

RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of Industrial Weekly

№ 08 (15) August, 2017

BRICS position

*International rules
of the industrial union*



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FSMTS of Russia

*The new trends
of the defense exports*



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Rosoboronexport

*The general partner
of Forum 'Army-2017'*



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Main naval show

*State tradition
returned to Russia*



.40

**Beauty and high
technical art
of defense
technologies**



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



The magazine 'Russian Aviation & Military
Guide', published by the United industrial
edition, is a winner of National prize
'Golden Idea 2016' FSMTC of Russia

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*There are materials from the information
agencies and from the press services
of the federal authorities of the Russian
Federation used in the project.*
Edition is 3 thousand copies

Editorial office:
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The materials marked with  published on a commercial basis

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EDITORIAL



Army-2017: main exam and holiday

Political situation in the world (conflicts, sanctions, threats of war and other) makes nations once again reconsider their defense possibilities. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and non-ending 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. International military-technical forum "Army-2017" presents the best weapons that price and quality are the undisputed world leaders in their segments.

World experience and Army-2017 show that it is not seriously about how many weapons you have, but quality and possibilities of every single one of them is fact what leads to victory on the battlefield. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hi-tech technology, solid after-sales service and proven reliability of products, Russia is honest and friendly partner for all countries, ready for mutual work.

Valeriy Stolnikov



SOKOL SECURITY SOLUTION

Rosoboronexport demonstrated Russia's state-of-the-art system providing security of vital installations, including military airfields, namely the SOKOL security solution, at the International Aviation and Space Show MAKS-2017. 'The unique system already caught attention of our partners from India and we count on it to pique interest on the part of customers from other countries in view of the growing terrorist threat. Promotion of such products paves the way for us to the market of hi-tech special-purpose equipment,' says Deputy Director General Sergey Goreslavsky of Rosoboronexport. The system utilizes alarm devices complete with fiber-optic cables to provide security of long perimeters and facilities. It boasts unique technical characteristics and capabilities. Should the boundaries of a protected installation be trespassed, the system automatically detects the place and directs to it video and IR imaging cameras to transmit information to the Duty Post. The trespasser may even not know that he has been detected, for the elements of the system can be buried into the ground forming up warning lines. Meanwhile, it has no impact whatsoever on the detection accuracy, which is within 5m, while the protected boundary can be as long as 100 km.

MOMENTS OF ARMY GAMES 2017

The Russian Defence Ministry issued the final video that concentrated brightest, breathtaking, challenging and spectacular moments of the International Army Games 2017. The video clip was published on the official website and accounts in the social networks Odnoklassniki, Vkontakte, Facebook, Twitter and YouTube. The clip comprises the footage of all contests of the Army Games 2017. They reflected the opening, culminating and final stages. Among them there are the highlights of the obstacle course passing at the Military Medical Relay Race contest participated by the women team, breathtaking fighters' flights at the Aviadarts, the individual race among the Chemical scouts within the Safe Environment, and classical views of the Alabino range that hosted the Tank Biathlon. The video clip ended with shots of the awards and closing ceremony, and the speech of the Russian Defense Minister General of the Army Sergei Shoigu.

Positive Export Trend

JSC Rosoboronexport (part of the Rostec State Corporation) has recorded a positive trend in the combat aviation market and now forecasts a further increase in the share of aviation equipment in the company's overall supplies.

'Aviation equipment has traditionally dominated Rosoboronexport's supplies. Since its establishment the company has exported over 1300 fixed-winged and rotary-winged aircraft and associated equipment totaling about 65 billion US dollars,' Rosoboronexport's Director General Alexander Mikheev said. 'Our forecasts are that the export volumes and cost of contracts on aviation equipment will continue growing. We expect the share of aviation equipment in the entire Rosoboronexport's supplies in 2017 to exceed 50%. The main importers of this type of weapons will be the Middle Eastern and Asia-Pacific countries.'

Successful activities of the Russian Aerospace Forces during the counterterrorist operation in Syria



have provoked a surge of interest in the Russian combat aviation in the global arms market. 'Foreign customers are peculiarly interested in the Su-

30 and Su-35 aircraft and Mi-28NE, Ka-52 and Mi-17 helicopters, which passed impeccably all the battle tests,' Rosoboronexport's CEO added.

Military and technical cooperation

Rosoboronexport, a member of Rostec, hosted in its main office in Moscow a conference with Rostec's representatives abroad. The leadership of the special arms exporter briefed on the 2016 foreign economic activity results and spoke about future strategies.

'In 2016, most of demand for the Russian military equipment came from North Africa and Asia,' reported Director General of Rosoboronexport Alexander Mikheev during the conference. 'Noteworthy are the beginning of the Su-35 supply to China, marketing of the new Su-32, as well as continuous efforts to implement projects in the interest of India's Navy,' the top official added.

According to him, the first half-year of 2017 witnessed a jump of the company's backlog worth from \$42 bln. to over \$45 bln. 'Our concerted efforts secured for Russia the second place on the world arms market. In the past five years, the company has accounted for 15 percent of the world military equipment export, while Russia's total share is 17 percent,' clarified the company's head.

Alexander Mikheev voiced new trends taking shape in Russia's military and technical cooperation with foreign states and noted that 'de-

ployment of Russian weapons in real combat contributed to the growth of demand for the S-400 SAM system, as well as Su-35 and Su-32 aircraft.' Besides, the official continued, this had piqued interest of foreign customers in the Iskander-E tactical missile system, Verba MANPADS, and other weapons and equipment.

Alexander Mikheev told Rostec's representatives that the company worked ceaselessly to find new forms and methods of doing business in modern conditions. 'We do our best to export military equipment not only to foreign ministries of defense, but other security agencies as well, working on extending the range of offered products, including civilian equipment,' said Alexander Mikheev. He also noted that the state had stepped up measures to support military and technical cooperation. Particularly prominent are efforts taken by Russia's leadership during contacts with foreign represen-



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ANGARA WANTS MC-21

During the International Aviation and Space Salon MAKS-2017 in Zhukovsky, Irkut Corporation (UAC member) and Angara Airlines signed the agreement of intent to purchase three MC-21-300 aircraft. From Irkut Corporation the document was signed by the President Oleg Demchenko, from the side of Angara Airlines — Director Anatoly Yurtaev.

TECHNICAL COOPERATION

Russia and Azerbaijan intend to develop Military Technical Cooperation. 'We are extending our cooperation in many fields: in the military in Military Technical cooperation, military education, joint exercises and training. I think we have great prospects, and in future we will develop this cooperation,' said Colonel General Zakir Hasanov. He reminded that Russia and Azerbaijan carried out joint exercises in the Caspian Sea. In addition, many servicemen and cadets from Azerbaijan get education in military educational institutions of the Russian Federation. A lot of Russian hardware is in service with our Armed Forces,' said Colonel General Zakir Hasanov. Speaking about the 'Tank Biathlon' contest, he highly praised the organization of the competition, and reminded that Azerbaijan hosted the contest of the International Army Games — 2017 — 'Caspian Cup', which gathered the Navy of the four countries.

ARMY-2017 IN VLADIVOSTOK

The International Military Technical Forum ARMY-2017 is to be held in Vladivostok from 22 till 27 August 2017. The exhibition will house 100 exhibits in four exhibition areas, about 60 pieces of weapons, military and special hardware of the Pacific Fleet and the Russian Aerospace forces. In addition, military and double-duty products, research organizations and higher educational institutions will be demonstrated. The exhibition of arms and military equipment in Vladivostok will be located at berth 33 on the Korabelnaya Embankment, at a military airfield in Central Angle and the branch of the Patriot Park on the Russky island. The events are planned to take place at the Officers' club of the Pacific Fleet and the Far Eastern Federal University. Research organizations, scientific production associations, industrial enterprises of the Far East, Eastern Siberia and other regions of the Russian Federation are invited to participate in the forum. Demonstration of your enterprise capacity will contribute to strengthening the reputation of the Russian Armed Forces, enable the innovative solutions application in the interests of armament development.

Russian President and MC-21 program

On July 18, during the visit to the Moscow International Aviation and Space Salon MAKS-2017, Russian President Vladimir Putin familiarized himself with the implementation of the new MC-21 commercial airliner program.

The head of state listened to a brief report of Oleg Demchenko, the head of the Irkut Corporation, about the MC-21 aircraft progress. The test pilots, Heroes of Russia Oleg Kononenko and Roman Taskaev, shared their impressions of the new airliner with Vladimir Putin. According to them, the first flights left the most favorable impression.

The President of Russian Federation watched videos of the recent test flight of the MC-21-300 aircraft over Lake Baikal. These videos from the escorting aircraft were demonstrated for the first time. The flight simulator of the MC-21-300 aircraft and a model of the new VIP version of the airliner are exhibited at the UAC stand in the F-1 pavilion.

MC-21-300 test aircraft, which performed the maiden flight on May 28, 2017, is being tested at the Irkutsk Aviation Plant, a branch of Irkut Corporation.

As of July 18, 2017, MC-21-300 test aircraft successfully completed 9 test flights. The processing of information obtained during the tests is being conducted.



Agreement of cooperation

During the International Aviation and Space Salon MAKS-2017, Sberbank and Irkut Corporation signed an agreement on the development of cooperation on the MC-21 project. The agreement implies the possibility to provide the Corporation with a wide range of financial products of the bank for the development of the MC-21 project, including the after-sales support of the aircraft.

Since 2012, Sberbank has been the main financial partner in the development and production of the newest medium-range MC-21 airliner. The amount of credit resources provided to the project is about 1 billion US dollars.

Vice President of Sberbank Vyacheslav Tsubulnikov said: 'We are proud to participate in the most important project of the Russian aviation industry to create a modern and competitive aircraft for world markets. Our bank continues to develop cooperation with the leading Russian aircraft manufacturers.'



President of Irkut Corporation Oleg Demchenko said: 'We highly appreciate the strategic partnership with Sberbank, with which we work on the core projects of the

ing on the glider in flight, with the loads taken during the design of the aircraft.

The MC-21-300 aircraft will perform more than 30 flights in Irkutsk within the framework of factory testing. After that the plane will fly to Zhukovsky airfield for passing the certification tests.

In 2018, three more MC-21-300 aircraft will join test flights, which are currently being built at the Irkutsk aviation plant, a subsidiary of Irkut Corporation.



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'GK LAUNCH SERVICES'

Within the frameworks of implementation of the strategy to develop commercial potential of the Russian space industry and in accordance with ROSCOSMOS decision, Joint Stock Company GLAVKOSMOS (a part of State Space Corporation ROSCOSMOS) and Limited Liability Company International Space Company Kosmotras (KOSMOTRAS) established a Joint Stock Company 'GK Launch Services'. This new Russian entity will become an operator of commercial launch services for satellites with the use of Soyuz family launch vehicles and the launchers developed on the basis of RS-20 rockets from the Russian launch sites. GLAVKOSMOS owns 75% and KOSMOTRAS – 25% of the new company's stock.

