taifun-PVO carries a crew of five: the commander, the driver, the machine-gun operator and two MANPADS operators. The latter are accommodated in the combat module along with all the gear, including the MANPADS launchers, power sources, interrogation radars, machine-gun munitions and so on. The combat module will eventually be fitted with analogue and digital radios and navigation devices. The rooftop turret sports a Kord large-calibre machine-gun; the roof also has the two hatches for the machine-gun operator and for a MANPADS operator. Fide can be conducted at speeds of up to 20 km/h.

Here are some more open-source details: the Taifun-PVO vehicle will carry up to nine MANPADS missiles of different types. The Verba MANPADS variant will allow for intercepting aerial targets travelling at up to 420 m/sec at distances of between 500 and 6,000 and at an altitude of up to 3.2 km. Apart from the autonomous operation mode, the MANPADS operators will obtain target designation from a higher command post. The automation systems are integrated in a way that allows MANPADS operators to receive target designation information without leaving the vehicle.

Independent experts believe that the Tor-M2 SAM system could be used as the commanding vehicle for the Taifun-PVO if need be. In this case, the unit incorporating mixed weapons systems will be able to use powerful Tor-M2 radars for aerial surveillance and target designation, while inexpensive MANPADS will be utilised to engage targets. The presence of a large-calibre machine-gun and the ability of using surface-to-air missiles against lightly armoured and unarmoured vehicles could also enable the use of Taifun-PVO vehicles in limited fire support roles.

No design features of the chassis are available so far, but an educated guess has it that these will coincide with the Taifun-VDV prototype, i.e. a maximum speed of 100 km/h and a highway operating range of over 1,200 km. The vehicle's clearance allows for negotiating hills up to 30o steep and fording water basins up to 1.75 deep. The 350-hp KamAZ-619 engine ensures high mobility parameters. The vehicle's weight and size parameters (in particular its mass of around 14 tonnes) allow for paradropping, turning it into a first-wave airborne troops asset. The vehicle offers Level 3 shrapnel protection and Level 4 ballistic protection as per the Russian classification. The crew are protected against a 4-kg detonation under hull and a 6-kig detonation under wheel, in TNT equivalent.

In fact, vehicles of the same type have already been tried in a near-combat environment: according to media reports last year two Taifun-PVO prototypes took part in the Chinese Clear Skies contest as part of the Army 2019 international war games. The 9.5-km offroad route involved 12 obstacles, including a slalom, an eight-loop, a trench, a ford, a slope, a treadway bridge, hills and so on. The weapons operators had five points to hit aerial targets head-on and on pursuit courses, as well as targets imitating helicopters and lightly armoured vehicles. Both MANPADS and large-calibre machine-guns were involved. The Russian crew took just 43 minutes and 30 seconds to clear the route.

Judging from the vehicle presented at Army-2020, the project is in a fairly advanced stage now that it has been rolled out for military expert and the general public. Independent military experts who have already familiarised themselves with the new development are of the opinion that the Taifun-PVO will be an inexpensive and efficient mobility solution for MANPADS operators. /RA&MG/

The experimental sample

BE-200 TOOK UP FIRE EXTINGUISHING DUTY

Two Russian Be-200ES amphibious aircraft had arrived in Turkey and from June 16 began work on supressing the spread of forest wildfires in the Republic of Turkey. The signing of the Forest fire-fighting service agreement and the aircraft deployment were organized by the United Aircraft Corporation (PJSC UAC powered by Rostec State Corporation) with the assistance of the Ministry of Industry and Trade of the Russian Federation, the Ministry of Civil Defence, Emergencies and Disaster Relief of the Russian Federation and the active support of the State Corporation Rostec Representative Office in Ankara. The request for help in controlling forest fires in the coming hot season came from Republic Of Turkey Ministry Of Agriculture And Forestry. Be-200 amphibious aircraft with Russian crews remains on duty ready to firefighting actions in the vicinity of Antalya, Izmir and Bodrum for 4 months.

'Today we see the first results of constructive cooperation between Russia and Turkey in the field of aviation. According to the results of the agreements between the countries, with the assistance of our Trade Representation in Turkey, which has been at the forefront of the negotiation process throughout the whole period, over the next 4 months we will be able to observe how the planes of the Taganrog Aviation Scientific-Technical Complex n.a. G.M. Beriev with Russian flight crews will help in the fighting against possible nature disasters in the vicinity of Antalya, Izmir and Bodrum. Russia has unique competencies in the aircraft industry, which allow creating unique aviation complexes. The Be-200 is an amphibious aircraft designed to save people, wildlife, and infrastructure objects. The mission of this multifunctional machine is to be at the forefront, to help in the most difficult situations. We are pleased that our Turkish partners will be able to fully appreciate the potential of this highly efficient technology' – stressed Deputy Minister of Industry and Trade of the Russian Federation Oleg Bocharov.

The Be-200 amphibious aircraft was demonstrated during the MAKS-2019 air show, attended by Russian and Turkish leaders. In 2019 it took part in the flight program of the Teknofest-2019 Aerospace and Technology Festival in Istanbul, and after the end of the forum, Be-200 demonstrated its unique characteristics for real situations.

'Russian Be-200 is an amphibious aircraft with unique characteristics and high efficiency. The aircraft proved itself during wildfire fighting and rescue operations in Europe and Southeast Asia. Be-200ES is an export-oriented product, it causes great interest among foreign customers. Joint work with Turkish partners shows that we can have good potential for the development of cooperation, including in the supply of aircraft in the interests of boosting the Turkish firefighting fleet, "said Yury Slyusar, General Director of PJSC UAC.

