

# RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of the United Industrial Publishing

№ 05 (58), June 2021

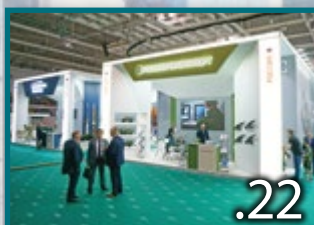
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*Military Technical  
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## EDITORIAL



### The best aerospace technologies at MAKS-2021

The Fifteenth International Aviation and Space Salon MAKS-2021 will be held in Zhukovsky, Moscow Region, on July 20-25, 2021 is gathering the best innovations for aerospace branches. The event is sponsored by the Ministry of Industry and Trade of the Russian Federation, and the State Corporation for Assistance to Development, Production and Export of Advanced Technology Industrial Product 'Rostec'. Organizer of MAKS-2021, Aviasalon JSC. This exhibition is undoubtedly the largest international industry platform for presentations and analysis. We are sure that MAKS-2021 will become the most important page in the development of Russian aircraft industry and space industry and their cooperation in the world market.

Political and economic situation in the world (conflicts, sanctions, threats of war and other) makes nations once again reconsider their technologies possibilities. It has become already obvious and undeniable that security is becoming increasingly important among the various values of civilization. Today, for any state, the ability to reliably and securely protect the territory, residents and these values is a priority.

But together with developing of technologies in order to safety, rivalry increases in order to achieve such goals as increasing profits and market share. MAKS-2021 presents the best world (Russian also) aerospace innovations for global market, which are the undisputed world leaders on price and quality in their segments.

This salon in Zhukovsky shows that it is not serious about how many airplane you have, but quality and possibilities of every single one of them is fact what leads to victory on the global market. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hitech products, solid after-sales service and proven reliability, Russia is honest and friendly partner for all countries, ready for mutual work. Taking part in MAKS-2021 Russia continues the policy of open partnership with other states.

**Valeriy Stolnikov**

## LARGEST VOLUME OF SALES

The radio-electronic complex of Rostec State Corporation increased its annual revenue by 21% in 2020, up to 223 billion rubles. The share of civilian products increased to 27% and amounted to 60.3 billion rubles, which is 18% more than in 2019. The final indicators reflect the financial results of the Avtomatika concern, the National Center for Informatization, and the Ruselectronics Holding. In 2020, these structures implemented a number of large-scale projects: the development of the Unified State Healthcare System and the Regional Medical Information System, social facilities' connection to IT infrastructure, modernization of regional airfields, laying of trunk fiber-optic communication lines, and design and modernization of border checkpoints.

'Recent experience shows that foreign shipments of electronic components, products and software can be terminated at any time. That is why we are speeding up the creation of our own technologies and products', commented Sergey Chemezov, CEO of Rostec.

The largest volume of sales was made up of 'Kupol' data storage systems, workstations, equipment for marking goods, fiscal storage devices, medical equipment, telecom equipment, crypto-bio-cabins and video-conference systems. In addition, in the past year mass production of smart electricity meters and fire protection devices to mitigate wiring faults were launched.

## MSTA-S AND ORLAN-10E

Rostec has demonstrated joint operation of Msta-S self-propelled howitzer, modernized for NATO-standard 155 mm calibre, and Orlan-10E reconnaissance drone to representatives of a foreign customer. During the demonstration, the artillery system created by Uraltransmash (subsidiary of UralVagonZavod under Rostec State Corporation) fired at a maximum range of 40 kilometers and showed excellent coordination capabilities with the UAV. The demonstration took place at the Staratel training ground in the city of Nizhny Tagil.

'The combat capabilities of the modernized 155 mm self-propelled howitzer 2S19M1-155 were demonstrated to a foreign customer. It fired at a maximum distance of 40 km with laying recovery in automatic mode. Msta-S has also shown excellent results when used in coordination with a control system and Orlan-10E UAV, reported the Rostec armaments cluster. In this mode, Orlan-10E can transfer target coordinates to the control system, which calculates the proper firing arc and sends the data to the crew of the self-propelled howitzer.

## Su-35S Multipurpose Fighter Jets

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

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

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



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

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

## Production of Ropeway Transport Systems

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

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

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



tourist resorts are developing', commented Alexander Nazarov, CEO of RT-Business Development.

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

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## FIRST TWO KA-226T HELICOPTER FUSELAGES



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

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

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

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



## Russian Army Receives new 'Alligator' Helicopters

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

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

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

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



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

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

## First 'Ansar' to European Customer

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

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

'This delivery demonstrates the competitiveness of the Ansar in the European market, and we see prospects for new orders. I am sure that other European operators will appreciate the favorable cost of operating the helicopter, its versatility and reliability. Two more Ansars for the needs of the police will be transferred to Republika Srpska in 2021 and 2022, they will be additionally equipped with searchlights, a parachute-free landing system, a winch and an external sling', said Andrey Boginsky, General Director of the Russian Helicopters holding.



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## WORLD MARKET FOR HELICOPTER

Russian share in the world market for helicopter engines ranges between 10 to 12 percent. This was reported to TASS by the Deputy General Director – General Designer of the United Engine Corporation (UEC, part of the Rostec State Corporation), Yuri Shmotin.

'Today UEC is represented on the global helicopter engine market by two types of motors: TV3-117/VK-2500 and TV7-117V. The corporation's market share in 2019-2020 amounted to around 10 to 12 percent', said Shmotin.

He predicts a gradual rise in the corporation's share in the global market. 'By 2035, it is planned to increase the market share to 18-20%. The main driver for growth will be the launch of VK-650V and 1600V engines, as well as the adaptation of the entire model range of Russian helicopter engines to foreign platforms in the UEC's traditional sales markets, Southeast Asia', added the General Designer. As noted by Shmotin, the share of helicopter engines in the UEC revenue structure is about 6-9%. 'Considering that 95% of the fleet used by the state aviation consists of helicopters with engines that were produced in Ukraine until 2015, revenue is not considered as main indicator for UEC. The state's defense capability and maintaining the export potential of Russian helicopter technology in the international market is a higher priority' he emphasized. UEC is the sole Russian manufacturer of engines for light and medium helicopters.

## CAMERA FOR NAVY

The SWIR camera can be used around the clock at low light levels and in the most challenging climatic scenarios. The camera's case is completely sealed and protects against damage, dust and water. The camera's range from 0.9 to 1.7 microns allows to see camouflage coatings and detect camouflaged objects. In addition, it is able to locate laser sources and thermal flashes such as shots, volleys and signals. The product developer is the Research and Production Association 'Orion'. 'Our camera is of interest to the Russian armed forces, since its broad scope of application includes security and control of situations on land as well as assistance in sea navigation. Participation in the development of an 18-day expedition to the Novaya Zemlya archipelago in the Arctic Ocean made it possible to fully assess its advantages, including in detecting and identifying objects in difficult meteorological conditions', said Pavel Abramov, acting director general of 'Orion'. During the Arctic expedition, representatives of the Russian Navy tested a number of special-purpose Shvabe developments, as well as the PO 3-12x50 'Zenith' civilian sight made by Krasnogorsky Zavod. The high-performance characteristics of the device guarantee its use in polar conditions.

## New Generation Radar

*Ruselectronics Holding of Rostec State Corporation has launched production of Miass mobile radars for airfields of light and regional aviation. Prototype tests are scheduled to begin in the second quarter of 2021.*

The project is being implemented by the Chelyabinsk Radio Plant 'Polyot' of the Vega Concern of the Ruselectronics Holding jointly with the Industrial Development Fund, which has allocated a loan of 320 million rubles under the Conversion program.

A key feature of the new radar system is the mode of targeted information exchange with a specific aircraft, which facilitates air traffic control and reduces the likelihood of data transmission errors.