Establishment of GK Launch Services is driven by new challenges on the launch services market, and creates a new level of public-private partnership for business in space domain. Combined efforts of GLAVKOSMOS and KOSMOTRAS will give an impetus to the promotion of Russian launch vehicles on the international market. Bringing together unique expertise and resources of the two companies will significantly expand a scope of the launch services offered and thus enable orbital injection of various types of spacecraft with the mass ranging from 1 kg to 6 metric tons into the most popular orbits. This also meets an increasing demand in the segment of commercial space projects dealing with development and launch of small class satellite constellations and individual spacecraft.

According to Alexander Serkin, CEO of GK Launch Services, creation of a dedicated company will facilitate strengthening the positions of Russia on the international market and increase the workload of the Russian launch sites. The GLAVKOSMOS and KOSMOTRAS cooperation will enhance competitiveness of products and services of the Russian space industry, first of all, through optimization of launch costs and short-

er timelines of the launch projects implementation.

JSC GLAVKOSMOS is an enterprise of ROSCOSMOS State Space Corporation (the only shareholder) with the key objectives to promote the Russian space industry capabilities on the world market and to manage challenging space projects. During more than 30 years of its history, GLAVKOSMOS has successfully implemented 120 international contracts. Launches of more than 20 small satellites have been carried out since 2012. In 2017, the company plans to launch more than 100 small satellites for 15 foreign and Russian customers under the existing contracts. GLAVKOSMOS is an operator of Soyuz-2 commercial launches and a coordinator of ROSCOSMOS international projects. Spacecraft for the following customers have been launched on Soyuz-2 launch vehicles to date: Skybox Imaging, Norwegian Space Center, UTIAS SFL, SSTL, UK Space Agency, and DLR. The company's wide range of activities includes integrated solutions in creating satellite systems of various applications, turnkey solutions for Earth observation, telecommunications, space research and exploration, provision of Earth observation data from the Russian satellite constellation, as well as export of Russian space equipment.

It is also responsible for coordination of Russian enterprises activities for Soyuz-ST commercial launches in the Guiana Space Center. Among partners and customers of GLAVKOSMOS are NASA, Arianespace, Great Wall China and other private companies, as well as Russian and European universities.

International Space Company KOSMOTRAS

LLC (a Joint Stock Company until August 2016; from then on — a Limited Liability Company) was established in 1997 under the Russian law. The company's head office is located in Moscow, Russia. KOSMOTRAS is a launch service provider offering launches of converted RS-20 rockets on international and domestic markets. The rocket is capable of delivering payloads with the mass of up to 2 metric tons into LEO. These payloads are launched either in dedicated missions or as part of cluster (multiple small satellites) launches. Since the inaugural mission in April 1999, KOSMOTRAS has carried out 22 commercial launches lofting 128 payloads into orbit for 37 customers from 28 countries. Among KOSMOTRAS' customers are major aerospace companies and space agencies such as ESA, CNES, JAXA, KARI, EIAST, KACST, NEC, Airbus Defence and Space, MDA, SSTL, SSC, as well as universities and private companies.

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KA-52 TO TEST NEW MISSILE WEAPON

'Russian Helicopters' Holding Company together with the Russian Ministry of Defence will conduct tests of the newest guided missiles on Ka-52 ship-based reconnaissance and combat helicopter. Specialists of the Holding Company will also test on-board equipment and armament of the helicopter for their resistance to electromagnetic fields.

Currently, the tests are performed on four Ka-52K prototypes. One of the helicopters is being prepared for tests to evaluate the resistance of avionics and air weapons to external electromagnetic fields. The second helicopter undergoes preliminary tests at the airfield, and on the third helicopter a new inertial navigation system is tested.

The fourth Ka-52K prototype is at the testing site of the Russian Ministry of Defence, it is planned to test new guided missile weapons on this helicopter.

'Ka-52K helicopters are going through the final stages of the tests, and the Holding Company is ready to start serial production of this helicopter in the near future. We note interest of the Russian ministry of Defence in this helicopter. The design of the helicopter allows it to be placed on the decks of frigates, anti-submarine destroyers and the Admiral Kuznetsov aircraft carrier. Moreover, the Ministry of Defence

made a decision to develop Russian helicopter carriers,' Andrey Boginsky, CEO of Russian Helicopters Holding Company, noted.

During tests Ka-52 helicopter was significantly improved. The helicopter was equipped with the state-of-the-art target sight systems and weapon control systems, combat survivability of the helicopter was enhanced and autonomous deployment system was improved. These modifications provided the Ka-52K with a range of competitive advantages as compared to the similar helicopters of foreign production.

Ka-52K helicopter is the next product in the range of sea helicopters designed by Kamov Design Bureau. The helicopter is designed for patrolling, fire support of assault forces when landing, performing anti-airborne defence missions on the forefront and in tactical depth, under any weather conditions and at any time of day or night. State-of-the-art on-board equipment ensures helicopter navigation in conditions with no visual references at sea.

Ka-52K helicopter differs from the baseline model by availability of a shortened folded wing, which was upgraded for the installation of heavy weapons, and a blade-folding mechanism, which ensures its compact arrangement inside a ship's hold. Reduced dimensions of Ka-52 ship-borne helicopters allow increasing the number of helicopters located on a ship to maximum. Armored cockpit and unique ejection system provide pilots with the maximum safety level, which cannot be ensured on any helicopter of this class produced abroad.

Another important feature of the Ka-52K is the use of corrosion resistant materials, which is conditioned by the necessity of helicopter's operation in conditions of humid marine climate. The helicopter is equipped with a single-point refueling and a modernized air conditioning system ensuring ventilation of sea rescue suits of the crew members. In addition, the helicopter is equipped with short-range radiotechnical navigation system, which was not used on the baseline model.

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Conquering elements is what we do. Modern technologies and long-term experience in production allow us to resist the most severe weather and climatic conditions. Rescue of survivors from water surface, offshore operations, monitoring and patrolling – all these missions are carried out by Russian-made helicopters throughout the world on a daily basis.

**USING THE POWER OF AIR,
WE ARE CONQUERING WATER.**

BRICS LEADERS' MEETING

In Hamburg before the start of the G20 Summit there was informal meeting of the BRICS countries. Meeting took place between the heads of state and government of the BRICS countries - Brazil, Russia, India, China and South Africa.



Speaking at an informal meeting of the BRICS leaders on the sidelines of the G20 Summit in Hamburg, Vladimir Putin stressed that in the G20 discussions on the state of the global economy, Russia will focus on ways of ensuring positive momentum in global

trade. According to the President of Russia, the G20 should be proactive in promoting open, equitable and mutually beneficial trade in keeping with WTO rules.

Improving the international financial system so that all economies can benefit from it, including developing economies, remains high on the G20's agenda. Vladimir Putin said that further promoting IMF reform is essential for delivering on this objective.

The President went on to say that Russia attaches special importance to issues related to climate change and energy. 'Russia is a reliable energy supplier to global markets, and to many countries and regions of the world,' he pointed out.

In addition, Vladimir Putin spoke about counter-terrorism efforts, noting that no country is able to overcome this scourge and protect its people on its own. Accordingly, Russia, on a number of occasions, has

called for a single counter-terrorist front with the United Nations playing a central role.

President of Russia Vladimir Putin said: 'We appreciate the BRICS tradition of comparing views before G20 summit meetings and other key international events. I would like to say a few words about Russia's positions on the key issues on the G20 meeting agenda. The key priority is terrorism.'

Experience shows that no country, however powerful, can deal with this evil or reliably protect its citizens on its own. This is why Russia has, on several occasions, advanced the concept of a common UN-led counterterrorism front. This time, we will again urge our G20 partners to join forces against terrorism and work together to eliminate the political, social, economic and ideological preconditions for the rise and expansion of terrorism.

During discussions on the global economic situation at the G20 summit, Russia will highlight the need to promote an upward trend in global trade. We are against the economic protectionism that is gaining momentum in the world.

Illegal and politically biased trade and financial restrictions are actually aimed at removing rivals and result in the curtailment of business ties and a loss of trust between

remove the imbalances that have developed among countries.

As we all know, the global economy's transition to a new industrial order is underpinned by the development of digital technology. We believe that the G20 could take on a leading role in shaping international regulations in this area.

Improving the international financial system so all economies can benefit from it, including those in the



partners in economic cooperation, which is destroying the global economic fabric.

In light of this, the G20 should more energetically uphold the principles of open, equal and mutually beneficial multilateral trade as stipulated in the universal rules of the World Trade Organisation.

We are convinced that the G20 should make a bigger contribution to the creation of a fair system of global economic development, one that is capable of ensuring sustainable and inclusive growth and that can help

developing world, remains high on the G20 agenda. Further promoting IMF reform is essential for delivering on this objective.

We attach special importance to matters related to energy and climate change. Russia is a reliable energy supplier to global markets, and to many countries and regions of the world.

Moving forward, Russia remains committed to proactively contributing to the harmonization of the global energy market and reducing price volatility by working together with other countries that produce



and consume fuel, in order to ensure global energy security.

Russia has been doing a lot to reduce the anthropogenic impact on the environment, and stands ready to continue this important work. The reasons behind climate change have not been thoroughly researched, nor are we fully aware of the mechanisms of ongoing climate change. That said, Russia views the Paris Agreement signed in April 2016 as an interna-



tional legal foundation for long-term joint work on climate-related regulations.

We support the efforts and specific assistance by the G20 to African countries. It is important to carry on efforts aimed at promoting industrial and transport infrastructure development on the continent, and expanding access to education.

To conclude, I would like to thank our colleague, President of the People's Republic of China Xi Jinping, and note the effectiveness of China's BRICS Chairmanship in 2017! /RA&MG/

TRENDS AND TENDENCIES IN THE DEFENSE EXPORT

Dmitry Shugayev: 'We understand that the relations with partners in the 'only export' coordinate system are becoming a thing of the past. The current trend is to create new high-technology products in co-operation.'

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

— **Dmitry Yevgeniyevich, how high is the potential of the ARMY-2017 International Military-Technical Forum in the context of promotion of Russian military products through the MTC?**

— Indeed, the ARMY-2017 Forum taking place for the third year in sequence in the Patriot Expocenter near Moscow is one of key tool to further develop the military-technical co-operation of the Russian

Federation with our traditional partners and to find new partners. In meetings of organizing committee for preparing and holding the ARMY-2017 International Military-Technical Forum, a significant attention is tra-

ditionally paid to issues of international cooperation. FSMTC of Russia actively participates in both preparation and holding of this large-scale and important event.

More specifically speaking, the Service participates in activities at ARMY-2017 to provide demonstration of military purpose products from Russian and foreign manufacturers, as well as in arranging and holding negotiations with foreign partners related to MTC issues. I'd like to emphasize that organizer of the Forum, the Defense Ministry of the Russian Federation, and the FSMTC of Russia, as a control and supervisory authority in the field of MTC are making every effort to create friendly and supportive environment for all foreign participants of ARMY-2017 to the maximum possible extent.