New medical modules for Ansat

Kazan Helicopters (part of Russian Helicopters/Rostec) received a permission from the Russian Federal Air Transport Agency (Rosaviatsiya) to equip Ansat helicopters with a special module for transporting neonatal patients. This equipment can be used to provide evacuation and airborne medical care to infants.

Ansat equipped with the neonatal transport module passed whole range of necessary certification tests. During the ground testing stage, the certification team demonstrated the capabilities of the model to conduct emergency evacuation of the crew, medical workers and a neonatal patient. Flight tests evaluated the performance of the module and verified its electromagnetic compatibility with the standard equipment of the helicopter.

The new module was developed together with the Ural Optical and Mechanical Plant (part of Shvabe holding company) specifically for neonatal air transport. The manufacturer of the Ansat medical module, Kazan Aggregate Plant, developed a special platform for the incubator to replace the more traditional stretcher design. No redesign of the helicopter interior was required.

'The capability to install a neonatal medical module for Ansat had been in demand for a long time. Thanks to cooperation of Rostec holding companies and other partners, the helicopter now comes with upgraded equipment, allowing medical teams to continuously monitor the condition of a child, maintain the vital body functions and conduct intensive therapy during the flight,' said Managing Director of Kazan Helicopters Yuri Pustovgarov.

The incubator comes with a set of medical equipment, including an artificial lung ventilator, a monitoring unit, an aspirator, and an infusion pump. The neonatal module can be installed optionally on all Ansats equipped with base medical modules.

Ansat helicopters are used for rescue operations in various regions of Russia, the geography of their application is constantly expanding. The development program of the Russian air ambulance fleet has been in implementation since 2017 and is now part of the National Healthcare project.

Ansat is a light multipurpose twin-engine helicopter, serial production of which is deployed at Kazan Helicopters. According to the helicopter certificate, its design allows converting it into a cargo version or into a passenger rotorcraft that can lift up to seven people. In May 2015, a supplement to the type certificate for the modification of the helicopter with a medical module was obtained. Ansat is certified for use in the temperatures ranging between -45°C and +50°C, and in high mountains.

Commercial Aviation Division

Russia's United Aircraft Corporation (UAC) forges corporate and business processes to form the Commercial Aviation Division. In accordance with the decision of the UAC Board of Directors, JSC 'Sukhoi Civil Aircraft' and LLC 'UAC – Integration center' will be incorporated into the PJSC 'Irkut Corporation' as branches. As parts of the Division, branches retain core competencies in the development and production of aircraft.

The main efforts of the Division in the near future will be focused, first of all, on the completion of MC-21-300 tests and the establishment of serial production and modernization of the Superjet 100 and its business version, the creation of a unified system of MRO and marketing.

Consolidation of the main R&D and production capacities of civil aircraft industry will make implementation of existing programs and development of perspective projects more efficient.

It is planned to achieve significant progress in the field of after-sales service, optimize operational processes and, ultimately, significantly increase the attractiveness of Russian commercial aircraft in the market.

The issues of existing intra-group obligations and formation of the share capital will be resolved during 2020.

THE AIRFRAME FOR IL-96-400M

In May the works upon building up the long-haul widebody IL-96-400M aircraft were carried on at the final assembly shop on VASO aviation plant in Voronezh.

The new aircraft was developed as a modification of the mass-produced IL-96-300 with a fuselage 9.35m longer than its predecessor with the additions for the original type certificate. The newly built was to maintain high reliability specifications as its famous forerunner. Work on the programme was on schedule.

'At the moment, the main parts of the airframe for the first flight prototype are being connected. The process of affixing the wing to the fuselage is completed. At the next stage, we are going to set the empennage and the pylons. Our specialists are carring out the installation of the main aircraft systems. The aircraft is intended to be finished before the end of 2020, at which point it will be sent to the flight test station', – said Alexander Yarchevsky, acting Managing Director of VASO.

IL-96-400M will be equipped with modern Russian-made flight-control navigation and radio communication equipment, which will allow fulfilling the current and upcoming requirements of the international aviation authorities.

PRELIMINARY RESULTS OF MC-21-300

Irkut Corporation summarized the preliminary results of MC-21-300 aircraft ground testing, which confirmed the possibility of operating the aircraft in presence of water on runway.

During the period from 16 to 22 July 2020, the MC-21-300 aircraft performed 29 runs and 3 taxing on water at speeds from 10 to 150 knots (1 knots = 1.852 km/hour) at various configurations of mechanization and power plant modes, including the use of engines thrust reversal.

The tests were carried out on the 'Ulyanovsk-Vostochny' airfield, where the 'pool' of more than 70 m long and more than 20 m wide was mounted. Parameters of the 'pool' provided a normalized water depth in accordance with Russian and international requirements, which are established for these types of tests.

In the process of testing the possibility of safe movement on a wet runway in a wide range of speeds without any failure of marching and auxiliary power plants, as well as other systems and equipment of the aircraft were confirmed.

In addition, the tests found that the MC-21-300 aircraft is steadily moving and retains control on the runway covered with water.

The course of testing was recorded by a complex of onboard measurements of the aircraft and a system of video cameras installed on the ground and on the aircraft.

Mi-171A2 reaches record speed

Mi-171A2 helicopter by Russian Helicopters holding company (part of Rostec State Corporation) established a Russian record: it reached a maximum speed at a limited distance of 1.6 kilometers. During the 'Baikal Mile' festival the civilian helicopter operated by the crew of the Ulan-Ude Aviation Plant (U-UAZ) reached the speed of 268 kph at a minimum altitude of 20 meters.