Miass radars transmit information about aircraft coordinates to dispatchers around the clock and without the presence of attendants via the primary channel within a radius of at least 100 kilometers and via the secondary channel within a radius of at least 300 kilometers.

Another important advantage is the radar's small size and reduced



weight, which simplifies the process of its design, transportation, survey, construction and installation on site.

'The Industrial Development Fund's investments made it possible to quickly launch serial production of these radars and bring to the market a new product that will significantly increase the safe-

ty of air traffic and contribute to the expansion of regional traffic. Also, within the framework of the project, it is planned to modernize the production infrastructure of the enterprise, including measuring and testing equipment', said Alexander Nesterov, General Director of Chelyabinsk Radio Plant 'Polyot'.

## SSJ100 Airplanes to Domestic Airlines

*The Irkut Corporation of United Aircraft Corporation and PSB Leasing group of companies have signed three contracts for supply of eight SSJ100 airplanes for use by Aeroflot, Azimuth and Red Wings Russian airlines.*

Under the terms of the contracts, Irkut Corporation will supply the eight aircraft. Five planes will be supplied to Aeroflot, two to Azimuth, and one to Red Wings. The airliners will be produced in two cabin layouts. Aeroflot's aircraft are manufactured in a two-class cabin layout: with 12 business-class and 75 economy-class seats, while Azimuth and Red Wings have a single-class cabin.

The contracts are financed under a Promsvyazbank credit line opened for PSB Leasing group of companies with the aim of acquiring and leasing aircraft in 2020 and 2021. The source of repayment of the loan obligations will be lease payments received from the airlines during the period of aircraft operation.

The SSJ100 is a regional airliner with a cabin capacity of up to 103 passenger seats. The aircraft has



demonstrated economic efficiency during the pandemic due to its optimal combination of flight range and cabin capacity. The airplane is currently operated by fourteen carriers.

In March 2020, the first contract was signed with the United Nations for the use of SSJ100 aircraft to provide services to UN peacekeeping missions.



## UNIFIED ENGINE DESIGN



Rostec's United Engine Corporation successfully completed the first stage of testing the PD-8 gas generator for SSJ-NEW planes. Specialists of UEC-Saturn (Rybinsk) tested its launch and operation in a slow mode and in other modes. The full-size gas generator specimen will be presented at the International Aviation and Space Salon MAKS-2021.

The gas generator which is called the 'heart' of an aircraft engine consists of a high-pressure compressor and a combustion chamber – this part drives the power unit. As part of tests, estimates and experiments were carried out, and the optimal configuration of the gas generator (its electrical, hydraulic and pneumatic systems) was found. After that, specialists launched 'hot' starts of the engine using real jet fuel, which were successful.

'PD-8 is the 'youngest' one among Rostec's aircraft engines, which is designed for short-range aircraft. The gas generator of this power unit was assembled and installed on a test stand in May. During the first phase of tests, specialists successfully launched the engine and operated it in a slow mode. The tests confirmed that the design solutions were correct. This experience will be taken into account when subsequent gas generator samples and test samples of the PD-8 engine will be made and tested,' said Rostec speaker.

The PD-8 engine is being jointly created by UEC enterprises for SSJ-NEW – an upgraded version of the aircraft, which will be widely used for import substitution. The design of the power unit includes technologies which were tested during creation of the PD-14 engine for medium-range aircraft.

Currently, SSJ-100 have SaM146 turbofan engines designed by UEC-Saturn together with the French company Snecma in the first half of the 2000s. The French party makes gas generators for power units.

As it has already been reported, Rostec is also developing the PD-35 engine for wide-body long-range planes, which is the largest aircraft engine in Russia. This is one of the largest projects in the Russian aircraft industry. Engines with such characteristics had never been previously created in the USSR and Russia.

## Klimov presents design of VK-1600V engine

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

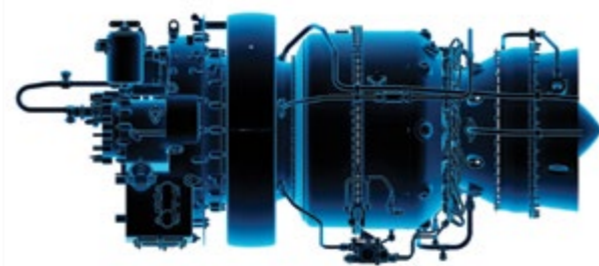
Consideration of the new engine by the committee is an important stage of development ahead of planning the certification tests. The prototype commission also green-lighted the automatic regulation and control unit for the VK-1600V – the BARK-15V, developed at JSC Klimov.

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

'We have passed an important stage in the process of creating a new engine. It is noteworthy that in diffi-

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

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



## Mi-171A2 in Vietnam

*The Civil Aviation Authority of Vietnam (CAAV) has validated the type certificate of Mi-171A2 multipurpose helicopter produced at the Ulan-Ude Aviation Plant of the Russian Helicopters holding company. This opens the Vietnamese market for the latest modification of the Mi-8/17 helicopter family.*

Earlier on March 13, 2020, the Federal Air Transport Agency (Rosaviatsia) and CAAV signed an airworthiness agreement aimed at supporting and simplifying the validation of Russian aircraft exported to Vietnam. This allows Rosaviatsia to support the development plan for the export deliveries of next-generation domestic aviation technology, formed together by the Ministry of Industry and Trade of Russia and companies from the Russian aircraft industry.

The first foreign operators of the Mi-171A2 were Kazakhstan and India. The helicopter type certificate has been validated by the aviation authorities of India, Colombia, South Korea and now Vietnam. The validation is also planned by China, Brazil, Mexico, Peru and other countries.

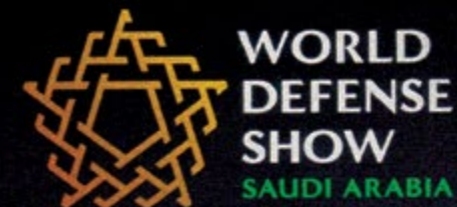
Mi-171A2 integrates the best characteristics of the famous Mi-

8/17 helicopters. It is equipped with VK-2500PS-03 engines with a digital control system. The increased power output of its engines and modernized piloting, navigation and radio communication equipment have expanded the model's scope for various operations. They provide Mi-171A2 with fundamentally new capabilities when operating in mountainous regions and hot climates. Due to its more efficient X-shaped tail rotor, a new main rotor with all composite blades, and improved aerodynamic profile, the cruise and maximum speeds of Mi-171A2 helicopter are 10 percent higher and its load capacity is 25 percent greater than those of serial Mi-8/17 helicopters (up to 4 tons of cargo inside the cargo bay or up to 5 tons on an external sling).

Mi-171A2 comes with a modern KBO-17-1 digital 'glass cockpit' avi-

onics suite, which allows to reduce its crew to two persons. Video cameras provide a better view during external load operations. Its flight safety is improved by modern terrain awareness and warning systems, airborne and obstacle collision avoidance systems. The model's cargo bay can be quickly modified for different operations by converting it between cargo transportation, search and rescue or passenger variants.

The helicopter was certified in A category, with the strictest flight safety requirements for civilian helicopters. The helicopter can perform search and rescue missions, medical and cargo operations, fight fires or carry passengers in daylight and during night, and at temperatures from -50 °C to 50 °C. It is suitable for high-mountain, desert, tropical or arctic climates and capable of carrying out long flights without landing.



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## NEW PARACHUTES FOR SPECIAL FORCES

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

## ELECTRIC MOTOR TO PROTECT TROPICAL HELICOPTERS

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

## Interactive Assembly Complex

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

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

'Assembling an aircraft is a complicated process. This interactive



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

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

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

## Parachute systems for airborne personnel

*The Ivanovo parachute plant 'Polyot' of the Technodinamika holding has ensured the early fulfillment of several state defense contracts for the supply of parachute systems to the Russian Ministry of Defense for airborne personnel. Among them are 'Malva-24' parachutes and the backup system 'Z-5'. The delivery to the end customer was completed ahead of schedule.*

One of the technologies supplied to the Ministry of Defense is the Malva-24 parachute system, designed to perform all types of jumps both by individual paratroopers and by groups of paratroopers from aircraft and helicopters. Its specifications and quality conform to leading international standards.