— **Do you expect a broad foreign participation in the ARMY-2017 Forum?**

— In my opinion, it will be quite representative. Thus, as of the middle of August, we have received participation confirmations from represen-

tatives of more than 50 countries including more than 20 official delegations headed by ministers of defense and about 100 companies of defense industry from tens of countries. And the number of delegations expressing a wish to come to ARMY-2017 is growing continuously. And we are seeing a very strong interest to the Forum of both traditional MTC partners of Russia and, let's say, future or potential partners. In general, it may be safely stated that within these three years the ARMY-2017 International Military-Technical Forum has already gained an image of world leading event and its potential is far from being exhausted.

— **What are the principles, the system of cooperation in the field of MTC is based on today?**

— Today the system of military-technical cooperation of Russia is built as a vertical relationship where Rosoboronexport is the only exporter of final military purpose products. Concurrently, there are so called 'small' parties of military-technical coopera-

tion who are authorized to provide service of the equipment previously purchased by customers, to upgrade it and to supply spare parts for this equipment. These, in particular, include such integrated structures of the defense industry as United Aircraft Corporation, United Shipbuilding Corporation, Almaz – Antey Air and Space Defense Corporation and others. It is caused by the fact that these 'small' parties are just the industry representatives, i.e. the factories that manufacture spare parts, components, etc. THEMSELVES.

Federal Service for Military-Technical Cooperation

is an agency that controls and supervises all the activities related to military-technical cooperation and licensing, respectively. From strategic point of view the FSMTC of Russia plays the role of government policy 'conductor' in the field of military-technical cooperation and acts as a controlling and licensing agency at the same time.

However, all decisions regarding final supplies anyway are made at the highest level in Russia. That is, either



an appropriate ordinance or instruction of the President or the Russian government should be issued. That's why I call it 'vertical relationship'.

— **How can you describe the development and dynamics of Russia activities in the field of MTC?**

— First of all, I'd like to note that Russian is steadily occupies the second line in the list of world top exporters of military purpose products. It is not a secret that last year it was a bit higher than \$15 bln. The major part of this export is aviation equipment; export of the equipment



related to aviation varies in the range of 40-50%. Of course, we positively appreciate this fact, and we wish exporters of other weapon types to achieve these figures as well.

At the same time we understand, that the market of military purpose products (MPP) is a very specific market having cyclic nature. A number of factors should be taken into account, including rearmament programs of armies, financial solvency of countries depending on their general economic health. Therefore, without being expecting any abrupt jumps, we build long-term relationships that allow us to speak with confidence about stable growth of export supplies.

It is important for us to participate in long-term programs, provide technical support to our clients, create maintenance stations with understanding that many of our clients are aimed at creation or improvement of their own industry, for example.

— **Is Russia open today for new cooperations?**

— Yes, we are open for new cooperations and we understand that

this is the trend. Of course, the situation of 'buy or look for it in another place' is becoming a thing of the past. Naturally, sales of the final product is our main priority, but our partners increasingly aimed at building their national manufacturing facilities to develop their industries.

The relationship with partners in the 'only export' coordinate system are gradually replaced by cooperation in the field of creation of new high-technology products as a result of

many years of experience and strong reputation of Russian weapons in the world...

— **Is it really strong?**

— Yes, it is. Russian weapons and military equipment have made a good showing in the world. Today experts state that our weapons are: first, highly technological; second, proving their 'mission survivability'. In addition, it is relatively easy to maintain our weapons. Combination of the above mentioned factors



mutual efforts. And we are ready for this kind of cooperation as a country that has built its own defense industry. We are ready for cooperation and we will help our partners to create systems they need today.

— **Can you give any particular examples?**

— A bright example is the joint venture to manufacture Ka-226T helicopter, which is registered in India in accordance with appropriate inter-governmental agreement. It will start its active work soon. Another example of technological cooperation is BrahMos joint venture established in India.

In addition, the establishment of a chain of maintenance stations in the Latin America, in particular, in Peru and in Brazil can be mentioned as an example. We have a lot of cooperation projects with Chinese companies and so on.

Therefore, our foreign partners can be sure that we are ready for technological cooperation based on

explains why our products are so popular in the world.

At the same time today we offer the best value for money in the global market. This is recognized by everybody, including our competitors. I state this proudly and not for the purpose of advertising, because it is not only our opinion, but assessments of experts of the global market of military purpose products.

Thus, for example, despite the Afghan army has Mi-171 helicopters in use for a quite long time, pilots do not wish to refuse these machines and migrate to other, newer helicopters. By the way, the American pilots who use our special-purpose helicopters give similar assessments.

— **And did the soviet equipment prove its high efficiency?**

— Yes, it did. And it continues to prove its efficiency. For example, Vietnam is our partner in the field of military-technical cooperation for a long time for one reason only: Vietnamese army uses soviet mili-

tary equipment for decades and is satisfied with it and with Russian products supplied as replacement of obsolete soviet equipment.

— **In this is in the situation of evidently growing competition in the weapon market...**

— We live in a real world and clearly understand that there is a sufficiently strong competition. It is absolutely normal situation. Also, all Russian manufacturers take into account tendencies in the global market of military equipment.

Today Russia is a manufacturer of a large number of advanced and very expensive weapons, including the most innovative. But this is not to say that we shall offer exclusive solutions only. Russia is aimed at active expansion of its niches in the global market participating in many international tenders for both exclusive weapons and quite traditional products. This stimulates national industry to manufacture the best products at the most competitive prices.

— **What is impact (if any) of sanctions of some Western countries on the MTC of Russia with foreign countries?**

— Sanctions is a bad thing in principle, they contradict the pure logic of free market development. It is suffice to say that WTO, where Russia is included as a member state, states that its members are free from any restrictions. However, we can often see that major international institutions intended to strengthen mutually beneficial cooperation do not work. And in this particular case we can see an absolutely politically motivated and unjustified discrimination. However, being realists, we have to work and find solutions in this reality.

In the beginning, after the sanctions were imposed (since it was done quite abruptly) our industry, of course, was faced certain difficulties related to embargo of component supplies, interruptions of cooperation relations we had, among others, with Ukraine (by the way, Ukraine has done it unilaterally).

But in spite of everything, today the system of military-technical cooperation with foreign countries has adapted to these changes. We have implemented a program of import

substitution, which has timely oriented the industry to creation of certain systems previously supplied by our partners from abroad. Thus, a serious impulse was given to development of national industry, especially in the fields of engine manufacturing, radio electronics, manufacturing of special materials, including those used in military equipment. We found solutions for the contracts made with our partners before sanctions, which were exposed to serious risks.

However, the companies that are enforced to follow the sanctions imposed on Russian companies, have considerable losses as well. It will be very difficult to return to our market after cancellation of these sanctions (this will happen sooner or later). Perhaps it will be impossible at all: the niches are already occupied.

We hear claims for 'fatigue' from sanctions with increasing frequency having face-to-face communication with partners from countries that imposed the sanctions at a sufficiently high level, and not only from business community. Everybody understands that this should be stopped, because nobody gains from



it. We shall see how things turn out. The Russian Federation never burns out bridges, we take the situation in a pragmatic and unimpassioned way.

— **That is the question, who suffered from the sanctions is still undecided?**

— It is they who lost the Russian market who suffer most. The biggest suffer is experienced by those who lost their markets. Nobody wants to lose the Russian market, but this is the scenario we face now. First of all our suppliers have suffered from sanctions. Especially this is related to Ukrainian suppliers. It's a pity, of course, but it is not our choice. You know, they have stopped unilaterally



all the cooperation with the Russian Federation. But I repeat it again: our industry eventually gained from it. We started to manufacture everything by ourselves, that's our gain. By the way, it is an important factor for our customers: when a product is manufactured completely in the country of supplier, with all components and equipment, it eliminates any issues of supplies in future.

I mean, first of all, the aftersales service. Today Russian manufacturers due to the imports substitution program and the search for new cooperations have minimum risk of the situation when their contractors refuse to supply some devices because of some reasons (mainly politically motivated) and the companies are enforced either to shift supply dates or to achieve other agreements with their customers. Nobody finds this situation comfortable. If a MPP is manufactured completely within the country, it is a guarantee for the national army that everything will be done in a timely manner. And it is a big competitive strength for foreign customers.

/RA&MG/



HIGH-PRECISION
WEAPONSHIGH-PRECISION
WEAPONS

Defensive masterpieces in frame of the International military-technical forum 'Army-2017'

Russian systems like 'Pantsir-S1', 'Iskander-M', 'Kornet-EM' and others made by High-Precision Weapons Holding (part of Rostec Corporation) are determining technological and combat future of high-precision systems all over the world. This Russian holding is the primary designer and manufacturer of Russian high precision weapons is engaged in producing the world's best types of high precision weapons.

The High-Precision Weapons Holding was founded in 2009 and includes 19 enterprises being mostly world leaders in their production and technology segments is the world largest science and technology complex engaged in developing and creating high-precision weapon systems for combat tactical zones. The company being a member of Rostec, the world largest engineering corporation, is among the leading designers of state-of-the-art weapons in the world.

The holding consists of a number of largest leading defense enterprises that are well known on the world arms market. It is sufficient only to mention such brands as Shipunov KBP Instrument Design Bureau, Tula Arms Plant, Tulatochmash, Tactical Missiles Corporation, Nudelman Precision Engineering Design Bureau, Kovrov Electromechanical Plant, V.A. Degtyaryov Plant, All-Russian Scientific Research Institute Signal, and others. Most of them are national and international leaders in their segments.

High-Precision Weapons Holding plays an increasingly important role on the world arms market. The holding is the Russian largest developer and manufacturer of the most modern and innovative high-precision weapons. The importance and potential of the Russian holding increase worldwide as well: On a scale of the top 100 weapons manufacturers in the world, the Stockholm International Peace Research Institute (SIPRI) rates the High-Precision Weapons Holding from Russia at 39.

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

The weight of the holding company and its products in terms of strengthening defensive power of Russian army and delivery of the newest weapons to world markets can hardly be overestimated. There is a fast growing number of high precision systems and importance of tasks performed with them in the biggest armies of the world. Thus, over the recent five years Russian Armed Forces have had increasing purchase volumes. Export volumes of the latest weapons are also increasing. According to Alexander Denisov, Director General of High-

tem, 'Kornet-E', 'Konkurs', 'Metis-M1' antitank missile systems, 'Krasnopol', 'Arkan' guided missile systems and others. The majority of weapons being exported by High-Precision Weapons Holding are second to none in the world in terms of performance and efficiency.

An average annual increase of the company's export deliveries is 25-40% that is certainly a world record in the sector of high precision weapons. Middle East, North Africa, Persian Gulf countries and

its products (both at displays and open sites) are leading objects of regard for experts and ordinary visitors. This is also because everybody wants to take a closer look at famous 'Pantsir-S1' or 'Kornet-E' and meet the people who create the most efficient and advanced weapons in the world.

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Among absolute masterpieces acknowledged by experts is 'Kornet-EM' long-range antitank missile system, which in term of versatility, efficiency and reliability is considered to be a unique product of today. This multipurpose 24-hour high precision system is designed to engage ground and air targets. It is capable of killing both



Precision Weapons Holding, 'in view of defense and industrial sector mission we are considering well-timed and full fulfillment of purchase obligations as a priority task.'