The U-UAZ crew set the record during three competition flights. Prior to that, a series of training flights were made to assess the behavior of the helicopter and how the measuring equipment works, and to adjust photography and video equipment for taking pictures and filming.

'Mi-171A2 has the best features of the world-famous Mi-8 type rotorcraft. The rotorcraft was tested in extreme environmental conditions: these helicopters can be operated in temperatures from -50 to +50 degrees Celsius. At the Baikal Mile festival the rotorcraft demonstrated its best features once again: speed, control, maneuverability, and stability. The record set at the short distance and at the limited altitude confirmed the great performance of the helicopter,' said Executive Director of Rostec State Corporation Oleg Yevtushenko.

Mi-171A2 helicopter has the best features of the world-famous Mi-8/17 type rotorcraft. The helicopter is equipped with VK-2500PS-03 engines (the civilian version of the military helicopter Mi-28 engines) with a digital control system. The helicopter can be used for a wider range of purposes due to upgraded piloting and navigation equipment and avionics. Mi-171A2 may be effectively operated in high mountains, at low and high temperatures, high humidity, and overwater. The piloting and navigation equipment allows using the helicopter around the clock, in normal and difficult weather conditions.

'Participation of the helicopter in the festival and flights over the ice of Lake Baikal are additional opportunities to

show the potential of Mi-171A2. The flights to set the record started with hovering. A mobile GPS station installed on the helicopter recorded the result,' said U-UAZ Managing Director Leonid Belykh. 'I am convinced that our equipment is reliable, and that pilots are highly skilled. The certificate issued by the representatives of the Russian Book of Records confirms that.'

The helicopter was certified according to Category A, which provides for meeting the most stringent requirements to flight safety specified for civilian helicopters. Depending on what the operator needs, Mi-171A2 helicopter can perform search and rescue missions, medical transportation, cargo operations, fight fires or carry passengers day and night, at temperatures from -50°C to + 50°C, in high mountains, in a desert, in tropical and Arctic climate. The helicopter can make long non-stop flights. Mi-171A2 helicopter was certified in India and Colombia. It is planned to validate the Mi-171A2 type certificate in China, South Korea, Brazil, Mexico, Peru and other countries.

Rostec developed a collimator sight

'Roselectronica' Holding of the Rostec Corporation developed the first domestic collimator sight for large-caliber machine guns. The sight allows to effectively hit targets when shooting from a moving base – from a board of a helicopter, boat or armored vehicles.

The device is designed for use as part of large-caliber machine guns. It has increased resistance to recoil, impact loads and it increases the speed of aiming and accuracy of firing.

The collimator sight forms a luminous mark (Red Dot) in the field of view of the shooter, which allows you to effectively accompany the target at dusk, sunlight, at any angle and at any distance from the eyepiece. The large output window of the reticle provides a wide field of view of 20 degrees, making it convenient to use the reticle for moving and shooting at moving targets. A sight adjustment mechanism allows accurate shooting at distances of 400, 800 and 1200 meters.

The sight is developed by the subsidiary of the 'Roselectronica' holding – of the 'Cyclone' Research Institute.

'The sight is developed specially for heavy automatic machine guns, first of all – machine gun Kord of 12.7 mm caliber, which can be installed on armored vehicles, boats and helicopters. Usually collimator sights are required only for short range operation. With the help of our design, shooters can control and hit targets at distances over 1000 meters, and the field of view of this collimator is so wide that it is almost impossible to miss a target. Tests have shown the effectiveness of our sights – that the accuracy of shooting increases several times', – was told in 'Roselectronica'.

EMERGENCY FLOATATION SYSTEM ON ANSAT HELICOPTER

The Federal Air Transport Agency (Rosaviatsiya) certified the installation of the Emergency Floatation System on Ansat helicopter. It is designed for emergency water landing and is used to save lives of the crew and passengers. Rosaviatsiya also issued Kazan Helicopters of Russian Helicopters holding company (part of Rostec State Corporation) with the approval for the main change: the reduction in airworthiness limitations of several main parts of Ansat.

The Emergency Floatation System was tested at the flight and test complex of Kazan Helicopters. The program included assessment of the helicopter performance with packed and filled ballonets, which are made of an elastic material ensuring flotation of the rotorcraft. The time necessary for filling the ballonets during the flight was also measured. During the tests on the ground, the activation of life rafts and the possibility of evacuating passengers and the crew through emergency exits were assessed.

'Kazan Helicopters received an opinion on flotation and resilience of Ansat helicopter with the sea state code 4 (moderate waves) according to the World Meteorological Organization, after simulation tests of the Central Aerohydrodynamic Institute named after N.E. Zhukovsky in a basin and in the open sea. I would like to emphasize that due to this system, Ansat helicopter provides for safe evacuation of passengers and the crew to life rafts in case of ditching,' said Managing Director of Kazan Helicopters Yuri Pustovgarov.

Ansat helicopters equipped with the Emergency Floatation System will be capable of flights at a considerable distance from the coast, as well as of participation in search and rescue operations. The installation of the Emergency Floatation System will be optional, at a customer's request.

Additionally, Ansat has certification of the reduction in airworthiness limitations of its main parts, such as the main rotor hub, the antitorque rotor, the empennage, etc. This will allow reducing the cost of replacing the parts and considerably reduce the cost of helicopter maintenance, and a flying hour in general.

These changes make Ansat more attractive for potential customers and increase its competitiveness compared to foreign rotorcraft.