The main parachute is rectangular in shape and has seven sections. The 24.2 square meter canopy is suitable for skydivers weighing up to 100 kg. The set consists of the main and spare canopies, a satchel with a harness, a carrying bag, accessories, packing and spare parts. Depending on the configuration, the system is produced with two models of backpacks: 'Malva' (standard) and 'Comfort'.



The design of the Malva-24 parachute system with Comfort backpack ensures reliable operation when the parachute system is put into action at an altitude of 2000m above sea level at a flight speed of 140 to 225 km/h, both with immediate deployment and with delay in

opening the knapsack valves. In addition, 'Polyot' parachute plant is a reliable supplier of Z-5 reserve parachute systems compatible with almost all types of landing and training parachutes. 'Z-5' is quickly and conveniently mounted to main parachute harnesses.



Международный военно-технический форум

№01, 22 августа 2021 года

## Главный форум!!! The Main Forum!!!



Сегодня в подмосковном КРИУ «Патриот» начинается свою работу Международный военно-технический форум «Армия» — безусловно, главный форум в жизни российского оборонно-промышленного комплекса и Вооруженных Сил страны. Форум в очередной раз собрал воедино новейшие образцы вооружений и военной техники, ведущие предприятия оборонно-промышленного комплекса России и зарубежных стран. Форум «Армия-2021» снова представит очередные рекорды — по масштабам экспозиции, объемам представленных образцов инноваций, яркости динамичных показов и т.д.

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

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

Official information analytical edition of the forum — newspaper show-daily 'ARMY-2021'  
Four issues: 'First day', 'Second day', 'Third day', 'Fourth day', 'Fifth day'

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

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

ОФИЦИАЛЬНОЕ ЕЖЕДНЕВНОЕ ИЗДАНИЕ ФОРУМА

## Дорогие друзья!

Dear friends!

По традиции этот масштабный смотр новейших разработок оборонной промышленности собирает ведущих российских и зарубежных специалистов, служит востребованной площадкой для обсуждения вопросов военно-технического сотрудничества и, конечно, содействует укреплению партнерских контактов между оборонными ведомствами разных стран. Ведь только вместе, доверяя друг другу, мы сможем противостоять общим вызовам и угрозам, обеспечить глобальную стабильность и безопасность.

Убежден, что обширная программа форума вновь убедительно продемонстрирует огромный потенциал наших оружейников: конструкторов, инженеров, работников науки, техники, промышленности.



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

I strongly believe that the forum's rich program will offer Russian designers and engineers a unique opportunity to showcase their latest achievements.





# MILITARY TECHNICAL COOPERATION

June, 7 in the Kremlin, Moscow President of Russia Vladimir Putin had a working meeting with Director of the Federal Service for Military Technical Cooperation Dmitry Shugayev.

**V**ladimir Putin said: 'Mr Shugayev, we discuss military technical cooperation on a regular basis. We have created a special agency to help promote our equipment on international markets. Still, I would like to hear your assessments of how this work has been progressing in the first months of this year compared to 2020.'

After this Dmitry Shugayev in his speech spoke to Vladimir Putin about key topics of military technical cooperation: 'Mr President, everything

***'It is very important to note that we still have contacts with certain regions, primarily our partners from Asia and Africa. We maintain relations with more than 100 states, and we have supplied our equipment to 51 countries.'***

*Dmitry Shugayev,  
Director of the Federal Service  
for Military Technical Cooperation*

is going according to plan – that's the plan we adopted in 2020. Most importantly, we have kept with last year's figures. The total amount of our projects exceeds 15 billion, or 102 per cent of the target. We have secured a portfolio of contracts, which is vital, exceeding \$50 billion. This is one of the main indicators that give us confidence in the future, for defence companies as well as the entire military technical cooperation system.

The military technical cooperation system has been naturally affected by the pandemic. This includes our relations with our partners: our relations, our contacts have shrunk due to objective circumstances. Our marketing activities have been severely affected. For example, almost all international exhibitions were closed. One exception was our Army 2020 forum in Kubinka. That was the only major international event actually held last year.

It is very important to note that we still have contacts with certain regions, primarily our partners from Asia and Africa. We maintain relations with more than 100 states, and we have supplied our equipment to 51 countries.

That is, today, Mr President, we are moving forward confidently. And the most important thing is, we are talking multibillion-dollar supplies, even today. I am primarily referring to our top-notch equipment for the air force and air defence, of course – these enjoy the greatest demand.

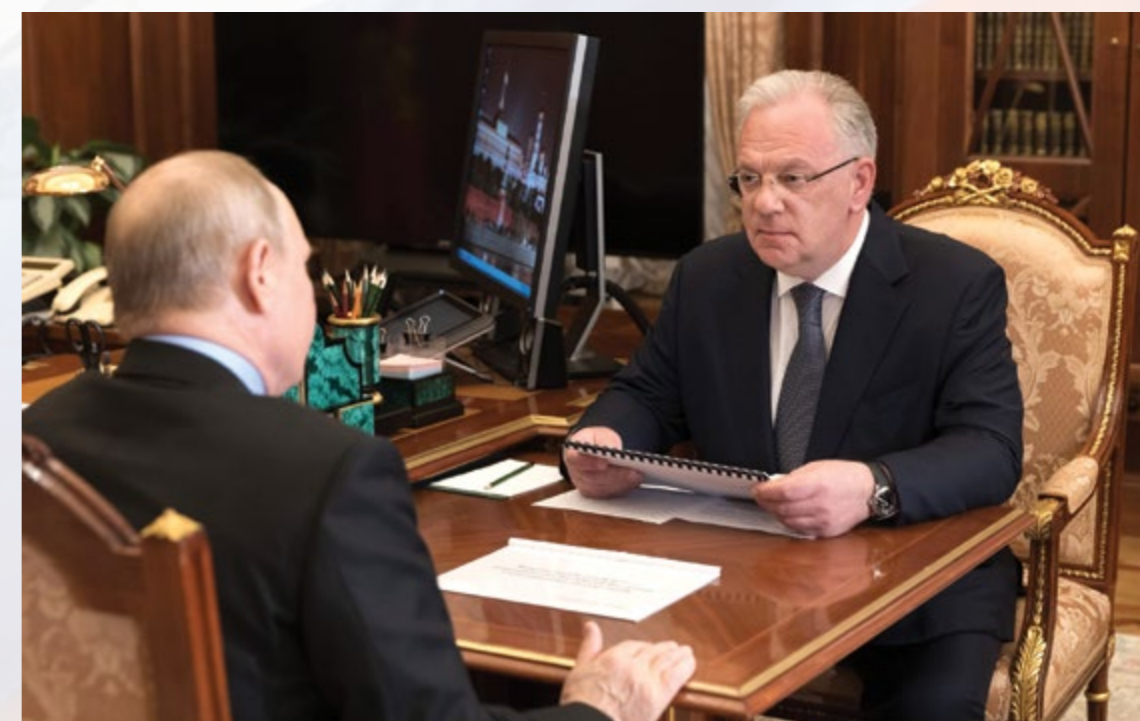
Still, we should not disregard our ground-force and naval equipment, of course – this equipment is also in demand. Admittedly, we have to operate in a tough competitive environment, and under very, very difficult conditions. Moreover, our competitors, despite the overall difficult situation, keep stepping up influence on our partners.