According to military experts among the calling cards of the company is first of all the above-mentioned 'Pantsir-S1' air defense gun and missile system made by Tula instrument design bureau (KBP), ship-based 'Palma' air defense artillery system armed with 'Sosna-R' missiles, 'Kapustnik-B' fire control sys-

tem, 'Kornet-E', 'Konkurs', 'Metis-M1' antitank missile systems, 'Krasnopol', 'Arkan' guided missile systems and others. The majority of weapons being exported by High-Precision Weapons Holding are second to none in the world in terms of performance and efficiency. An average annual increase of the company's export deliveries is 25-40% that is certainly a world record in the sector of high precision weapons. Middle East, North Africa, Persian Gulf countries and



modern and advanced tanks including those equipped with reactive armor. As a matter of fact 'Kornet-EM' is a versatile defensive and offensive mean which can be also used during local conflicts with fast moving battles. In addition to engaging any tanks 'Kornet-EM' can easily fight any light-armored equipment, ensure crossing fortifications, provide protection against air weapons (UFV, helicopters and so on) at a distance of up to 10km.

'Kornet-EM' features the modern 'fire and forget' principle, where targets are killed almost automatically to reduce psychophysical load, skill requirements and preparation time. 'Kornet-EM' is also popular for its mobility and easy-to-use capability. It



is manufactured in two versions, they are tripod-mounted hand-held version (to augment antitank defense of attacking and defending ground troops and field artillery) and version mounted on small vehicles (car, APC, IFV and others).

It goes without saying that when you talk about Tula KBP you should anyway mention its famous 'Pantsir-S1' air defense gun and missile system designed to defend military, administrative and industrial assets and districts against airplanes, helicopters, cruise missiles and high precision weapons, smart air bombs and remotely-controlled vehicles as well as to augment air defense forces when repelling air strikes and kill light-armored vehicles. Today 'Pantsir-S1' is possibly the most famous and popular weapon not only in its class but among all other defensive means generally.

It is no coincidence that currently 'Pantsir-S1' is among the top 10 rated ground weapons in the world. Escalation of tensions, military operations in unstable regions, all this only adds the Russian air defense system a fair-minded attractiveness to strengthen defensive power of many countries. Besides, its geographical application is extending. Military exercises and tests show that 'Pantsir-S1' can be properly used both in sand storm and severe conditions of polar night. In addition to that, being equipped with many heavy weapons 'Pantsir-S1' remains highly maneuverable, all-terrain, easy-to-use. Besides, it is capable of steady killing the wide range of targets including low-flying air ones.

The newest defensive sensation from High-Precision Weapons Holding was the presentation of

anti-aircraft artillery weapon system Pantsir-ME in Saint-Petersburg (the end of June this year). The creation of new innovative defense complex confirms the fact that Russian High Precision Weapons Holding is one of the world leaders in creating modern weapons.

There was an absolute sensation in the world of military innovation. The system provides the ultimate protection against modern air threats, including small-size unmanned aerial vehicles. The naval missile and anti-aircraft artillery weapon system Pantsir-ME developed by the Tula KBP (part of the High Precision Weapons Holding) provides the ultimate protection against modern air threats, including low-flying and small-size unmanned aerial vehicles.

The naval weapon systems Pantsir-ME and its forerunners

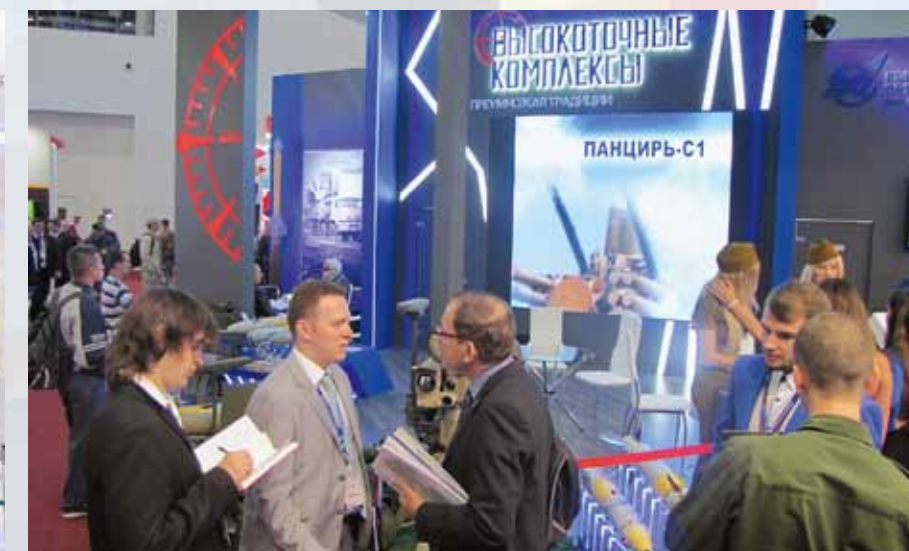


created by KBP is that they can first open fire on a target with missiles and then, in the dead zone of anti-aircraft missiles, use artillery armaments, if the target is not destroyed.

'One of the key imperatives in the strategy of Rostec weapons cluster is the development and creation of new weapons, including anti-aircraft missile systems. The development of the Pantsir-ME system is a consistent element in the implementation of this strategy. The creation of almost each primary system required brand-new high-tech solutions. As a result, the destructive potential of Pantsir-ME is 3-4 times higher than that of Kashtan-M,' says CEO of Rostec Sergey Chemezov.



gets within the whole range of field conditions and counter-weapons with a potential for further development until 2020-2025.



Kashtan and Kashtan-M developed by the Tula KBP (part of the High Precision Systems Holding) are the only systems in the world that combine a powerful artillery armament, an effective multimode missile armament and an integrated radar-optical armament control system in a single turret mount. Equipped with two types of armament (which is already a considerable advantage), these systems have better characteristics of each individual armament type as compared to their analogues.

The creation of the new weapon system 'Pantsir-ME' provides reliable protection for ships against air threats with absolute probability virtually equal to 1, including protection against low-altitude anti-ship missiles and unmanned aerial vehicles. The key feature of the systems

Thus, the missile intercept zone has been increased from 10 to 20 kilometers in length and from 3 to 15 kilometers in height. All the stages of combat performance – from target search to firing – are performed in motion. The combined use of radar and optical control systems provides an all-weather 24/7 operation. All the system processes are automated, the crew ensures only supervision and control.'

High engagement effectiveness is determined by the new features implemented in the 'Pantsir-ME' system. The modular design remains intact: 1 command module and up to 4 combat modules depending on ship type, which allows a flexible defence. The combined missile and artillery armaments ensure an effective engagement of all types of tar-

The combat module of 'Pantsir-ME' includes a multifunction radar station with a phased antenna and an intercept missile with an engagement range of 20 km, which ensures simultaneous engagement of 4 targets, as well as an engagement of new types, updated anti-ship missiles and small-size air threats and surface targets. The combat module can work autonomously and as part of a cell of 4 modules. The system can be installed on ships with a displacement of 300 tonnes and more.

There is no doubt that in the framework of International military-technical forum 'Army-2017' the products of the High-Precision Weapons Holding and its defensive masterpieces will also be the focus of the exhibition and its guests. /RA&MG/

RUSSIAN DEFENSE INNOVATIONS

Rosoboronexport is the general partner of the International military-technical forum 'Army-2017'

JSC Rosoboronexport (part of the Rostec State Corporation) — the sole Russian state intermediary agency, which is responsible for import/export of the full range of defense and dual-use end products, technologies and services. Rosoboronexport is the general partner of the International military-technical forum 'Army-2017'. The company's participation in 'Army-2017' shows a serious export orientation of this forum.

At the International military-technical forum Army-2017 Rosoboronexport will present their exposition in the framework of the demonstration center of the Rostec Corporation in the joint exhibition of the Corporation. Rosoboronexport's stand will be 222 sq. m, and will use the modern mul-

timedia tools (a table with the effect of levitation, video wall, touch panels, etc.), where will be presented for a wide range offered for export military products from Russia. There is the latest exhibition technology, also with holographic multimedia catalogs and many other innovations. On that stand Rosoboronexport will present several high-technology products — T-90S,

MiG-29M, Su-35, Ka-52, Mi-171SH, S-400 "Triumph"? "Carapace-C1" and a submarine of project 636). It will also demonstrate two scale models — BTR-82A and Taifun-K.

It is important to remember that only Rosoboronexport has the right to supply the world market with a full range of arms and military equipment manufactured by Russia's defense

industrial complex and approved to be exported. Rosoboronexport accounts for more than 85% of Russia's arms exports. Rosoboronexport is among the major operators in the world market for arms and military equipment. This year JSC Rosoboronexport will mark its 17th anniversary.

Rosoboronexport was set up by RF President's Decree as a federal state unitary enterprise tasked to implement the national policy in the area of military-technical cooperation between Russia and foreign countries. Since 1 July 2011 Rosoboronexport has been operating as an open joint stock company. Rosoboronexport operates under the strict supervision of the Russian President, the Russian Government and in full conformity with the UN

Rosoboronexport pursues a marketing strategy targeted to expand the geography, range and volume of export deliveries. A number of special programs and projects for exporting products to specific countries have been developed based on a comprehensive analysis of the arms markets and foreign partners' needs. Rosoboronexport seeks to operate flexibly and efficiently in the market, using modern and advanced marketing and customers' settlement methods.



arms control treaties and the relevant international agreements. Director General of Rosoboronexport — Alexander Mikheev.

The official status of the exclusive state intermediary agency gives Rosoboronexport unique opportunities to expand long-term mutually beneficial cooperation with foreign partners, provide guaranteed state

support of all export-import operations, and strengthen Russia's leadership in the world arms market.

The main result of biography of Rosoboronexport, despite the difficult economic conditions and fierce, often unfair, competition in the global arms market, that company have managed not only to carry its sales, but also significantly enlarge its footprint in

The first Soviet state intermediary agency for military-technical cooperation with foreign countries was created on 8th May 1953 after the USSR Council of Ministers had decided on forming the General Engineering Department within the then Ministry of Domestic and Foreign Trade. Other special foreign trade bodies were created later on to provide for further expansion of military-technical cooperation activities. In the late 1990s there were two federal state unitary enterprises in Russia acting as state arms exporters Rosvoorouzhnie State Corporation and Promexport.

In November 2000 the two enterprises were merged into a single one — Rosoboronexport Federal State Unitary Enterprise, the sole state intermediary for export/import of defence products, by the Presidential Decree No. 1834 dated 4th November 2000 aimed at restructuring the system of military and technical cooperation of the Russian Federation with foreign states, and improving its performance. Since September the 1st, 2014 Rosoboronexport has been operating as a joint stock company.



the traditional and new arms markets. Through integrated marketing strategies, company have ensured that order book today exceeds US\$ 45 billion.

The special exporter makes painstaking efforts on a daily basis to increase Russian arms exports resulting in more than a thousand contract documents signed with foreign customers every year. Over the period of its operation in the international market, Rosoboronexport has delivered hundreds of thousands of units of military equipment and weapons worth more than US\$ 120 billion to 115 countries.