The first serial produced Mi-38

Russian Helicopters Holding Company (part of Rostec State Corporation) delivered the first serial produced Mi-38 helicopter with a highly comfortable cabin to its client, Gazprombank Leasing company. The helicopter, built by Kazan Helicopters, will be operated by Russian Helicopter Systems (RHS).

The delivery ceremony for the first serial Mi-38 was held at the Kazan Helicopters facility. The ceremony was attended by the President of the Republic of Tatarstan Rustam Minnikhanov, Director General of the Russian Helicopters Andrei Boginsky, as well as Director General of Kazan Helicopters Yuri Pustovgarov.

'The newest Mi-38 is a multipurpose helicopter that will fill the empty niche between medium Mi-8 and heavy Mi-26 models. It can be used for transportation of cargo and passengers, search and rescue operations, and as a flying hospital or an offshore helicopter for delivering specialists to oil production platforms at sea. The first serial produced machine will be used for business class transportation. We have already demonstrated this helicopter with highly comfortable cabin to the leaders of Russia and foreign countries. The superior flight performance characteristics and competitive price will guarantee that Mi-38 will find its place in the helicopter fleet of Russia, our partners in the Middle East, Southeast Asia, Latin America and other regions,' said the Industrial Director of Rostec Aviation Cluster Anatoly Serdyukov.

'The delivery of the first serial Mi-38 is an important step, confirming that Kazan Helicopters is ready to serial delivery of this type of machine for both commercial operators and governments. The demand forecast of potential buyers for Mi-38 by 2030 is more than 100 aircraft,' said the Director General of Russian Helicopters Andrei Boginsky.

The Director General of Kazan Helicopters Yuri Pustovgarov handed a symbolic key to the new Mi-38 helicopter to the CEO of RHS Mikhail Kazachkov. The helicopter with a highly comfortable cabin is designed to carry up to 10 people.

The first serial Mi-38 helicopter was introduced to the general public at MAKS-2019 Moscow Air Show, where it was demonstrated to the President of Russia Vladimir Putin and the President of Turkey Tayyip Recep Erdoğan. Mi-38's foreign debut took place during the Dubai Airshow 2019, where the head of the Russian Ministry of Industry and Trade Denis Manturov showed it to the Crown Prince of the Emirate of Abu Dhabi, Sheikh Mohammed bin Zayed Al Nahyan.

'We are glad to continue our cooperation with Russian Helicopters and implement another deal – financing the production of Mi-38 in the framework of the previously signed cooperation agreement. Renovation of aircraft fleets requires high capital investments, and leasing allows you to divide the cost of expensive asset acquisitions into long periods comparable with the life of the asset, making it undoubtedly an effective financial tool in solving such problems. Together with Gazprombank, we see good prospects for leasing aircraft and, in particular, helicopters. We have the capability and resources to finance the renewal of fleets of both commercial and federal subjects in the Russian Federation,' commented the CEO of Gazprombank Leasing Maxim Agadzhanov.

During the ceremony, employees of Kazan Helicopters were awarded for their active participation in the production of Mi-38 and a significant contribution to the development of domestic helicopter construction. Employees of the enterprise were awarded the title of Honored Mechanical Engineers of the Republic of Tatarstan, and also received honorary diplomas of the Ministry of Industry and Trade of the Russian Federation, Rostec State Corporation and Russian Helicopters Holding Company.

The design of Mi-38 consists of a single-rotor scheme and a twin-engine power plant with high power and economic performance. The main structural elements of the fuselage are made of aluminum alloys, individual components and parts are made of steel, titanium and composite materials. The helicopter uses two Russian-made TV7-117V engines, equipped with dust protection devices with a high degree of air purification. An advanced six-blade rotor provides high thrust and low vibration levels. The blades are equipped with an anti-icing system, and the X-shaped tail rotor gives the helicopter excellent handling with low noise level.

Mi-38 is equipped with a modern navigation system and satellite navigation system. The cockpit of the helicopter is equipped with five versatile LCD color screens to ensure the effective display of information. The flight range of the new helicopter is up to 1,200 kilometers (with additional fuel tanks). With its maximum takeoff weight of 15.6 tonnes, the helicopter can carry 5 tonnes of payload on board or on an external sling.

Special project with participation of Rostec State Corporation

Rostec

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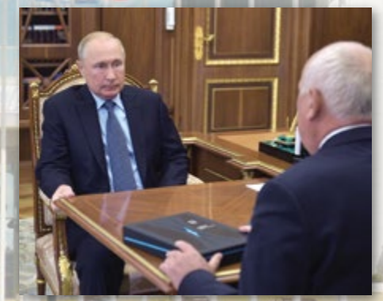
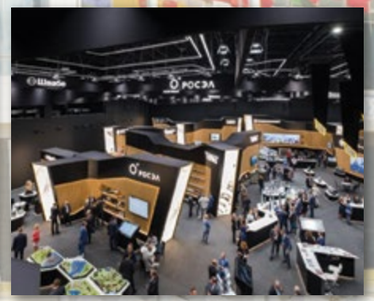
EXPORT PROGRAMS OF ROSTEC

- **Special role Rostec State Corporation in global innovation markets**
- **Key principles of export activity of Rostec State Corporation**
- **Achievements, plans, programmes and prospects**
- **New products of Rostec State Corporation enterprises for world security markets**





Sergei Chemezov,
CEO of the Rostec State Corporation:

'Rostec State Corporation accumulates a wide range of research and industrial activities. It unites more than 800 enterprises and is involved in science-intensive industries including aerospace, electronics, digital technology, automotive engineering, shipbuilding, new materials, and medicine.