In this sense, we are facing unprecedented pressure and we can see that our partners are under very, very strong pressure. But we are taking into account the interests of our old partners and, of course, we are striving to establish good relations with new ones, to meet them halfway. Military technical cooperation seems to love silence sometimes.' **/INATG/**



***'Today we are moving forward confidently. And the most important thing is, we are talking multibillion-dollar supplies, even today. I am primarily referring to our top-notch equipment for the air force and air defence, of course – these enjoy the greatest demand.'***

*Dmitry Shugayev,  
Director of the Federal Service  
for Military Technical Cooperation*





### ***Dear colleagues and friends,***

*In 2021, two major international exhibitions, MAKS and ARMY, are held in Russia, where Russian and foreign companies will traditionally showcase all the latest military, dual-use and civilian products.*

*These are always bright and intense events that are attended by most of our partners and potential customers from major regions of the world. Rosoboronexport, a member of the Rostec State Corporation, provides sponsorship support to these events, given their particular importance for the development of military-technical cooperation between the Russian Federation and foreign countries.*

*The main goal of Rosoboronexport at MAKS and ARMY is to exploit all the opportunities to translate keen interest in Russian equipment into new contracts and replenish its order portfolio. To that end, we'll demonstrate the latest high technologies, as well as discuss with foreign partners the possibility of their participation in the implementation of joint industrial partnership projects.*

*The MAKS International Air Show, held in Zhukovsky near Moscow, was and remains the main venue for showing the best export versions of Russian aircraft and armaments, air defense and electronic warfare systems. In 2021, it will be held from July 20 to 25.*

*No MAKS show can do without new products. In 2021, we are going to present for the first time to our foreign partners the IL-114-300 aircraft, the Ka-32A11M, Ansat-M, Mi-171A3 helicopters, as well as the S-350 Vityaz long-range SAM system manufactured by Rostec companies. In addition, among the new products of MAKS-2021, foreign partners will undoubtedly be interested in the virtual reality Su-35 and Su-57E pilot station simulators, presented by Sukhoi, which enable pilots to practice skills to handle in-flight emergencies safely on the ground.*

*At its stand in Pavilion C2, Rosoboronexport will organize a demonstration of the Globe touch-screen interactive multimedia installation. With its help, it will be possible to get acquainted with 38 3D models of advanced Russian defense products, their performance characteristics, and view photo and video materials. In addition, scaled models of the IL-76MD-90A(E) military transport aircraft, Mi-35M transport/attack helicopter, Ka-52 scout/attack helicopter, Mi-26T2 heavy-lift transport helicopter, and the Mi-17V-5 military transport helicopter will be on display.*

*As part of MAKS, Rosoboronexport plans to carry out joint activities with Russia's major aircraft, air defense and electronic warfare systems manufacturers Almaz-Antey Air and Space Defense Corporation and Rostec's subsidiaries United Aircraft Corporation (UAC), Russian Helicopters, and High-Precision Weapons to promote Russian military and civilian products.*

*From August 22 to 28, the ARMY-2021 International Military-Technical Forum will be held in pavilions and open areas of the Patriot Convention and Exhibition Center, the Alabino Training Ground and the Kubinka Airfield. The Forum will take place simultaneously with the International Army Games.*

*ARMY presents the main export novelties and bestsellers of the Russian defense industry for all services and branches of the armed forces, as well as for special forces and anti-terrorist units. Of all the exhibition events taking place around the world, the Forum has been steadily successful for Rosoboronexport from a monetization standpoint.*

*The format of the Forum, which combines the demonstration of the widest possible range of products in the static display area and in action at a test range, provides a more comprehensive understanding of the features and capabilities of the items and systems being exhibited.*

*Rosoboronexport's exhibit display at ARMY traditionally encompasses all segments of the modern market of weapons, military and special equipment. Advanced pieces of equipment showcased at the forum will undoubtedly attract attention.*

*As regards air materiel, these are the IL-112V aircraft, the modernized Mi-171SH special-purpose military transport helicopter, the Ka-226T light multi-purpose helicopter, and an extensive range of unmanned aircraft systems for various purposes.*

*Rosoboronexport expects that representatives of the ground forces of the partner countries will show keen interest in the Tosochka TOS-2 heavy flamethrower system, the Rubezh-ME coastal missile system will be of interest to representatives of the naval forces, and I am sure that AK-19 and AK-308 assault rifles, chambered for the NATO cartridges and included in a small arms exhibit, will evoke much interest. In addition, taking into account the experience of recent military conflicts, we expect strong market potential of the Repellent-Patriot, the latest electronic warfare system for combating small-sized UAVs.*

*The fight against terrorism, armed crime, and drug trafficking remains an urgent problem in the modern world, and Russian manufacturers offer a unique set of tools to effectively counter these threats. Rosoboronexport will showcase a wide range of security equipment, including service weapons, precision long-range sniper rifles, explosive and drug detectors, and the latest body armor facilities.*

*For Rosoboronexport, MAKS and ARMY are the most important marketing tools, since foreign customers can use them to identify key trends in the development of the Russian defense industry and discuss their needs in detail with us and representatives of the developers and manufacturers.*

*During the exhibitions, in parallel with the traditional business program, Rosoboronexport will be actively promoting products in the Internet space, as well as through video conferencing, which will significantly increase the number of partners and improve their awareness of new models of weapons and military equipment that we offer. The company will hold online presentations and video broadcasts, show video reviews of new products and events at MAKS and ARMY. The materials will be available on the website of Rosoboronexport ([www.roe.ru](http://www.roe.ru)), on our YouTube channel and Facebook and Instagram accounts.*

*I wish all participants and guests of the exhibitions the most intense and fruitful work, new business contacts and great mood. Together, I'm sure, we will maintain Russia's leading position in the defense field, will be able to withstand any challenges and will continue the successful development of Russia's military-technical cooperation with foreign countries in the Asia-Pacific region, the Middle East, Europe, Africa and Latin America.*

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



# OFFICIAL SPONSOR OF MAKS-2021

Rosoboronexport JSC (part of the Rostec State Corporation) will be the official sponsor of the MAKS-2021 International Air Show, which will be held from July 20 to 25 at the Gromov Flight Research Institute's airfield in Zhukovsky, near Moscow.

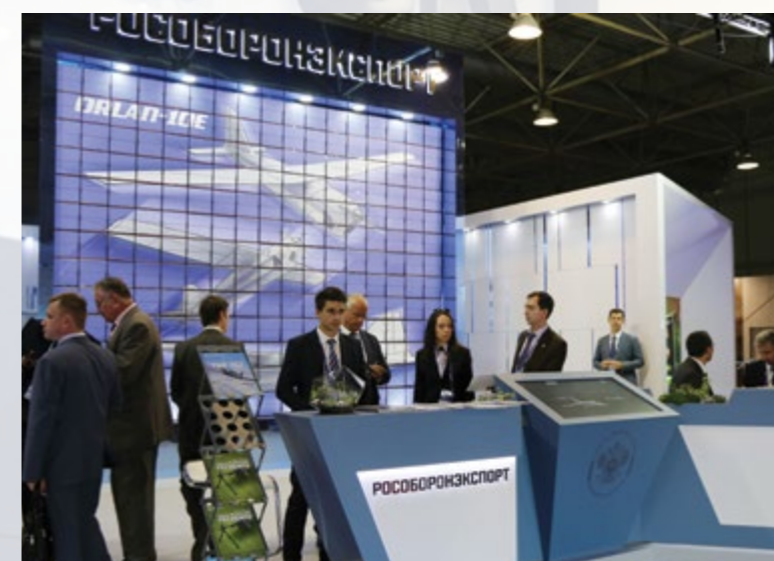


**F**or Rosoboronexport, MAKS was and remains the premier venue to show its partners the best export versions of Russian aircraft and armaments, air defense and electronic warfare assets, including new products no air show in Zhukovsky can do without. In 2021, we have invited more than 120 delegations from 65 countries and are going to unveil the IL-112B, IL-114-300 aircraft, Ka-32A11M, Ansat-M, Mi-171A3 helicopters, as well as the S-350 Vityaz long-range SAM system,' said Alexander Mikheev, Director General of Rosoboronexport.