Rosoboronexport pays great attention to both major billion dollar contracts and small deals. The company seeks to operate flexibly and efficiently by using modern and advanced marketing and customer settlement methods. The special exporter cooperates with more than 700 Russian defense-industrial enterprises and organizations, which enables it to offer partner countries the comprehensive and cost-effective solutions for strengthening their defense capability and national security.

By concluding export contracts, Rosoboronexport supports the



organization of licensed production in customer countries, the setting-up of joint ventures to manufacture and maintain equipment, as well as joint R&D efforts. Rosoboronexport widely uses the optimal offset programs. With regard to foreign customers' interests and the opportunities of the Russian defense industrial complex to increase its exports, Rosoboronexport pays much attention both to major billion-dollar contracts and small deals worth the hundreds of thousands to several millions of dollars.

/RA&MG/



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Core areas of activities of Rosoboronexport

- Export / import of all types of conventional weapons, military and dual-use equipment and services.
- Organization of licensed production of armaments and military equipment abroad, joint R&D efforts with foreign partners.
- Maintenance and repair of earlier supplied weaponry and military equipment.
- Modernization of Russian-made weapons and military equipment.
- Training foreign specialists in Russia and customer countries in the operation and maintenance of supplied military equipment.
- Technical assistance in the construction of military infrastructure facilities: defense plants, airfields, depots, ranges, training centers.

Russian defense industry, which is especially important under difficult conditions in the global market. High-tech products are in increased demand in the world arms market today and thus the company is interested in developing smart manufacturing in Russia.

In addition, Rosoboronexport is actively involved in a number of charitable and sponsorship projects. The company provides assistance to military hospitals, military historical museums, and children's educa-

tional institutions. Rosoboronexport supports major sporting events and various sports federations, acts as sponsor and partner of the largest industrial exhibitions and cultural events held in Russia and abroad.

Rosoboronexport pursues a marketing strategy targeted to expand the geography, range and volume of export deliveries. A number of special programs and projects for exporting products to specific countries have been developed based on a comprehensive analysis of the arms markets and foreign partners' needs. Rosoboronexport seeks to operate flexibly and efficiently in the market, using modern and advanced marketing and customers' settlement methods.

Foreign customers are offered package solutions for national systems intended to defend land, air and seaside borders, which feature the optimal trade-off between cost and performance. These solutions may include both the supply of military products and services and



The BTR-82A armored personnel carrier is designed to transport personnel of motor rifle units during the march or forces maneuver, including hasty crossing of water obstacles, protect the crew and troops against small arms fire, mines, shell fragments and NBC effects, and defeat enemy manpower and lightly armored targets. The BTR-82A is the result of upgrading the BTR-80A APC in order to improve its main performance and service characteristics through the use of a higher-capacity power plant, an armament stabilizer, a combined (day/night) sight, as well as improvements to transmission and running gear units. Equipping the BTR-82A with a new 300hp KamAZ-740.14-300 engine, higher-capacity shock absorbers, an upgraded transfer box, drive shafts, axles and unified final drives has increased the total service life of the vehicle, its average speed over rough terrain, improved the chassis reliability, ride comfort and mobility in general.

ARMORED PERSONNEL CARRIER BTR-82A

**ROSOBORONEXPORT**

LEADING BRAND FOR AIR DEFENSE

Almaz – Antey Air and Space Defence Corporation remains firmly at the top of the list with international rating agencies analyzing prominent arms makers.



Yan Novikov, general manager of the Almaz – Antey Corporation

Undoubtedly, Almaz – Antey Air and Space Defence Corporation (Almaz – Antey for short) keeps firm on the list of largest and most advanced arms makers coming from all parts of the world. This fact is reflected in the Top 100 from Defense News, a US-based weekly doing its own rating. For three years in a row, this publication places Almaz – Antey – Russia's leading defense industry enterprise — at no. 11 position on the list. This rating applies both to amount of income and innovation of products for military applications. Visitors to the Army 2017 international military technical forum in Kubinka, Moscow Region, can judge the matter for themselves. Inspecting exhibits the Corporation placed on display here, they can make sure that the world's most popular and reliable anti-aircraft systems are delivered under the brand of Almaz – Antey.

Enduring success of the Russian maker in the global marketplace is due to the high technological level, unrivalled performance and reliability of its products, and the cutting edge of innovations being applied to these products.

This explains why the Corporation's worldwide sales have showed a stable tendency for growth — the fact being continuously reflected in high marks with the world's rating agencies. Such has been the case with the Top 100 from Defense News; this rating has been published since 2000 and largely

accepted as the most authoritative worldwide.

Mr. Yan Novikov, general manager of the Almaz – Antey Corporation, emphasizes that 'The Corporation is a prominent player in the international market for anti-aircraft and missile defense equipment. Despite tough and tense competition in the global marketplace for defense products which are our specialization, we have been keeping our leading positions in that segment for a number of years recently. The Corporation has also managed to maintain its leading positions in the Russian market on the whole spectrum of high-tech products for anti-aircraft and missile defense, air-and-space defense, means of reconnaissance, as well as air traffic control and airspace management.'

Mr. Novikov stresses that numerous examples of anti-aircraft and



missile defense equipment in the Corporation's product range are in service with many nations round the globe. 'This gives us a firm footprint for expanding the scope of cooperation with those customers who seek ways to improve their assets through collaboration with the original equipment manufacturer — namely the company that developed, manufactured and supplied these systems.'

'Our activities in the sphere of military-technical cooperation with foreign countries demonstrate results that go in line with the tendency of the past few years for a high solvent demand in the market for defense equipment which is Almaz – Antey's

specialization. Deliveries of our products to foreign customers go through a government-appointed mediator — Rosoboronexport, or directly in such cases when the Corporation exploits the lawful rights to carry out its own activities in the international market for defense equipment.'

The Corporation is a prominent player in the international marketplace for anti-aircraft and missile defense systems. In the grand total of export sales generated by the Russian industry in the military equipment market for anti-aircraft and country's missile defense systems, the share of the Corporation products amounts to 65-75%.

Many nations round the globe show their continuous affection for the Corporation's products and





remain customers for them. In the areas of technical performance and operational merits, as well as pricing, the anti-aircraft and missile defense systems being supplied by the Corporation demonstrate the same or higher level in comparison with the best specimens available elsewhere. Furthermore, in certain parameters these systems are superior to their closest foreign analogues.

This finds reflection in the fact that many buyers from different regions round the world opt for Almaz – Antey products. Therefore, the following fact shall make no surprise. It compares the exact amount of shipments made to foreign countries in the two consecutive years and related to equipment developed and manufactured by the Corporation. The respective figure for 2016 was roughly two and a half times higher than that for 2015.

Today, defense systems from Almaz – Antey are in service with doz-

ens armed forces round the globe. This fact makes the Corporation look for ways to improve its services to end-users, and offer them upgrade packages as necessary. Despite growing competition for best air defense solutions, the number of countries that intensify efforts in development of new air defense weapon types increases. Notwithstanding, Almaz – Antey's positions in the global marketplace remain stable. More than that, our customer base has been expanding, with new clients joining in traditional ones on a regular basis.



This fact finds reflection in the news reports by the international media.

The statements made above are also applicable to upgrade and modernization programs. Despite ever increasing number of proposals coming from different market players, the end-users tend to go for those offered by Almaz – Antey Air and Space Defence Corporation. Many of our customers consider us as the only one among other possible collaborators who can deliver on its promises with outstanding quality.



Contracts for components and SPTA (spare parts, tools and accessories) continue to prevail in the order backlog that the Corporation has so far managed to win through direct foreign sales, executing its lawful rights to perform commercial activities in the markets for military equipment outside Russia. Prospects for near future: exploiting further its lawful rights for foreign trade, the Corporation may seek to increase the share of ready-to-use anti-aircraft equipment and services on upgradation of those systems



that are already in operation in foreign countries. The aforementioned services include those rendered through local technical centers in the customer territory that are set up to undertake aftersales support on defense and special-purpose equipment.

Almaz – Antey has increased the amount of work it does for foreign countries on training of their personnel in operation and maintenance of the equipment being supplied to those customers by the Corporation and its member companies. Much attention is paid to the issues pertaining to setting up regional service centers in the countries that are members in the Commonwealth of Independent States (CIS) and other issues in the context of the Joint air defense system for CIS and its development.

Seemingly, the theme that is most widely discussed in the international mass media, and to do with the Corporation's activities, has been that of the S-400 surface to air missile (SAM) system shipments to a growing number of foreign customers. Solvent demand for that system is so huge that makes some experts

express concern whether the existing manufacturing capacity is enough to fulfil all the commitments, given the fact that the Corporation is doing a large amount of work under the State defense orders for equipment intended for the Russian Armed Forces.

Addressing such concerns, Mr. Yan Novikov, general manager of the Almaz – Antey Corporation, says the following words. 'On few occasions previously, we announced that last year the Corporation completed construction and put in operation two large factories — in Nizhny Novgorod and Kirov. These factories are meant to be end-manufacturers. Besides, we are on target to complete, later this year, our North-East Regional Center in St. Petersburg that would comprise three plants and three scientific institutes. With such capacities in place, we — no doubt — can manage both the State defense orders and foreign contracts.' /RA&MG/



Almaz – Antey Air and Space Defence Corporation

is one of the largest integrated structures in the Russian military-industrial complex with a workforce of 127 thousands. Armed Forces of more than fifty countries operate equipment manufactured by the Corporation. There are over sixty enterprises that are members in the Corporation, including those specialized in scientific research, development, manufacturing, maintenance and repair. There are the following items among our most popular products:

- surface to air missile (SAM) systems under the brands of Tor, Buk, Favorite, Pechora, Osa, Rif, Shtil, Klinok, Gibka, etc.
- Radars under the designations of Gamma, Nebo, Protivnik, Gazetchik, Credo, Fara, Kasta, etc.
- Automated control systems and sets of automated facilities under the designations of Baikal, Fundament, Krym, Universal etc.



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RUSELECTRONICS

Components for radio communication, location and military automatic control systems

Ruselectronics Holding of the Rostec State Corporation is a recognized Russian leader of microwave electronics with a market share exceeding 80%. Enterprises within the holding develop and produce unique components for radio communication and radiolocation systems of any type of basing. In addition, the holding is the largest supplier of automated control systems (ACS), including special purpose ones.

A line of the latest travelling-wave tubes (TWT) for advanced radio engineering systems, as well as a group of automated control systems for artillery batteries and air defence anti-aircraft brigades developed by the famous Penza JSC Radiozavod are presented at the 'Army-2017' expo.

TWT is a vacuum booster for microwave signals and due to its unique properties — broadband, amplification gain factor, linear-

ity at a high output power level, is an indispensable component in the communication, location and navigation industries. TWT demonstrates high reliability and durability, modern technologies provide acceptable weight and dimensions figures.