Our key mission is to improve the quality of people's lives. We implement large-scale projects in health care, environmental conservation, development of digital technologies, energy security and many other areas. We are engaged in research and development, create new technological solutions and competitive products. In 2019, Rostec subsidiaries completed 350 R&D projects, created over 200 innovative products and technologies, took out 865 patents and had 570 know-hows registered.

We continue to work successfully despite the sanctions, the delicate global situation and the need to resolve complex issues of national importance related to stabilisation of distressed industrial assets. Just as before, Rostec companies meet their state defence order obligations to 99.5%. The share of revenues from civilian sales has exceeded 31%, largely thanks to the launching of new types of competitive hi-tech products. Consolidated revenues across the Rostec organisations exceed 1.7 trillion roubles ($23bn); more than a third of this amount comes from hi-tech exports.

We continue to build our presence on military, civilian and dual-use markets. For several years now, the order portfolio of our exporting arm Rosoboronexport has remained at a record high of almost $50bn annually. Historically the aviation equipment and air defence systems cover the highest export demand.

Every year Rostec State Corporation demonstrates a positive development trend, facilitating the implementation of critical solutions in new technology and also in developing, manufacturing and exporting of competitive science-intensive products.'

ROSTEC STATE CORPORATION AT THE ARMY-2020

In this short review, we would like to present some of the best innovative products that the companies that are part of the Rostec State Corporation presents to the participants and guests of the International Military-Technical Forum ARMY-2020.

The upgraded tank T-90MS

T-90MS is a heavily upgraded version of the T-90S (were developed in Concern Uralvagonzavod), the most commercially successful tank of the 21st century. In terms of its operational effectiveness it significantly surpasses the baseline model, which is renowned for its excellent combat and operational parameters, outstanding reliability and minimal required operational maintenance. The modernisation programme is so profound that the T-90MS is in effect an all-new tank. Its modular design allows for adding capability during subsequent upgradation efforts.

The T-90MS features:

- an all-new combat turret module equipped with:
- a powerful 125-mm cannon enabling the use of high-lethality munitions;
- a remote-controlled 12.7-mm machine-gun mount to ensure an independent firing channel for protection against tank-threatening personnel;
- a highly automated digital fire control system which allows for seeking, detecting, reliably identifying and automatically tracking targets, as well as effectively engaging them from a fixed position and in motion, around the clock and in any weather conditions;
- improved situational awareness provided by a broadband dual-channel VHF radio, a combined orientation system and a tactical terminal allowing for the tank's integration into a unit combat control system;
- effective third-generation modular all-aspect protection from the main contemporary anti-tank weapons. In addition to the armour, the tank is equipped with an automated multispectral screen system against laser-guided missiles. The vehicle can also be equipped with an active protection system and an additional anti-cumulative protection kit for urban operations.
- enhanced mobility, manoeuvrability and controllability thanks to a powerful 1,130-hp diesel engine and a movement control system with automatic transmission and chassis health monitoring.

The T-90MS tank has completed the requisite testing programme, including in a hot desert environment. Its equivalent, the T-90M, is currently being procured by the Russian Defence Ministry.

World's most successful combat helicopter

Mil Mi-24/35 helicopters (were developed in Russian Helicopters holding company) are reputedly tried-and tested combat aircraft. The history of their use in anger spans over 30 armed conflicts around the world. They became the first Russian-made rotorcraft specifically developed and built for combat. The designed proved so successful that various modifications of the aircraft are operated in different countries to this day.

On 23-30 August, the Russian Helicopters static exposition at the Army-2020 International Military-Technical Forum will be presenting the newest iteration of the famed helicopter, the Mi-35P, which has already completed the flight test programme. The aircraft features a new sight system, an advanced avionics suite and an automated target tracking capability.

The Mi-35P's sight system includes a third-generation long-wave matrix thermal imager, a high-resolution colour TV camera and a laser rangefinder. It also carries a new digital avionics suite, which improves controllability and stability and automates flight control to ease the pilot's workload. The modified sighting computer significantly improves target accuracy. The Mi-35P also has new pilot and operator instrument panels with advanced flight control instruments which increase crew awareness and simplify information perception.

The Mi-35P stands out for its flying performance. In particular, it can be effectively operated in hot-and-high environments. The fuselage design ensures a low acoustic signature, increased survivability in combat and easy maintenance.

Like its predecessor, the Mi-35P can be used in a variety of roles – as a tank killer, a transport for eight troops, a casevac aircraft for two casualties and one medic, and a transport for carrying up to 1,500 kg of freight inside the cabin or up to 2,400 kg underslung.

Special-purpose parachute system BERKUT-A

The BERKUT-A special-purpose parachute system by the Ivanovo-based company SC Polyot has a significant export potential. It is intended for the paradropping of special troops and law-enforcement units from altitudes between 700 and 8,000 m, at aircraft speeds ranging between 140 and 255 km/h with immediate canopy opening and between 140 and 350 km/h with delayed opening. The system allows for frontal attachment of a cargo container weighing up to 50 kg and for the attachment of weaponry and oxygen equipment to the parachutist's harness. The system weighs not more than 17.5 kg without the carrying bag and the safety device. It can carry weights of between 90 and 180 kg.

The system comprises:

- the parafoil main parachute with an area of 300 ft^2 (28.4 m^2) and a lift-to-drag ratio of 2.6. The upper surface of the canopy is made of a zero air permeability fabric, with Microline suspension lines;
- the reserve parachute with an area of 290 ft^2 (27 m^2), with a lift-to-drag ratio of 2.4;
- the container with the harness; the range of flight under the main parachute from an altitude of 8 km with a tail-on wind is up to 35 km. Additionally, the 'stirrups' contraption can be used for protracted flights.