In addition, among the new products launched at MAKS-2021, the virtual reality Su-35 and Su-57E pilot station simulators, presented by Sukhoi (a Rostec subsidiary),

*'For Rosoboronexport, MAKS was and remains the premier venue to show its partners the best export versions of Russian aircraft and armaments, air defense and electronic warfare assets, including new products no air show in Zhukovsky can do without. In 2021, we have invited more than 120 delegations from 65 countries and are going to unveil the IL-112B, IL-114-300 aircraft, Ka-32A11M, Ansat-M, Mi-171A3 helicopters, as well as the S-350 Vityaz long-range SAM system.'*

Alexander Mikheev



will surely be of interest to foreign partners.

At its stand in Pavilion C2, Rosoboronexport will showcase the Globe touch-screen-based interactive multimedia installation. With this installation, visitors will be able to see 38 3D models of advanced defense products, their performance data, and view photos and videos. In addition, scaled models of the IL-76MD-90A(E) military transport aircraft, Mi-35M transport/attack helicopter, Ka-52 scout/attack helicopter, Mi-26T2 heavy-lift transport helicopter, and the Mi-17V-5 military transport helicopter (an export version of the Mi-8MTV-5 helicopter) will be on display at the stand.

Rosoboronexport also prepared multimedia presentations of products promoted in external markets such as the Su-35, MiG-35/35D, IL-76MD-90A(E) and IL-78MK-90A aircraft, Ka-52, Mi-28NE, Mi-35M, Mi-35P, Mi-17V-5, Mi-8AMTSh-VA, Mi-171Sh

and Mi-38T helicopters, air defense systems and equipment: S-400 air defense missile system, Viking, Buk-M2E, Tor-M2KM, Tor-M2 SAM systems, Pantsir-S1M and Pantsir-S1 SPAAGM systems, Verba and Igla-S MANPADS, radars and EW systems.

As part of MAKS-2021's business program, Rosoboronexport plans to carry out activities aimed to promote military and civilian products under ongoing joint action programs with Rostec's subsidiaries United Aircraft Corporation (UAC), Russian Helicopters, and High-Precision

Weapons, as well as with the Almaz-Antey Air and Space Defense Corporation.

'The main goal of Rosoboronexport at MAKS-2021 is to exploit all the opportunities to translate keen interest in Russian equipment into new contracts and replenish its order portfolio. To this end, we'll make a presentation of the latest aerospace technologies, as well as discuss with foreign partners their possible participation in the implementation of joint projects,' Alexander Mikheev added.

/RA&MG/

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Alexander Mikheev





# IL-78MK-90A. TANKER AIRCRAFT

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

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

**I**L-78MK-90A tanker is intended for in-flight refueling of different types of aircraft by means of three aerial refueling pods and can perform fuel distribution on-ground. The aircraft may perform the take-off and landing from/on the paved and unpaved airfields.

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

**Main characteristics**

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



**Learn more about IL-78MK-90A aircraft**  
**e-mail: [roe@roe.ru](mailto:roe@roe.ru)**  
**[www.roe.ru](http://www.roe.ru)**



# SU-57E PERSPECTIVE MULTIROLE FIGHTER

*Multifunctional 5th generation aircraft system for execution of a wide range of combat tasks*

Unique features of the 5th generation fighter provide covertness of combat operation due to low signature level in the radar field, ensure continued supersonic cruise flight, solve the whole range of fighter and strike tasks that are assigned on tactical aviation.

**Su**-57E Perspective multirole fighter is designed for execution of a wide range of combat tasks while operating against aerial, ground and surface targets day-and-night with the use of the up-to-date progressive guided and unguided weaponry.

The fighter is equipped with the most advanced avionics suite, armament and self-defense complexes. Advanced intelligent support of the fighter and high level of automation ensure effective piloting of the aircraft and execution of the whole range of combat tasks with one pilot.



**Learn more about Su-57E fighter**  
**e-mail: [roe@roe.ru](mailto:roe@roe.ru)**  
**[www.roe.ru](http://www.roe.ru)**





# RADAR AGAINST HYPERSONIC TARGETS

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

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

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

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

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

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

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

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

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

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

'I 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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# RUSSIA at the MILEX-2021

Rosoboronexport JSC (part of Rostec State Corporation) organized a single Russian exhibit at the MILEX-2021 International Exhibition of Armament and Military Equipment, which was held from June 23 to 26 at the Minsk-Arena multifunctional sports and cultural complex in Minsk, the capital of the Republic of Belarus.

**R**osoboronexport increases the level of military-technical cooperation with the Republic of Belarus. The company offers the Republic of Belarus packaged supplies of Russian defense products and special equipment for all services of the Armed Forces and other

national law enforcement agencies. Rosoboronexport, with its unique status, is able to synchronize the supply of weapons and special equipment with training both at industrial enterprises and using the Russian Ministry of Defense's capabilities to provide other services in this area, while optimizing various,

including logistics, costs. We are ready to boost implementation of joint projects with the Belarusian side in the production of military equipment, expand the areas of interaction through industrial and technological cooperation,' said Alexander Mikheev, Director General of Rosoboronexport.

At its stand, Rosoboronexport showcased scaled models of the Mi-35M transport/attack helicopter, the BTR-82A armored personnel carrier and the Tor-M2KM SAM system with combat and support modules.

In addition, Rosoboronexport also exhibited mockups of the famous SVLK-14S Sumrak (Twilight) and DVL-10V3 Volkodav (Wolfhound) sniper rifles produced by KBIS LLC (Lobaev Arms), Automatika Concern's Pishchal-PRO hand-held anti-drone system, Argus-NV's non-military thermal imaging cameras and optical devices, as well as scaled models of Typhoon K-63968 and Typhoon K-53949 vehicles and Linza (Lens) protected ambulance vehicle produced by Remdiesel, a spin-off from KAMAZ truck manufacturer. Special Technological Center's (STC's) specialist provided comprehensive information about the company's Orlan-10E unmanned aerial vehicle.

As part of the exhibition, a comprehensive presentation of Russian-made security equipment, including small arms and non-lethal weapons and ammunition, body armor facilities, cargo and people screening equipment, was held at Rosoboronexport's stand. Also Rosoboronexport was held a presentation of the Azart unified tactical radio communications system – a new network solution for improving resilience and security of command and control networks.

As part of the joint Russian exhibit at MILEX 2021 leading Russian weapon companies were presented their stands: the Almaz-Antey Air and Space Defense Corporation with its subsidiaries Kupol IEMZ and JSC VNIIRT, NPO Pribor, Rostec's holding companies Technodinamika

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*Alexander Mikheev*

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with its subsidiaries JSC Polyot Parachute Plant, Uralvagonzavod with Uraltransmash, NPK Techmash, High-precision Systems and KBP, as well as SPLAV, Research Institute of Applied Chemistry and Bakhirev NIMI Engineering Research Institute.

In addition to its stand, JSC Kronshtadt was demonstrated a full-scale unmanned reconnaissance/strike system with the Orion-E long-endurance UAVs, a ground control station, payload options, as well as air weapons in the outdoor display area. Belarusian industrial companies are expected to participate in the production of this system.