Saratov enterprise of the Ruselectronics holding — JSC 'NPP 'Almaz' — produces a wide range of TWT of land, marine, airborne and satellite basing. Devices for space communication — ultra-long-lived

(up to 150,000 hours), highly efficient (with efficiency up to 65%), with a gain up to 50 dB, operate in the S, C, X, Ku and K ranges. Devices for locating systems — high power (tens and hundreds of kilowatts) with a bandwidth of up to 10%, multifunctional modes of operation, including air surveillance and aircraft guidance. Devices for systems of radio countermeasures — broadband and super-broadband, output power from 10 W to more than 1 kW, frequency range — from L to Ka inclusive.



At present, Almaz is actively developing a new direction of vacuum-solid-state amplifiers — integrated TWT-based products. These devices combine a solid-state pre-amplifier, TWT and a power source in one housing. The use of a solid-state amplifier provides a low noise level at a high gain factor, as well as the ability to adjust the amplitude-frequency response, which makes it possible to use the TWT most efficiently. NPP Almaz produces complexed products for various systems with output power up to 1 kW, in the ranges from L to Ka inclusive.

A 'Ruselectronics' Penza enterprise — JSC 'Radiozavod' — complements the holding's exposition by a group of military ACS. The enter-

prise presents, in particular, the control system of the anti-aircraft missile brigade of the air defence troops 'Polyana-D4M1', on a number of indicators outstripping foreign analogues. This is a universal mobile system capable of uniting all types of anti-aircraft missile systems into a single information-control system and distribute groups of air targets between various anti-aircraft complexes. The control objects for the ACS are the long-range SAM (S-300), medium-range (Buk type) and short-range (Tor type). 'Polyana' provides protection by the air defence facilities within a territory of 640,000 square kilometres (800x800 km). Up to 500 air objects may be simultaneously located in the zone of respon-



sibility. The reaction time to open fire is 2–3 seconds.

'Polyana' provides collection and processing of data from radar stations of different ranges of ground and airborne basing, as well as from air traffic control centres and is the mobile control unit of the





The Ruselectronics Holding is Russia's largest developer and manufacturer of radio electronic components and technologies, communications equipment and systems, automated control systems, robotic systems, microwave electronics, computer equipment and telecommunications equipment. It unites more than 170 enterprises and scientific organizations. Within the framework of the 'Army-2017' expo, Ruselectronics' developments for ground forces, air defence, aviation and fleet are presented in the Democentre of the Rostec State Corporation.



air defence system of state facilities, industrial zones, military deployment areas.

The system has the ability to accumulate and independently use the database. Elements of artificial intelligence provide the ability to control in three modes: manual (according to the commands of the operator), semi-automatic (operator is given management advice, which he affirms or not), automatic (operator does not participate in the control process, all decisions are made by the artificial intelligence)

A high degree of adaptability ensures the possibility of integrating the 'Polyana' system into air defence systems with a wide range



of fire complexes and radar information sources, both of Russian production and production of other countries.

Thoughtful design and ergonomic arrangement of equipment with the set of automated control systems, which significantly reduces crew fatigue and ensures their activity during a long time, especially noted by specialists

In addition, Ruselectronics presents at the 'Army-2017' expo a portable set of technical means for automated control of anti-aircraft and artillery. The complex is a unique development in Russia, it allows twice or thrice reduce the time of accomplishing tasks and to ensure interfacing with reconnaissance assets. Combat application of the complex 1,5-2 times increases the damage inflicted to the enemy, reducing weapons expenditures for 10-15%.

/RA&MG/



ROSOBORONEXPORT



NEW TAIFUN-K

In the framework of International military-technical forum Army-2017 Rosoboronexport will first present at its stand the model of the family car Taifun-K (KAMAZ-53949). The Taifun-K motor vehicles are designed to provide integrated logistics support to combined arms and special units, including peacekeeping formations, in various environments. They can be used to carry personnel and military cargos and serve as the basic chassis for mounting a variety of technical systems and weapons.

The vehicles are available in the 6x6 (KAMAZ-63969) and 4x4 (KAMAZ-53949) wheel configurations, have high combat and operational characteristics (mobility, protection, fighting power, design and ergonomics).

The KAMAZ-63969 and KAMAZ-53949 offer high steering capability, speed, off-road performance and maneuverability on all types of roads and terrain. The Taifun vehicles are capable of fording 1.50 meters without preparation and climbing a grade up to 30 degrees. Equipped with 350hp and 450hp diesel engines and automatic transmission systems, they attain a road speed of at least 100 km/h and can travel up to 1,000 km without refueling.

A hydropneumatic suspension system used in all vehicles of the family ensures high ride comfort and effective vibration damping, allowing a change in the suspension stiffness characteristics, ground clearance and body position relative to the road surface, both in automatic and manual override modes. Ground clearance is automatically adjusted depending on vehicle speed, road pavement quality and person-specific driving style.

The Taifun-K vehicles provide a high level of mine and ballistic protection. Special seats, along with others design features, reduce the negative effects on the crew and troops when a 8 kg TNT

explosive device explodes under any wheel and anywhere under the bottom of the vehicle. A high level of ballistic protection is achieved through the use of 'sandwich' armor consisting of inner conventional armor steel and new-generation outer ceramic armor.

The Taifun-K vehicles share the common unitized automobile platform used in the KAMAZ family of tactical protected multipurpose all-wheel-drive medium- and heavy-duty vehicles and feature a high degree of commonality of components and assemblies within the family.

The main differences typical of the new family of tactical protected multipurpose vehicles are as follows:

- enhanced armoring, including mine protection of the chassis bottom against antipersonnel, anti-tank and improvised explosive devices;
- increased power, reliability and fuel efficiency of the diesel engine;
- higher level of safety and comfort for the crew and combat personnel;
- possibility to install a two plane stabilized remote-controlled weapon station;
- on-board information and control system;
- central tire inflation system;
- all-around video surveillance;
- signature reduction package;
- autonomous diesel power unit;
- automatic fire-extinguishing unit.

MAIN CHARACTERISTICS

- Wheel arrangement: 4x4
- Curb weight, kg: 13700
- Load-carrying capacity, kg: 2000
- Gross vehicle weight, kg: 15700
- Gross trailer weight, kg: 5000
- Gross train weight, kg: 20700
- Engine: Cummins 6ISBe 350 P-6
- Max engine power, kW (hp): 258 (350)
- Max torque, Nm (kgfm): 1090 (109)
- Grade, deg: 31
- Max speed, km/h: 100
- Wheels: 10.00-10
- Tires: 14.00 R20
- Fording depth, m:
 - w/o preparation — 1,5
 - with preparation — 1,75
- Trench, m: 0,5
- Vertical step, m: 0,6
- Power-to-weight ratio, hp/t: 20,2
- Transmission: automatic
- Suspension: independent
- Vehicle-system voltage, V: 24
- Seating capacity (crew + troops): 10

JOINT FORCES RECONNAISSANCE SYSTEMS

Network centric environment for ships's task force in naval operations

G.A. Korzhavin, Y.F. Podoplekin, JSC 'Concern 'Granit-Electron'
A.B. Zemlyanov, N.G. Kuznetsov Naval Academy

JSC 'Concern 'Granit-Electron' is one of the major forefront Russian original equipment manufacturer of radio electronic warfare systems for the Russian Navy. JSC 'Concern 'Granit-Electron' with integrated enterprises provide R&D, manufacturing, test and trials, delivery and service support for supplied radio electronic warfare systems.

JSC 'Concern 'Granit-Electron' focuses on the following segments:

- Joint forces surveillance, target designation & attack radar systems for surface ships, submarines and coastal carriers equipped with missile weapons.
- Avionics, guidance and command systems for high precision missiles and antisubmarine weapons.

JSC 'Concern 'Granit-Electron' has a huge experience in the field of interfacing and integration of warfare command systems between

ships, coastal, airborne and space carriers that would enable task force groups to form network centric environment for naval operations.

For effective performing surveillance, designation and attack of targets by radar there is a need to provide multipurpose radar with the following surface and air environment data:

1. Available targets, target's type data
2. Coordinates and parameters of moving targets relative to source of target designation

3. Parameters of detected radiating targets

4. Weather conditions where the target or carrier is localized

5. Electronic warfare & electronic countermeasures activities in target localization zone

6. Availability of antisubmarine defense systems (aviation support, surface-to-air guided weapons)

7. Mapping support for target localization zone in view of weather conditions and another dynamic data

This information can be received from the joint forces combat and control systems integrated into

the following carriers (**picture 1**):

- Spacecrafts realizing active intelligence of surface situation and target designation

- Aviation posts, aircrafts, manned and unmanned aerial vehicles, equipped with active radars for intelligence of surface situation and sea targets

- Coastal posts equipped with long range and over the horizontal radars

- Autonomous (standalone) ship's radar, communication, bearing and acoustic equipment.

All these carriers to be integrated with ground-based or ships control systems vide common data links to provide real time designation and attack data for missile weapons

in network centric environment. To obtain this purpose our systems have data exchange channel.

JSC 'Concern 'Granit-Electron' developed multipurpose radar system equipped with (a) autonomous surveillance and target designation functions (by active and passive radar channels), (b) channels for receiving data from airborne posts and spacecrafts, (c) data channel for control mutual orientation and data correlation between carriers.

Surface surveillance system with data channel for communication with airborne posts and spacecrafts are incorporated into submarines.

Thus, these joint forces reconnaissance systems form reconnaissance and attack loop that integrates three separate computation nodes (**picture 2**):

1 — Node for target designation required for generation combat mission

2 — Node for weapon control system for generation flight trajectory for missiles as per the data received from stationary posts, aircrafts, satellites).

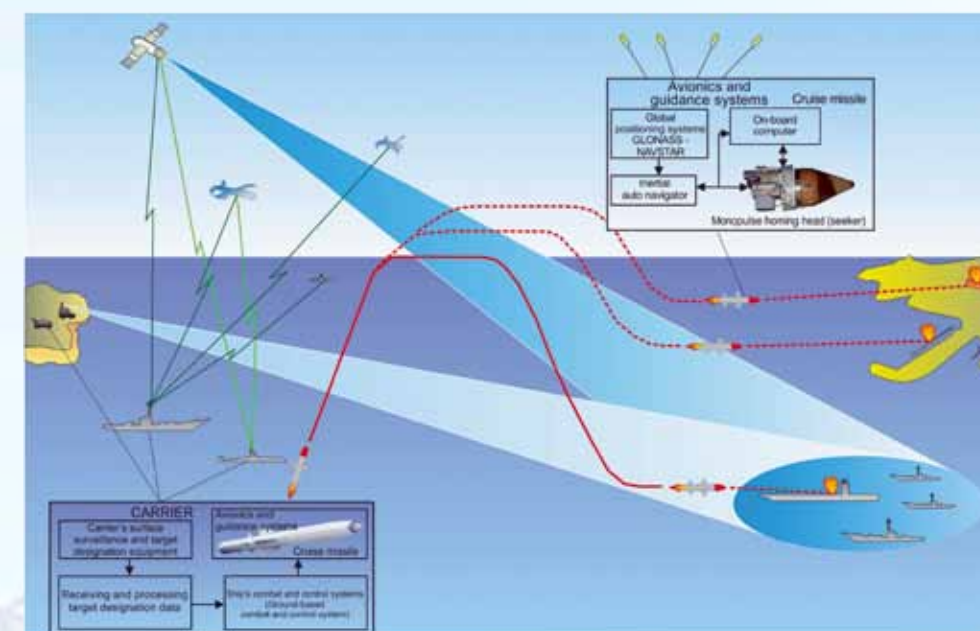
3 — In perspective, third node can be used for feedback regarding hit or not hit targets and damages.