9K515 Tornado-S MLRS

Debuting at Army-2020 is the 9K515 Tornado-S MLRS complete with the new munitions developed by Splav Scientific Production Association named after A Ganichev (is part of the control circuit of the Technodinamika holding company). The system is based on the Smerch MLRS baseline and incorporates cutting-edge developments by Russian defence enterprises. Also displayed at the forum is a full-scale mock-up of the newest 9M544 300-mm missile with high-explosive fragmentation submunitions for the Tornado-S. The missile is intended against armoured and unarmoured vehicles, personnel, as well as stationary and moving single and group targets.

The 9M544 missile is based on 300-mm projectiles for the 9K58 Smerch MLRS. It features:

- a control system module based on a platformless inertial navigation system with frbre-optic gyros integrated with equipment for Glonass and Navstar satellite-based navigation system;
- the capability to feed individual mission data and ephemeris information into each projectile prior to launch, to receive satellite-based navigation system signals, to perform navigation calculations along the flight trajectory, etc.

The Tornado-S MLRS and the associated new missiles havea huge export potential and are expected to eventually replace the earlier Smerch MLRS, which used to be exported to many countries.

Innovations by CSTS Dinamika

Centre for Scientific and Technical Services (CSTS) Dinamika (part of the Technodinamika holding company) has developed a unique UAV-based air defence training complex intended for the imitation of low-speed UAVs and helicopters in trials of prototype and upgraded weapons and in troop training. As part of the project, the company developed and successfully tested the first unmanned target imitating a helicopter with a take-off weight of over 300 kg, an endurance of at least one hour, a maximum altitude of 2,500 m and a range of at least 100 km. The company has launched series production of this vehicle.

CSTS Dinamika also has launched series production of simulators of the highest complexity level based on a six-coordinate dynamic platform. The simulators meet the ICAO 9625 recommendations and the EASA requirements. They provide the crew with virtually the entire set of acceleration cues characteristic of real-life flight and allows for practising a broad range of training exercises. The utilisation of highly representative aircraft movement mathematical models, new-generation electromechanical and hydraulic motion systems, visualisation systems with unprecedented imagery quality and cutting-edge virtual reality technologies enable the company to manufacture a complete model range of simulators for virtually all the existing Russian-made fixed- and rotary-wing aircraft types.

Experimental 2A46M Mango-M

Another novelty on display at the Army-2020 forum is the experimental 2A46M Mango-M 125-mm armour-piercing submunition for the 2A46M tank gun by Mechanical Engineering Research Institute (NIMI) named after VV Bahirev (is part of the control circuit of the Technodinamika holding company).

The upgraded submunition is intended against contemporary and modernised tanks equipped with complex combined or spaced armour, including with enhanced dynamic protection. This topical and promising development is a logical replacement for the 3VBM17 Mango 125-mm submunition thanks to its improved main specifications:

The Mango-M has excellent export prospects as it was designed, just like its predecessor the Mango, for use with T-72 and T-90 tanks in various versions. The main advantage of the Mango-M is that it does not require any upgrades to the tank autoloader. T-72 and T-90 tanks are in service with many foreign customers. The main foreign customer for the T-90 is India; the country licence-builds the tank and also locally manufactures 3VBM17 Mango submunitions. /RA&MG/

WIDE CAPABILITIES FOR FOREIGN CUSTOMERS

JSC Rosoboronexport and JSC Omsktransmash (part of JSC Concern Uralvagonzavod), which are subsidiaries of the Rostec State Corporation, have demonstrated the TOS-1A heavy flamethrower system to a number of foreign customers at the Nizhny Tagil Institute of Metal Testing's (NTIIM's) Staratel Proving Ground in Nizhny Tagil.

'The TOS-1A heavy flamethrower system is u nique to the world arms market, the only deadly short-range fire support weapon in the world. Such equipment is not produced anywhere in the world except Russia, and we are proud to show it to our foreign partners. The system has repeatedly shown its impressive capabilities to destroy well-protected terrorist groups in real combat conditions in the Middle East. Owing to its unrivalled performance, the TOS-1A has held steady in the Top 5 weapons supplied by Rosoboronexport to customers' land forces,' said Rosoboronexport's Director General Alexander Mikheev.

During the demonstration at the Staratel Proving Ground, the TOS-1A system has accomplished all its tasks. Visual observations and express data analysis substantiated its performance and the reliability of engaging targets at different ranges.

'The TOS-1A showed its best performance and high fire efficiency at the test site. Its effectiveness and firepower have been long recognized all over the world. It is a unique R&D product in terms of the technical solutions applied and combat effectiveness,' said Alexander Potapov, Director General of JSC Uralvagonzavod Concern.

The TOS-1A heavy flamethrower system is in service not only with the Russian Army, but also with the armed forces of several countries of the world. Unlike all currently existing multiple rocket launchers (MRL), only the BM-1 launch vehicle of the TOS-1A system, having MBT-level armor and a minimum firing range of 600 m (maximum range of 6 km), can perform the necessary combat missions on the forward edge of the battle area (FEBA) in a very short time frame, while remaining practically invulnerable. This is a deadly, time-tested and unrivalled flamethrower system whose high reliability has been proven more than once.

All existing MRLs have an order of magnitude longer minimum firing range and are located at considerable distances from the FEBA. The TOS-1A operates within the combat formation of troops, which reduces the targeting time and increases the efficiency of fire control. These systems are capable of delivering both indirect and direct fire on visible targets almost immediately after their detection.