'At MILEX 2021, Russian defense companies will present more than 20 products that Rosoboronexport

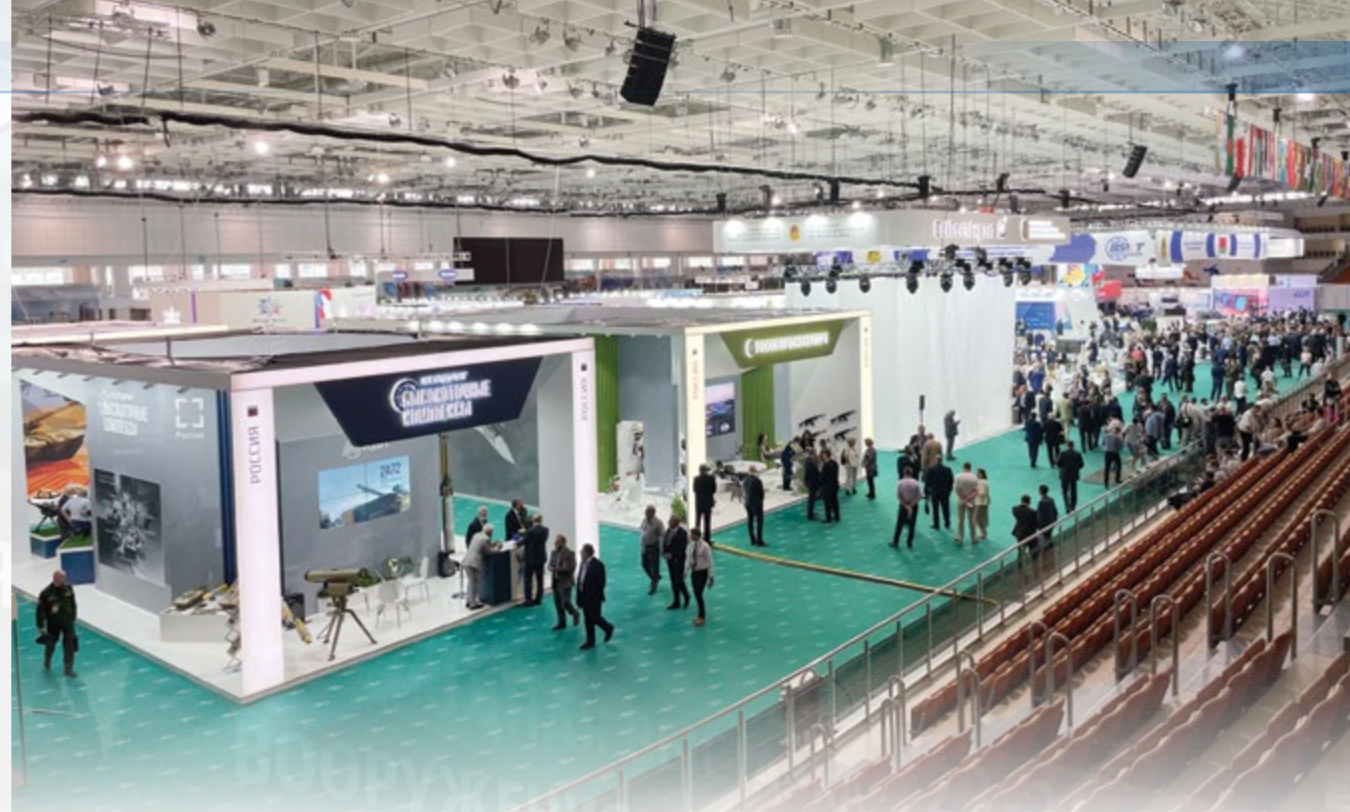
has launched in the international market over the past year. Among them, in addition to the reconnaissance/strike version of the Orion-E UAV, there is also the Antey-4000 air defense missile system, the upgraded 203-mm Malka self-propelled gun, a universal armored engineer vehicle, an armored personnel carrier and an infantry fighting vehicle based on the Boomerang platform. These pieces of military hardware will be exhibited in Belarus for the first time,' Alexander Mikheev said before the exhibition.

Rosoboronexport had a tight business program at the exhibition in Minsk, including meetings and negotiations with representatives of the Ministry of Defense of the Republic

of Belarus, leading local manufacturers and exporters of weapons, military equipment and other high-tech products.

The company's representatives also took part in the Ninth International Scientific Conference on Military-Technical Cooperation in Defense and Security, organized by the State Military-Industrial Committee of the Republic of Belarus.

During the event, heads and experts of the Russian and Belarusian ministries and departments, scientific and educational institutions, enterprises and companies engaged in the development and assimilation of advanced military and dual-use technologies discussed current trends in military science and security. /RA&MG/



# RUSSIA'S NEWEST SHIPBUILDING PRODUCTS

Rosoboronexport JSC (part of the Rostec State Corporation) was presented the latest models of Russian naval equipment and coastal surveillance and defense system to foreign customers during the tenth anniversary International Maritime Defense Show (IMDS 2021). The exhibition was held from 23 to 27 June 2021 in St. Petersburg.

**R**osoboronexport is a long-standing exhibitor and sponsor at the International Maritime Defense Show. Therefore, as one of the pioneers, we are very pleased to note that the show has grown qualitatively and placed high among the world's leading exhibitions,' said Alexander Mikheev, Director General of Rosoboronexport. 'Rosoboronexport has invited delegations from more than 70 countries to IMDS 2021 and we expect a strong incentive to develop military-technical cooperation with partners in the naval segment. Today, the com-

pany's order portfolio in this segment stands at about \$5.5 billion. It includes contracts for the supply and joint construction of ships and submarines, the supply of various weapons for them and coastal support equipment, as well as infrastructure projects.'

Rosoboronexport's exhibit at IMDS reflected the main needs of the present-day market, guiding potential customers towards the purchase the most in-demand products. Scale models of the Project 636 large diesel-electric submarine, Project 20382 Tigr class corvette, Project 677E Amur 1650 diesel-electric submarine,

Project 22800E Karakurt-Ecorvette and the Rubezh-ME coastal defense missile system were on display at the company's stand.

'The company showcases the most in-demand pieces of naval materiel at its stand. For example, Rosoboronexport is considering the supply of Karakurt-E corvettes to six countries, and eight our foreign customers are showing a strong interest in the Rubezh-ME coastal defense missile system. Together with manufacturers, we are also ready to present full-scale pieces of naval equipment to our partners in detail,' Alexander Mikheev added.

The latest pieces of Russian naval equipment, whose export versions Rosoboronexport offers to its partners on the world market, were showcased in the Passenger Port of St. Petersburg within the Show.

– Project 22800 corvette (export version – Project 22800E Karakurt-E) is comparable in firepower to a frigate and equipped with the Club-N integrated missile system and the Pantsir-ME multi-channel anti-aircraft gun/missile system.

– Rubezh-ME coastal defense missile system enables a single launcher vehicle to search and engage a target by integrating weapon and target designation subsystems into a single platform. A strike group consisting of up to eight launcher vehicles can also be formed.

– Project 677 diesel-electric submarine (export version – Project 677E Amur-1650) belongs to the latest generation of submarines and incorporates the most advanced technologies and materials. Its ammunition load includes Club-S missiles capable of engaging enemy ships and land targets, as well as torpedoes with a firing range of up to 50 kilometers.