Satellites, manned and unmanned aviation mainly with optic channels are used for receiving feedback data. This data required for taking a decision by the ship to continue or cancel the attack. All these functions has been realized in Syria.

Availability of the above maintained loops ensures the efficient, comprehensive, reliable target designation and attack mission with missile weapon.

Unification of data links up to the joint forces level would enable the existing and advanced perspective missiles carriers of the Russian Navy Forces to perform attack missions with high accuracy and efficiency at any operation zones.

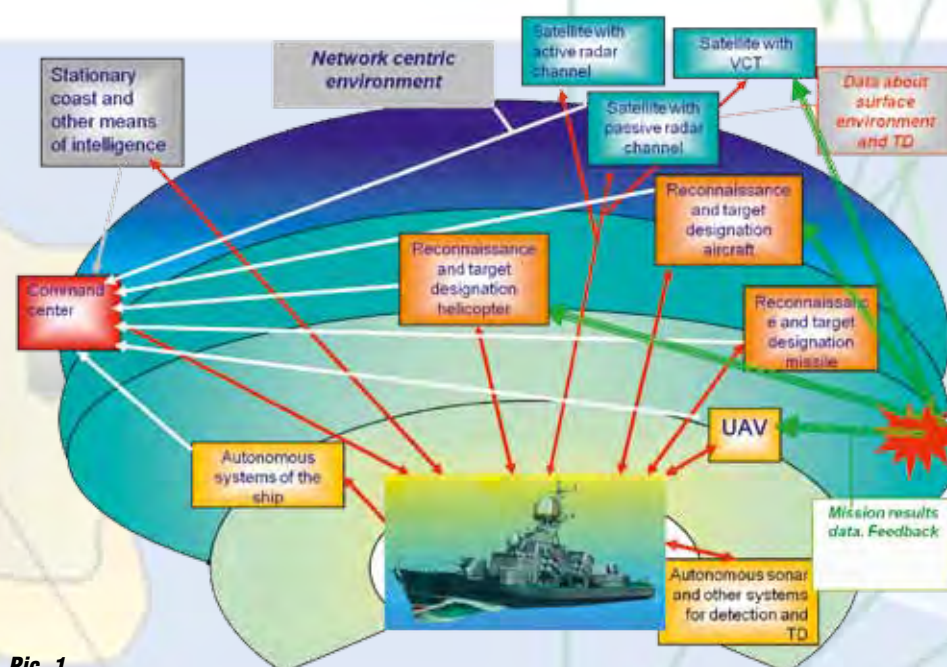
- Attack systems simulation
- Defense systems simulation
- Operations zones simulation
- Variable parameters for all involved parties



Pic. 2

JSC 'Concern 'Granit-Electron' established electronic firing test site (**picture 3**) for enhancing missile and torpedo control systems under active ECM and EW activities of potential enemy at any theatre of operations.

Electronic firing test site simulates missions by application of fundamental mathematical and function wrapping tools with mini-max algorithms required for efficient weapon employment with maximizing damages and minimizing losses. /RA&MG/



Pic. 1



Pic. 3

DEVELOPMENT OF AIRCRAFT ENGINEERING

During The 13th International Aviation and Space Salon MAKS-2017 the President of Russia Vladimir Putin chaired a meeting on the development of civil aircraft engineering. This meeting can be considered a milestone for the Russian aircraft industry in General.

Aviation for Russia is not only one of the branches of the industry. It is the embodiment of national pride. International Aviation and Space Salon MAKS is one of the largest aerospace trade fairs in the world. Some 700 Russian and 180 foreign corporations and companies from 36 countries were taking part in MAKS-2017. At the opening ceremony of the 13th International Aviation and Space Salon MAKS-2017 President of Russia Vladimir Putin said:

'This is an anniversary year for MAKS. It was first held 25 years ago, back in 1992. Since then it has established itself as a high-profile event, but we all know that this recognition did not come right away. Building on the persistence and talent of its organisers and with comprehensive support from the state, MAKS has definitely reached new highs, becoming an anticipated event for all those interested in aerospace technology.

Russians have always taken a keen interest in the development of aviation technology and space exploration.

It has to be said that this is an important element of our shared culture, and the history of Russian cosmonautics and aviation is a matter of national pride, and rightly so. We are proud of the outstanding achievements by prominent engineers Sergei Korolev, Nikolai Polikarpov, Pavel Sukhoi, Andrei Tupolev and Sergei Ilyushin. Our goal today is to build on the traditions they established.

Over the next few days, Zhukovsky, Moscow Region, will be hosting a large exhibition where leading

Russian and foreign companies will present their products, conferences and workshops will be held on matters that are currently relevant for the industry, and where a number of talks are scheduled to take place and major contracts to be signed.

We hope that all this activity will help step up industrial cooperation, foster international ties and promote Russian products on the domestic and foreign markets. We have much to offer. In recent years the aerospace industry benefited from substantial government support: its production assets underwent substantial upgrades, projects to create new, competitive civilian aircraft are underway, including the Ka-62 helicopter and the MC-21 aircraft.

Let me also note that Russia retains its leadership in military aircraft, as well as missile and space



'I would like to note that the industry is currently receiving substantial support. Last year alone, almost 52 billion rubles were allocated for these purposes under the Aviation Industry Development programme, and there are plans to allocate 60 billion in 2017.'

Vladimir Putin

manufacturing. We will continue developing these sectors. Of course, I have to say a few words about the flying displays, which is one of the most spectacular parts of the MAKS Salon. The show will feature the best Russian and foreign pilot groups, whose mastery is not just respected but admired.'

At the Meeting on the development of civil aircraft engineering Vladimir Putin said: 'Our meeting is taking place as part of the International Aviation and Space Salon MAKS-2017. I think this is a good venue for discussing the development of civil aircraft engineering. Incidentally, it is not the first time

we are doing this. We have just seen the latest designs from Russia's leading producers of aviation and missile space technology. I must say the Russian companies' potential is enormous and should be used in full.

For Russia the construction of competitive aircraft is one of the key conditions for easing access to remote regions and making air travel more comfortable. For such a vast country as Russia with its, let's be honest, poorly developed infrastructure, which has proved difficult to improve even during all the previous years of its history, considering the limitless expanses of Eastern Siberia and the Far East. However, it is vital to use modern technology to consolidate the country and make every corner equally accessible to every person regardless of his or her place of residence. People should be able to move easily and freely throughout the country, travel to our major





industrial and cultural centres and return in the same easy and free way. It is also important in this context to increase the production of high-tech, science-intensive products and promote the development of the entire national economy. Finally, this is a matter of the state's technological prestige.

I would like to note that the industry is currently receiving substantial support. Last year alone, almost 52 billion rubles were allocated for these purposes under the Aviation Industry Development programme, and there are plans to allocate 60 billion in 2017.

These measures are yielding positive results. Last year, civil aircraft production grew by 21 percent on 2015. This is a good indicator.

At the same time, I am confident that the national aviation industry has the required technological and human potential for long-term growth, for strengthening its posi-

tions on the domestic and global markets.

We have mastered batch production of regional airliners. We have just seen the Sukhoi Superjet here. Other promising projects are being implemented involving civil aircraft that can compete with foreign equivalents, including the new Ka-62 helicopter and the MC-21 passenger airliner. We have seen the Ansat helicopter today. There are other highly promising and interesting aircraft, and demand for them will undoubtedly soar in the future.

Today, we will discuss various measures making it possible to support these projects and to address the entire industry's tasks.

I would like to focus on the following.



Everything must proceed smoothly in this area.

Second, as you know, the United Instrument Manufacturing Corporation is expected to diversify and expand civil output. This also concerns the defence industry's aircraft enterprises.

Helicopter deliveries under defence procurement contracts will

First, the MC-21, which I have already mentioned, is currently undergoing flight tests. Today, I would like to hear how these tests are proceeding, to discuss the current aircraft certification stage and preparations to launch batch production of this airliner. I would like to focus on the aircraft's certification, and I would like to note technical issues that we know about.



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Vladimir Putin

soon peak. The Defence Ministry has already reduced its orders under these contracts. It is high time that we ponder ways to guarantee that the production capacities are utilised by creating demand from civilian customers. This should be done without delay. Among other things, Russian oil and gas companies, and other state-owned companies could play their part. They buy quite a few helicopters abroad. I believe that this has to change, as we have discussed with the heads of Russian companies. They should opt for Russian equipment, of course on the condition that it offers the same level or even better quality compared to similar imports. I think that this matter should be included in the agenda of the Government Import Substitution Commission.

Moving on, I would like to emphasise once again our intention to expand the market share of Russian aviation equipment on the domestic and international markets. For that, it is essential not only to improve its qual-

ity and reliability, but also to develop after-sales maintenance services. By the way this is also an issue for the defence industry: we need warehouses, spare parts, training, and we need to open service centres. We all know that those who are able to ensure

after-sales maintenance, guarantee timely repairs and promptly deliver parts stay on top of the competition. Today we will discuss how this work is organised, and what is there to do for ensuring effective maintenance of Russian aircraft'

/RA&MG/



THE MAIN NAVAL PARADE

Vladimir Putin: 'Navy Day is among the most popular holidays with the Russian people, who have hold in high regard people in naval uniforms, their nobility and heroism, and their professional traditions.'

On Navy Day of Russian fleet In St. Petersburg there was the Main Naval Parade of Russia. Parade was held in the Neva and inner harbour of Kronstadt. In accordance with the Presidential Executive Order of July 27, 2017, the Main Naval Parade was held for the first time in Russia's modern history. The parade featured the passing of ships and a marine air force unit overflight. Sailors from the Baltic, Black Sea, Northern and Pacific fleets and the Caspian Flotilla participated in the parade.

President of Russia Vladimir Putin was on the parade and congratulated all Russian veterans, sailors, midshipmen, petty officers, officers and admirals. In his speech Vladimir Putin said: 'This holiday is celebrated in each Russian region and with special solemnity, at

the bases and in the garrisons of the Northern, Pacific, Baltic, Black Sea fleets and the Caspian Flotilla.

Russia's history is inseparable from the victories of its courageous and fearless Navy. Our country's status as a strong marine power has been achieved through the brave acts of sailors and officers, the inven-

tive talent of our shipbuilders and the daring exploits of sea explorers.

Throughout the centuries, the fortitude and tenacity of Russian sailors was tempered in battles. Both on land and at sea, they mastered their military skills, strengthened the traditions of their unique naval brotherhood.