According to Igor Lobov, Director General of Omsktransmash, the TOS-1A developer and manufacturer, 'the tank chassis provides tactical mobility and a high level of crew protection, and also makes it possible to quickly move to the required firing position and operate in the zone of direct fire contact with the enemy, which no artillery system can do.'

The BM-1 launch vehicle is a 220 mm 24-barrel launcher mounted on a tracked chassis. It fires unguided rockets developed by Ganichev NPO SPLAV (part of the Rostec State Corporation). The rockets are equipped with a thermobaric warhead capable of engaging heavily protected enemy positions, including fortifications, with minimal means. A full salvo, lasting just a few seconds, is capable of destroying enemy forces over an area of 40,000 square meters. /RA&MG/

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RADAR AGAINST HYPERSONIC TARGETS

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

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

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

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

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

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

The 59N6-TE radar set includes an antenna-hardware complex and an indicator post, placed on a standard vehicle chassis of the 'KAMAZ-6560' type. There are also options to place the item on a single vehicle chassis, deploy it in a stationary version or to place the radar antenna system on a high tower support and other installations. Besides, the station is equipped with remote operator's work stations, which may stay at a distance of up to one kilometer from the indicator post if connected via glass fiber links, and up to 15 kilometers in case of using a radio link.

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

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BK-10 ASSAULT BOATS FOR SUB-SAHARAN AFRICA

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

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

'The contract signed by Rosoboronexport was the first document for the supply of Russian-made final naval products to Sub-Saharan Africa in the last 20 years. This is an undoubted success in fostering military-technical cooperation with the countries of the region that is strategically important for Russia. We have been working long and purposefully to develop relations with them and expand our African footprint, which now covers almost the entire continent. The Russia-Africa Summit and Economic Forum, held in Sochi in October 2019, gave a strong impetus to the growth of our cooperation and its transition to a new quality level,' said Alexander Mikheev, Director General of Rosoboronexport.

The Project 02450 fast assault boat BK-10 is intended for transporting personnel, landing troops on unimproved shores, providing fire support to forces ashore, fighting piracy and terrorism, rendering assistance to those in distress. It features high speed performance and long operational range.

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

The BK-10 has an armored wheelhouse and a bullet-resistant windshield. Armored plates can be installed around the perimeter of the troop compartment to protect the soldiers. Strong engine protection bars are installed.

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

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

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

MOBILE HOSPITALS AND MODULES

Rosoboronexport JSC (part of the Rostec State Corporation) is ready to supply to international customers advanced means for diagnostics, treatment and localization of viral and bacterial infections.

'Today, Rosoboron-export can offer to its partners a complete set of means and equipment to effectively manage most epidemic threats, including novel virus infections. Our catalog lists mobile hospitals with units for diagnostics and treatment of contagious diseases, control and disinfection stations, and modular facilities for isolation and observation of quarantined persons. They are self-contained, comfortable for the personnel and patients, and can be installed within short time constraints, from one to six days,' said Alexander A. Mikheev, Director General of Rosoboronexport.

Rosoboronexport offers to its partners a module-built mobile field hospital (MFH) designed and manufactured by Proekt-Technika Corporation.

In its standard version, the hospital can provide qualified medical assistance to wounded and sick people (up to 300 people a day). About 30 people can be hospitalized for up to 30 days. At the customer's option, the patient capacity of the MFH, the bed availability and the number of consultation rooms can be increased according to the customer's requirements.

The list and quantity of the medical equipment and inventory may vary according to the specialty and the patient capacity of the hospital, availability supplies to restock the inventory in the deployment area, and other requirements of the customer. Rosoboronexport is ready to supply additional specialized modules and medical equipment, including isolation wards, in required quantities.

The hospital is partially or fully mobile, as it uses its own motor vehicles (URAL or KAMAZ cross-country container trucks); when traveling long distances, it can be transported by rail, air, river or sea. Medical modules can be mounted on the customer's motor vehicles (subject to necessary adaptation).

The box vans are operated both on the chassis and on the ground. To remove the body of the truck from the chassis, a crane or special cargo-handling devices should be used. Advanced life-support systems guarantee a comfortable working environment for the personnel in various climate zones at temperatures of up to +50°C.

In addition, Rosoboronexport offers to its partners a self-contained field camp with a closed-loop life support system for up to 500 people (APL-500). It is designed to create necessary infrastructure in wildland. The camp can provide a comfortable environment for quarantined people in case of an epidemic risk.

The camp is fully self-contained, thanks to availability of sanitation and hygiene modules, water storage and purification modules, food storage modules, a kitchen, a bakery, a power station, air conditioners, modules for waste reception, disinfection and disposal. The persons accommodated in the camp can be observed using medical support modules.

The camp can have a checkpoint module, supplied by Rosoboronexport separately. It can be separately stationed at the borders of areas in which quarantine is enforced, in order to check, screen and test the persons moving between cities, towns or areas and prevent the spread of contagious and viral diseases.

The Russian-made mobile field hospitals and self-contained camps offered by Rosoboronexport have undergone tough tests in actual hostilities and within the framework of rescue and relief operations of the EMERCOM of Russia, as well as in peacekeeping missions, and actions of law-enforcement, security and civil defense agencies of other countries. Everywhere the Russian products performed very well and were highly commended by medical personnel and patients.