– Project 22350 multi-purpose frigate (export version – Project 22356) is a high-tech ship of the latest generation, perfectly adapted for operations in the far sea and ocean zone. Its armament suite includes a Club-N integrated missile system and a 130-mm A-192M gun system with a range of 22 km. Air defense is provided by a Rif-M multi-channel SAM system firing two types of medium-and short-range missiles, as well as by

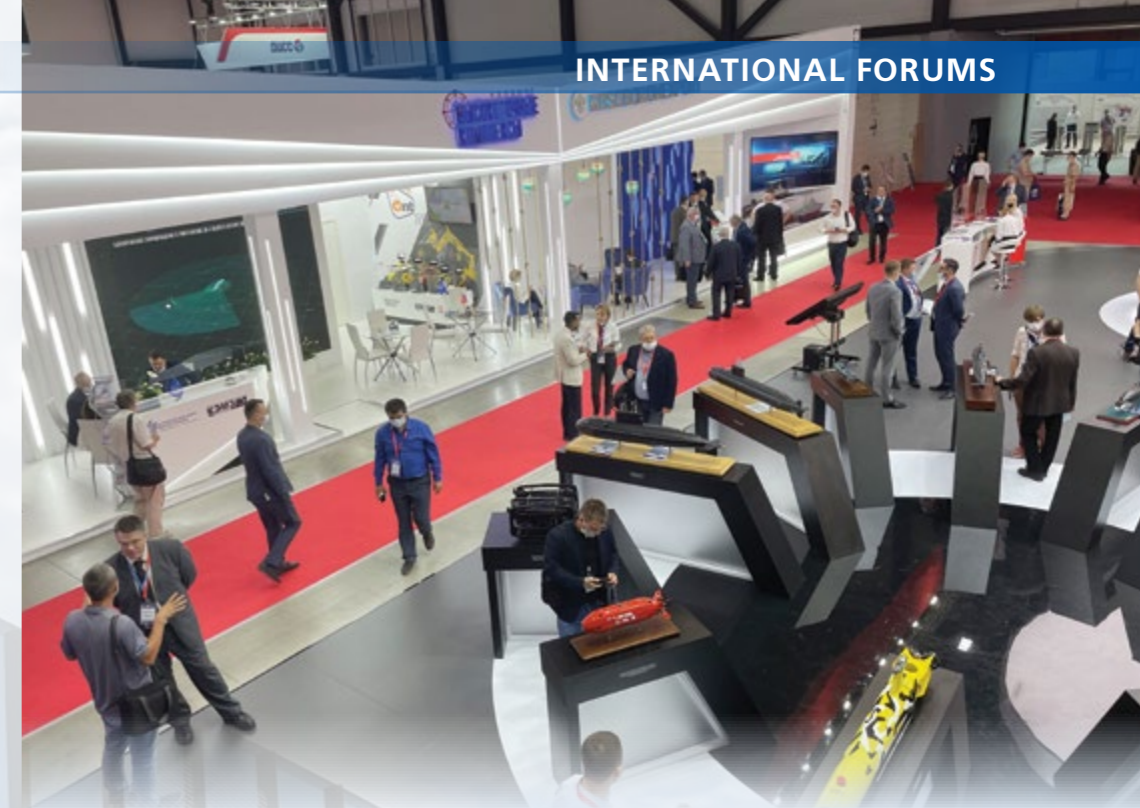
two Palma close-in weapon systems (CIWS). A Paket-E/NK small-sized anti-submarine torpedo system reliably protects the ship from attacking submarines and torpedoes.

– Project 22160 offshore patrol ship is excellently suited for patrolling vast sea and ocean areas, including those located at a considerable distance from the home base. The ship is equipped with deck-based helicopter and two unmanned aerial vehicles, an amphibious assault boat and high-speed motor boats. In wartime, the ship can be equipped with modular weapons and protect coastwise sea lanes, naval bases and sea areas.

– Project 12700 Alexandrit coastal minesweeper (export version – Project 12701) is equipped with a state-of-the-art mine countermeasures system to search and neutralize mines ahead of its course and sweeps. It is able to effectively protect naval bases, the exclusive economic zone, ships and transports during sea passage, detect and destroy minefields, and conduct mine reconnaissance.

At IMDS 2021, Rosoboronexport was held presentations of Russian surface ships, submarines and coastal surveillance system promoted to the external market in the course of negotiations with foreign partners, as well as talk about proposals for industrial cooperation in the field of naval shipbuilding.

/RA&MG/





# SHIELD AFRICA 2021

The delegation of Rosoboronexport JSC (part of the Rostec State Corporation) was attended the Shield Africa 2021 International Security and Defense Exhibition, which was held at the Police Academy in Abidjan, Côte d'Ivoire.



**R**osoboronexport is successfully continuing to foster military-technical cooperation with Sub-Saharan African countries, which received a strong impetus during the Russia-Africa Forum in 2019. In 2020 and early 2021 alone, we signed contract documents worth over \$1.7 billion in this region and brought the number of countries in Central, Western and Southern Africa in our order portfolio to 17, said Alexander Mikhnev, Director General of Rosoboronexport. 'Today, Rosoboronexport is marketing helicopters, air defense systems, naval products, armored vehicles, equipment for law enforcement agencies, airport and critical infrastructure security equipment, small arms, including special weapons, in the region.' During Shield Africa 2021, the Rosoboronexport delegation was held meetings and negotiations with representatives of law enforcement agencies of the African countries, also it was presentations of Russian-made products marketed by the company for all services of the armed forces, including police and special units.

Among Russian products that the company's specialists told about the BTR-80, 80A and 82A armored personnel carriers, Kalashnikov AK-100 and AK-200 series, AK-12 and AK-15 assault rifles that are most in demand in the region and the AK-19, AK-308 rifles, absolute novelties in Africa. In addition, the partners were provided with information about Russian anti-tank guided missile systems, including the Kornet-E and Kornet-EM systems, 120 and 82 mm mortars.

In addition to the Rosoboronexport delegation, Russia was represented by the Military Industrial Company (VPK), which organized an exhibit display with the full-scale VPK-233316 Tigr special armored vehicle in the Raid configuration, VPK-39473 Strela light armored and VPK-Ural multi-purpose armored vehicles. These vehicles were the first showcased at an exhibition on the African continent. During Shield Africa 2021, Rosoboronexport has detailed consultations and negotiations on the supply of this equipment. 'We will also inform our partners that we have significantly expanded our capabilities and are actively developing the activities related to supply of Russian civilian products. Rosoboronexport, which enjoys high reputation in the government and business circles of African countries, acts as a 'Single Window' and guarantor of the correctness and reliability of transactions for both Russian manufacturers and

foreign customers,' Alexander Mikhnev added.

In order to promote civilian products in the world market for companies unexperienced in independent foreign trade activities, Rosoboronexport has set up a special division to organize the supply of civilian products.

Among the core export product groups are vehicles, seagoing/river vessels, medical supplies, civil and service weapons, process equipment, metallurgical and chemical products. The company has already implemented several contracts for the supply of modern fire engines, civil helicopters, and security systems to various countries around the world, and a number of pre-contract negotiations are underway. Agreements on joint promotion of civilian products in the external market have been concluded with major Russian holding companies and are in force.

/RA&MG/



  
SHIELD AFRICA

June 8-10, 2021  
Abidjan  
Côte d'Ivoire


**DUBAI**  
AIRSHOW

# DUBAI AIRSHOW 2021

## Aerospace and defence startups to launch pad VISTA

Dubai Airshow 2021 is excited to introduce its new dedicated startup event, VISTA, which will be the ultimate platform for innovators, creators and market disruptors to display the latest technologies and play a part in accelerating the future of the aerospace and defence industries. The co-located event will connect startups with venture capitalists who are looking for disruptive new entrants that can out-hustle the big players. The event will be attended by national leaders, CEOs, investors, developers, technology disruptors, operators, and other key experts. Successful entrepreneurs from established global startups will also be present to inspire and guide aspiring startups.

**D**uring the 5-day programme, VISTA will feature a number of sub-events in partnership with Gothams, a leading accelerator that is helping to build the next generation of aerospace and defence startups. Entrepreneurs can take part in pitch competitions where they will be able to present their technologies to industry leaders and investors with the chance of winning some great prizes. They will have the opportunity to get involved in mentorship programs, workshops, and high-level networking, learn about market trends and receive the best guidance from experts, key decision makers, and global investors. A recent study has shown that startups that have helpful

mentors and learn from thought leaders have almost four times better user growth and raise seven times more capital.