During the Great Patriotic War the Navy fought to the bitter end on the coasts and sea borders of our native lands. The Battles of Odessa and Sevastopol, heroic deeds of the Northern Sea Fleet sailors, legendary raids by Soviet submarines, the defence of Leningrad and the impregnable Kronstadt have been forever enshrined in the chronicles of history.

The Navy and commitment to Fatherland are inseparable. As Admiral Nakhimov used to say, a sailor has neither an easy nor difficult path, but rather a glorious one.

And everyone currently serving, in our ground forces and submarines, in the marine air force, in the coastal defence, and those who work in the shipbuilding industry, all are faithful to these vows. Their high moral and



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professional qualities have been and will remain the foundation of successful service in the Navy, and the state will offer its full support.

Much is being done today for the development and renovation of the Navy. New ships are being commissioned, the fleet's combat training and readiness are being perfected. Seamanship is chosen by the vigorous and strong-willed, by those who dare to defy the elements, who





cannot imagine themselves without the sea, without difficult and noble service to their Fatherland.

Today the Navy is not only solving its traditional tasks but is also nobly responding to new challenges, making a significant contribution to the fight against terrorism and piracy. The children and grandchildren of today's sailors will take pride in their forefathers. Of this I am certain. Because your exemplary training, promptness and discipline are borne out during both training exercises and combat operations.



I want to express gratitude to those who wait for you in your homes and keep you warm with their love.

Thank you for your readiness and your ability to solve the most complicated tasks, for your worthy service and your unwavering allegiance to our Motherland and to our people.'

On that day Vladimir Putin has visited Admiralty building, which houses the Russian Navy Headquarters. The Supreme Commander-in-Chief of the Russian Armed Forces, accompanied by Defence Minister Sergei Shoigu and Commander-in-Chief of the Russian Navy Admiral Vladimir Korolev, toured the library premises and viewed its unique Russian naval history documents, including those from the Peter the Great era.

The President was also shown the office of the Russian Empire's last Naval Minister, Ivan Grigorovich. Once restored, the room can again be used as the main office of the Russian Navy Commander-in-Chief. Vladimir Putin left a note in the dis-



tinguished visitors' book saying, 'My congratulations on completing the restoration. I wish you success in your work in the name of the Russian Fleet.'

In the Admiralty building, the President also viewed an exhibition of the Central Naval Museum.

The restoration of the Admiralty building began in 2013, with repairs being made on the facades and the roof, and reinforcements done to the tower and the building's foundation. At the end of 2013, the Church of Saint Spyridon, Bishop of Trimythous, was opened in the



tower with the steeple at the intersection of Admiralty Embankment and Dvortsovy Proezd.

Following the visit to the Admiralty, the President attended a reception to mark Russian Navy Day. Vladimir Putin said: 'Navy Day is among the most popular holidays with the Russian people, who have hold in high regard people in naval uniforms, their nobility and heroism, and their professional traditions.'



Today, we honour courageous, strong-spirited people. You have chosen to serve in the navy, protect the interests of our Motherland and provide security of its citizens, while making a great contribution to the strengthening of Russia's defence capacity and global stature.

My most heartfelt congratulations to the veterans of the Great Patriotic War. You fought to bring victory on board military ships, on land, and as



part of combined naval units, marine infantry units. You have always been an example of perseverance and bravery.

My special words of gratitude go to workers, engineers and designers. Shipbuilders' Day, a holiday that was established this year, is the result of the well-deserved appreciation people have for the work of the many generations of people who have given life to ships and continue to do so.



We will strictly follow our other plans for the Navy's development to boost our arsenal of modern weapons and raise the quality of combat training. And, of course, we will provide all necessary social support and assistance to servicemen and their families.

We are rightfully proud of our legendary naval commanders, brave and bold officers and mariners, fearless pioneers of Arctic travels and



'Today, thanks to the potential of the country's industry and science, we are strengthening the national defence and replenishing our Navy with state-of-the-art vessels and equipment. Last year, the fleet received 24 surface ships, two general-purpose submarines, and a service ship. This year, we plan to commission 30 ships and vessels.'

Vladimir Putin

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the world's oceans, we are proud of today's generation of Russian Navy mariners, of all those who consider fidelity to duty and the oath to serve, honour and responsibility, and the spirit of military brotherhood as being of the utmost importance. Here is to Russian Navy and the prosperity of our dear Motherland!

/RA&MG/





EXPERT FOR EXPORT

New version of EXPERT Air Traffic Control (ATC) simulator has been commissioned in Turkey

The Radar and Tower simulator system has been introduced into full operation at the customer's facility at the Training Centre of General Directorate of State Airports Authority of Turkey at Esenboğa Airport (Ankara). The system has been created on the basis of EXPERT integrated ATC simulator.



The new software version of EXPERT ATC simulator allows efficient training and verification of proficiency of controllers staff. The simulator system has received high appreciation from the customer as it possesses several new features enhancing the efficiency of training and learning. In particular, the voice communication system has been noted. It has been modernised according to the customer's requirements, allowing to imitate radio exchange channels and introduce instructors' participation in training.

The enhanced simulator system has more than 600 functions for preparation of exercises, controlling air traffic, imitation of meteorological conditions and evaluation of results of training. The simulator has particulars of seven largest airports of the Turkish Republic in its database. This allows to create and process training exercises for Radar and Tower controllers in conditions closest to reality.

In the Tower mode with 360° visualisation more than 100 visual models of aircraft and helicopters of various types in the livery of interna-

tional and Turkish airlines are used as well as models of ground vehicles, animals and people.

To create reality of visual conditions the simulator imitates winter and summer, snowfall and rain, fog and thunderstorm. In addition a debrief classroom has been installed to go through the recorded training sessions with projecting video recordings onto the classroom screen. The recording of training sessions allows replay of visual imagery synchronized with radio exchange to provide means for debrief and evaluation. The customer's staff of instructors and teachers has been trained and certified for work on the modernised simulator system. In the ATC Training Centre in Ankara the new simulator will be used for initial training of new controllers as well as refreshing proficiency of radar, procedures and visual controllers, maintaining their professional skills and training them to act in difficult and emergency situations.

The simulator system has been created on the basis of EXPERT integrated simulator system developed and produced by NITA company of St.Petersburg. It is being used in more

than 100 ATC centres and education organisations in Russia and abroad.

The current simulator software allows new modern features such as zone navigation, OLDI and AMAN/DMAN. NITA company continues to develop simulator and educational systems for ATC controllers. This includes new programs and methods of teaching and evaluation of knowledge of general and aviation English, as well as tests of language proficiency according to the ICAO scale. In 2017-2018 phased introduction of AVIATION ENGLISH EXPERT software and methodological system is planned. It is intended for training ATC controllers in the radio exchange English language, utilizing the features of integrated ATC simulator EXPERT as well as classrooms for pre-simulator sessions of AIR ENGLISH system of teaching air traffic radio exchange phraseology. Some of the modes of integrated ATC simulator system EXPERT and AIR ENGLISH system are planned to be used for training pilots and introducing TELCAP test validated by ICAO and utilized to determine personnel's English language proficiency according to ICAO scale.

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'Russian Aviation & Military Guide' 2017

	Release dates	Additional distribution
'RA&MG'№08 (15)	August 22th	ARMY-2017 (22-27.08.2017, Russia, Moscow)
'RA&MG'№09 (16)	September 17th	AVIATION EXPO CHINA 2017 (19-22.09.2017, China, Beijing)
'RA&MG'№10 (17)	October 14th	BIDEC-2017 (16-18.10.2017, Bahrain, Manama)
'RA&MG'№11 (18)	October 15th	SEOUL ADEX 2017 (17-22.10.2017, Korea, Seoul)
'RA&MG'№12 (19)	November 04th	Defense& Security 2017 (06-09.11.2017, Thailand, Bangkok)
'RA&MG'№13 (20)	November 10th	Dubai Airshow 2017 (12-16.11.2017, UAE, Dubai)
'RA&MG'№14 (21)	November 20th	MILIPOL 2017 (21-24.11.2017, France, Paris)
'RA&MG'№15 (22)	December 10th	Gulf Defense & Aerospace 2017 (12-14.12.2017, Kuwait, Al Kuwait)

Russian Aviation & Military Guide' 2018

	Release dates	Additional distribution
'RA&MG'№01 (23)	February 05th	Singapore Airshow 2018 (06-11.02.2018, Singapore)
'RA&MG'№02 (24)	March 09th	DIMDEX 2018 (12-14.03.2018, Qatar, Doha)
'RA&MG'№03 (25)	March 27th	ArmHiTec 2018 (29-31.03.2018, Armenia, Yerevan)
'RA&MG'№04 (26)	April 02th	FIDAE 2018 (03-08.04.2018, Chile, Santiago)
'RA&MG'№05 (27)	April 13th	DSA 2018 (16-19.04.2018, Malaysia, Kuala Lumpur)
'RA&MG'№06 (28)	April 23th	Eurasia Airshow 2018 (25-28.04.2018, Turkey, Antalya)
'RA&MG'№07 (29)	April 25th	ILA Berlin Air Show 2018 (25-29.04.2018, Germany, Berlin)
'RA&MG'№08 (30)	May 04th	SOFEX 2018 (08-10.05.2018, Jordan, Amman)
'RA&MG'№09 (31)	May 21th	KADEX-2018 (23-26.05.2018, Kazakhstan, Astana)
'RA&MG'№10 (32)	June 11th	EUROSATORY-2018 (11-15.06.2018, France, Paris)
'RA&MG'№11 (33)	July 16th	Farnborough Airshow 2018 (16-22.07.2018, UK, London)
'RA&MG'№12 (34)	September	ARMY-2018 (September, Russia, Moscow)
'RA&MG'№13 (35)	September 17th	Africa Aerospace and Defence 2018 (19-23.09.2018, South Africa, Pretoria)
'RA&MG'№14 (36)	September 24th	ADEX 2018 (26-29.09.2018, Azerbaijan, Baku)
'RA&MG'№15 (37)	September 26th	Istanbul Airshow 2018 (27-30.09.2018, Turkey, Istanbul)
'RA&MG'№16 (38)	October 15th	Future Forces 2018 (15-19.10.2018, Czech, Prague)
'RA&MG'№17 (39)	October 22th	EURONAVAL 2018 (23-26.10.2018, France, Paris)
'RA&MG'№18 (40)	November 05th	Airshow China 2018 (06-11.11.2018, Zhuhai, China)
'RA&MG'№19 (41)	November 07th	INDO DEFENCE 2018 (07-10.11.2018, Indonesia, Jakarta)
'RA&MG'№20 (42)	November 10th	BIAS 2018 (14-16.11.2018, Bahrain, Manama)
'RA&MG'№21 (43)	November 26th	IDEAS 2018 (27-30.11.2018, Pakistan, Karachi)
'RA&MG'№22 (44)	November 27th	JIAE 2018 (28-30.11.2018, Japan, Tokyo)
'RA&MG'№23 (45)	December 03th	Expo Naval 2018 (04-07.12.2018, Valparaiso, Chile)

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

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Media postal address:

Moscow, Russia, 123104, mailbox 29, Industrial Edition

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