In addition to the means for diagnostics, treatment and isolation of sources of epidemic threats, Rosoboronexport is prepared to supply to international customers technical supervision systems to monitor compliance with the quarantine and self-isolation regime of individuals. /RA&MG/

INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES (provisional plan)

In 2020

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'GUIDE' №04 (53)	September 1th	**HELIRUSSIA 2020** (15-17.09.2020, Russia, Moscow)
'GUIDE' №05 (54)	October 05th	**EURONAVAL 2020** (20-23.10.2020, France, Paris)
'GUIDE' №06 (55)	October 10th	**Vietnam International Defence Expo 2020** (25-27.10.2020, Vietnam, Hanoi)
'GUIDE' №07 (56)	November 01th	**Airshow China 2020** (10-15.11.2020, Zhuhai, China)
'GUIDE' №08 (57)	November 07th	**BIAS 2020** (18-20.11.2020, Bahrain, Manamaa)
'GUIDE' №09 (58)	November 10th	**CSTO's session 2020** (November 2020, Russia, Moscow)
'GUIDE' №10 (59)	November 12th	**IDEAS 2020** (24-27.11.2020, Pakistan, Karachi)
'GUIDE' №11 (60)	November 20th	**EXPONAVAL 2020** (01-04, Chile, Valparaiso)
'GUIDE' №12 (61)	December 01th	**EDEX 2020** (07-10.12.2020, Egypt, Cairo)

In 2021

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'GUIDE' №01 (62)	January 10th	**Dubai Helishow 2021** (19-21.01.2021, UAE, Dubai)
'GUIDE' №02 (63)	January 20th	**AERO INDIA 2021** (03-07.02.2021, India, Bangalore)
'GUIDE' №03 (64)	February 03th	**SAUDI AIRSHOW 2021** (16-18.02.2021, Saudi Arabia, Riyadh)
'GUIDE' №04 (65)	February 15th	**IDEX 2021 / NAVDEX 2021** (21-25.02.2021, UAE, Abu Dhabi)
'GUIDE' №05 (66)	March 05th	**LIMA 2021** (March, 2021, Malaysia, Langkawi)
'GUIDE' №06 (67)	March 19th	**LAAD 2021** (06-09.04.2021, Brazil, Rio de Janeiro)
'GUIDE' №07 (68)	March 20th	**INDO DEFENCE 2021** (07-10.04.2021, Indonesia, Jakarta)
'GUIDE' №08 (69)	April 10th	**FAMEX 2021** (21-24.04.2021, Mexico, Mexico)
'GUIDE' №09 (70)	April 20th	**ADAS 2021** (05-07.05.2021, Philippines, Manila)
'GUIDE' №10 (71)	May 01th	**HELIRUSSIA 2021** (May 2021, Russia, Moscow)
'GUIDE' №11 (72)	May 04th	**SITDEF 2021** (13-16.05.2021, Peru, Lima)
'GUIDE' №12 (73)	May 10th	**IMDEX ASIA 2021** (18-20.05.2021, Singapore)
'GUIDE' №13 (74)	May 17th	**IDEF 2021** (25-28.05.2021, Turkey, Istanbul)
'GUIDE' №14 (75)	June 01th	**KADEX 2021** (10-13.06.2021, Kazakhstan, Nursultan)
'GUIDE' №15 (76)	June 16th	**Paris Air Show 2021 Le Bourget** (21-27.06.2021, France, Paris)
'GUIDE' №16 (77)	June 18th	**IMDS-2021** (23-27.06.2021, Russia, Saint Petersburg)
'GUIDE' №17 (78)	July 01th	**MAKS-2021** (July, 2021, Russia, Moscow)
'GUIDE' №18 (79)	August 01th	**ARMY 2021** (August, 2021, Russia, Moscow)
'GUIDE' №19 (80)	September 01th	**AVIATION EXPO CHINA 2021** (September, 2021, China, Beijing)
'GUIDE' №20 (81)	October 01th	**DSE Vietnam 2021** (October, 2020, Vietnam, Hanoi)
"GUIDE' №21 (82)	September 20th	**ADEX 2021** (05-07.10.2021, Azerbaijan, Baku)
'GUIDE' №22 (83)	October 01th	**INMEX SMM India 2021**(11-13.10.2021, India, Mumbai)
'GUIDE' №23 (84)	October 04th	**SEOUL ADEX 2021** (14-17.10.2021, Korea, Seoul)
'GUIDE' №24 (85)	October 12th	**BIDEC 2021** (25-27.10.2021, Bahrain, Manama)
'GUIDE' №25 (86)	October 20th	**Defense & Security 2021** (01-04.11.2021, Thailand, Bangkok)
'GUIDE' №26 (87)	November 01th	**Dubai Airshow 2021** (14-18.11.2021, UAE, Dubai)
'GUIDE' №27 (88)	November 15th	**Expodefensa 2021** (29.11-01.12.2021, Colombia, Bogota)
'GUIDE' №28 (89)	November 25th	**Gulf Defense & Aerospace 2021** (07-09.12.2021, Kuwait, Al Kuwait)

ALMAZ – ANTEY
ASD Corporation

Izhevsk Electromechanical
Plant Kupol

SAMS TOR-M2K

SAMS TOR-M2E

SAMS TOR-M2KM

- Highly effective ability to repel modern air threats mass attacks including maneuvering and low-flying targets.
- Ability to destroy simultaneously four air targets by one combat vehicle with four surface-to-air missiles.
- Ability to detect and identify air targets at stops and during movement, short reaction time, maximum automated combat operation process.
- High jamming immunity.
- Combat vehicle is capable of completion of assigned combat missions independently, within a group of two CVs in «Squad» mode and as a part of SAM battery consisting of four CVs under command of a battery command post.

TOR-TYPE SURFACE-TO-AIR MISSILE SYSTEMS

PERFECT SYSTEMS – RELIABLE PROTECTION