Especially the prevalent capital-spending curb due to the pandemic, investments by global venture capitalists continued to increase. According to a Magnitt report, Saudi Arabia's venture capital funding increased by 55% in 2020 reaching \$152 million. Saudi Arabia continued its work to increase venture capital funding in 2021, in support of emerging startups. Saudi Arabia's Sanabil Investments recently partnered with the early-stage venture fund, 500 Startups, to support startups in the region. 100 startups are expected to receive \$100,000 to accelerate their growth in the

region, as a result of this partnership. Moreover, in the UAE, The Abu Dhabi Investment Office (ADIO) has partnered with Microsoft and Plug and Play on a range of initiatives to support technology startups in the region.

Commenting on his startup's participation in VISTA, Co-founder of SARsat Arabia, Ahmed Alzurabi, said: 'We are delighted to be taking part in Dubai Airshow 2021 and have the opportunity to display our technologies to the wider industry. We look forward to receiving high-level guidance from significant mentors in the field, to support us in achieving our goal of using cutting-edge Earth Observation satellite technologies to help improve life on Earth.'

Mohamed Shawky, the Founder and CEO of GeoDrones Aerial Services startup in Dubai, said: 'Our startup aims to provide superior quality drone commercial services as we see a great potential in drone technologies. We have a wide range of innovative ideas that are key for achieving a major transformation in the aerospace industry and we look forward to presenting these innovations to key experts in the field.'

Maximilian Buerger, Founder and Managing Director of Aviationfly startup, added: 'Exhibiting at the Dubai Airshow was an easy decision for us – the event will most likely be the largest aviation industry event of 2021 and the meeting point of aviation leaders from around the globe. Aviationfly is a United Arab Emirates headquartered startup, which similar to the Dubai Airshow connects different stakeholders in the aviation industry – our focus being the global pilot training ecosystem. The pandemic has significantly affected our industry but we used it as an opportunity to diversify our activities and are excited to be launching a new platform in time for the event in November.'

Several startups that launched in the last few years brought revolutionary innovations to the aerospace industry. One example is Heart Aerospace, which will deliver the first ES-19 electric airliner certified for commercial flight by 2026. Heart Aerospace's mission is to create the fastest, least expensive, and most sustainable mode of regional

**Returning for its 17th edition, Dubai Airshow will be held from 14-18 November 2021 at Dubai World Central (DWC), Dubai Airshow Site. Dubai Airshow is one of the largest and most successful air shows in the world, connecting aerospace professionals across all areas of the industry to facilitate successful global trade. The event will be held with the support of the Dubai Civil Aviation Authority, Dubai Airports, the UAE Ministry of Defence and Dubai Aviation Engineering Projects, and organised by Tarsus Middle East.**

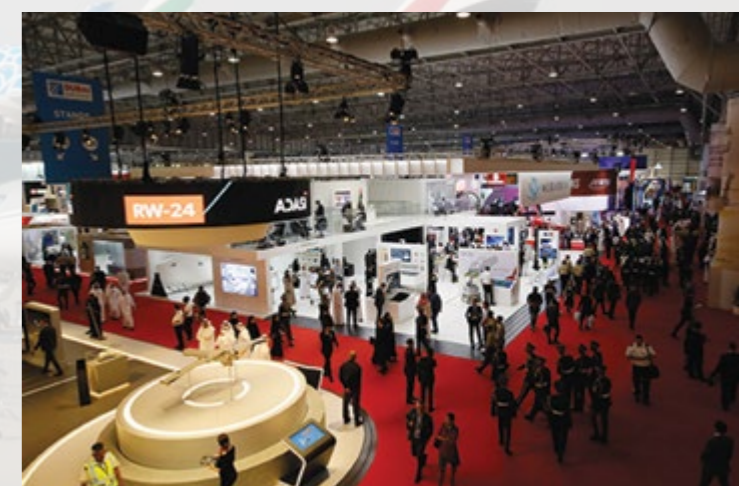
travel. Another example is Exodus Space Corp, a startup that aims to transform access to space through creating reusable AI-operated spaceplanes that can take off and land horizontally.

The aerospace industry has undergone an enormous transformation and development, making it one of the most lucrative industries within the startup ecosystem. In 2019, investments in aerospace startups reached nearly \$1 billion. Moreover, in Q3 of 2020, the global aerospace company and late-stage venture capital SpaceX invested \$1.9 billion in Space Technology startups, supporting the digital transformation of the aerospace industry.

One of the prominent startup accelerator in the aerospace industry is ATI Boeing Accelerator program, which invests in and accelerates up to 20 startups a year. The program targets startups creating sustainability solutions applicable to the UK's aerospace industry, offering a £100k equity investment. Intellegens, a startup that aims to use AI to accelerate innovation in advanced materials, chemicals, and drug discovery, was one of the startups selected for the ATI Boeing Accelerator.

VISTA will include startups from 12 different sectors, including Artificial Intelligence (AI), Future Mobility, Software, Space, Aerospace, Material Science, Cyber Security, Defence, Tourism, Robotics, Drones, and Sustainability. The startup hub will provide entrepreneurs with an unrivalled opportunity to connect with investors, partners, and mentors to launch, scale and grow their startups, and bolster the growth of the aerospace and defence industries in the region.

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## INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES

ISSUE	RELEASE DATES	ADDITIONAL DISTRIBUTION
'GUIDE' №04 (57)	June 10th	<b>IMDS-2021</b> (23-27.06.2021, Russia, Saint Petersburg)
'GUIDE' №05 (58)	June 15th	<b>ADAS 2021</b> (29.06-01.07.2021, Philippines, Manila)
'GUIDE' №06 (59)	July 01th	<b>DEFEA 2021</b> (13-15.07.2021, Greece, Athens)
'GUIDE' №07 (60)	July 10th	<b>MAKS-2021</b> (20-25.07.2021, Russia, Moscow)
'GUIDE' №08 (61)	August 07th	<b>IDEF 2021</b> (17-20.08.2021, Turkey, Istanbul)
'GUIDE' №09 (62)	August 12th	<b>ARMY 2021</b> (22-28.08.2021, Russia, Moscow)
'GUIDE' №10 (63)	August 31th	<b>AVIATION EXPO CHINA 2021</b> (16-18.09.2021, China, Beijing)
'GUIDE' №11 (64)	September 12th	<b>FAMEX 2021</b> (22-25.09.2021, Mexico, Mexico)
'GUIDE' №12 (65)	September 25th	<b>DSE Vietnam 2021</b> (October, 2020, Vietnam, Hanoi)
'GUIDE' №13 (66)	September 20th	<b>Partner 2021</b> (05-08.10.2021, Serbia, Belgrade)
'GUIDE' №14 (67)	October 05th	<b>SEOUL ADEX 2021</b> (19-24.10.2021, Korea, Seoul)
'GUIDE' №15 (68)	October 10th	<b>BIDEC 2021</b> (25-27.10.2021, Bahrain, Manama)
'GUIDE' №16 (69)	October 12th	<b>SITDEF 2021</b> (28-31.10.2021, Peru, Lima)
'GUIDE' №17 (70)	October 10th	<b>Airshow China 2021</b> (28-31.10.2021, China Zhuhai)
'GUIDE' №18 (71)	October 18th	<b>Defense &amp; Security 2021</b> (01-04.11.2021, Thailand, Bangkok)
'GUIDE' №19 (72)	October 28th	<b>Dubai Airshow 2021</b> (14-18.11.2021, UAE, Dubai)
'GUIDE' №20 (73)	October 30th	<b>Vietnam International Defence Expo 2021</b> (18-20.11.2021, Vietnam, Hanoi)
'GUIDE' №21 (74)	October 30th	<b>Expodefensa 2021</b> (29.11-01.12.2021, Colombia, Bogota)
'GUIDE' №22 (75)	November 12th	<b>EDEX 2021</b> (29.11-02.12.2021, Egypt, Cairo)
'GUIDE' №23 (76)	November 18th	<b>Gulf Defense &amp; Aerospace 2021</b> (07-09.12.2021, Kuwait, Al Kuwait)



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