RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of Industrial Weekly

№ 02 (20), April 2018

Russia and India: High Technologies of Defense Cooperation

SPECIAL PARTNERSHIP
DEFEXPO INDIA 2018

Russian Aviation Military Guide

#2 (20) April, 2018

'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

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EDITORIAL

Good real perspectives

India and Russia show an example of steady strategic partnership. The military and hi-tech components of our cooperation is one of the most successful and promising. This is especially important given the difficult situation on the world stage. 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.

World experience shows that it is not about how many weapons you have, but quality and possibilities of every single one of them is what leads to victory on the battlefield. Other significant factor is technological independence from seller – modern technologies make it possible to shut down any device from any place of the globe if you have appropriate access. With hi-tech technology, solid after-sales service and proven reliability of products, Russia is honest and friendly partner for India and other countries, ready for mutual work. And DEFEXPO INDIA 2018 shows good real perspectives of international hi-tech cooperation with Russia.

Valeriy Stolnikov

TECHNOLOGY IN YEREVAN

JSC Rosoboronexport was organizing a unified Russian exhibit at the ArmHiTec 2018 in Yerevan. The combined team of the Rostec State Corporation and Rosoboronexport at the exhibition was headed by the special exporter's Deputy Head of the Department of Marketing Activity Vladimir Goncharov. He said, 'Rosoboronexport traditionally pays considerable attention to defence exhibitions in the territory of CIS countries. They provide to the company an excellent opportunity to present the best models of the modern Russian weapons at the markets, which are familiar with the history and traditions of our armaments business, to display the high level of technological development in our country. Extensive business program of ArmHiTec exhibition contributes to the strengthening of the military and technical cooperation and good neighborly relations between Russia and Armenia.'

COOPERATION AGREEMENT

The Roscongress Foundation and Moscow State Institute of International Relations (University) under the Ministry of Foreign Affairs of the Russian Federation have concluded an agreement on cooperation. The document was signed by Roscongress Foundation CEO Alexander Stuglev and Moscow State Institute of International Relations Vice Rector Artem Malgin. The parties agreed to cooperate in order to ensure the highest-level preparation and holding of congress, exhibition, and social events in Russia and abroad, involving Moscow State Institute of International Relations. Cooperation will consist of bilateral and multilateral consultations, webinars, forums, roundtables, seminars, conferences, joint projects and initiatives, youth projects, as well as conducting practice-oriented studies on areas of joint activities.

SUCCESS OF KAMAZ

At the plant where car frames for KamAZ of the 5th generation are manufactured, there is a preparation for the production equipment assembling. New car frames will be delivered both to KamAZ trunk conveyer and an assembly plant of Mercedes-Benz trucks. The mass production of the KamAZ of the 5thgeneration with new car frames is planned for 2019.
In the painting shop of the car frames there is already compartition for the paint equipment. Welded frames on the assembly line will immediately turn to the electrovection and painting line and after drying, they will be lifted to the second floor. From there the frames will enter the logistic zone and will be shipped to the auto plant. Pre-commissioning activities of welding and painting manufacturing are set in June, and the pilot series of the car frames should be produced in October 2018.

Tecmash in 2017

Tecmash Concern has summed up the results for 2017. More than 40 military-cum-technical cooperation contracts were fulfilled and a 45% increase in civilian production output was recorded during the reporting period.

For instance, the Concern delivered all the main targets under the State Defense Order, fulfilled more than 40 military-cum-technical cooperation contracts, and decreased the number of toxic assets almost by half. Eight federal target programs and ten restructuring projects have also been completed in 2017.

The annual volume of civilian goods production went up by 45%. It was RUR 11.2 billion last year against RUR 7.7 billion in 2016. New civilian products including drilling equipment and refrigerators, have been designed and put into batch production by the holding facilities as part of the Rostec overall strategy implying a 50%, increase of civilian products share by 2025.

Science-cum-production Concern Tecmash was founded by the Rostec State Corporation in 2011. The Tecmash holding structure includes 36 enterprises of the ammunition industry. Highly effective models of military hardware manufactured by the Tecmash holding are used in more than 100 countries around the world.

The scope of the Concern affiliates civilian production encompasses the fossil and power production complex equipment, industrial and medical refrigeration equipment, agricultural machinery and consumer goods.

Light Aircraft TVS-2DTS

The Rostec State Corporation launches manufacturing of TVS-2DTS light aircraft at the facilities of the Ulan-Ude Aviation Plant (U-UAZ), a member of the Russian Helicopters holding company. The aircraft will be utilised for regional passenger operations, initially – in Siberia and the Russian Far East where a new airline company will be established for these purposes.

The agreement on local airline operations was signed during the Russian Investment Forum in Sochi by the Ministry of Industry and Trade of the Russian Federation, the Ministry of Transport of the Russian Federation, representatives of the Republic of Buryatia and the Sakha Republic (Yakutia), as well as the Russian Helicopters holding company. According to the agreement, new TVS-2DTS aircraft manufacturing facilities will be built at U-UAZ by 2019. During the period of 2021-2025, the plant agrees to supply at least 200 vehicles for regional aviation.

TVS-2DTS is a lightweight multipurpose aircraft with an all-composite structure. It is equipped with an avionics system allowing to operate it during any time of day or night and in any weather conditions. Another advantage of the aircraft is that it does not require any special take-off or landing site. Its cruising speed reaches 350 km/h, load-lifting capacity – 3.5 tons, and the maximum flying range is 4,500 km.

TVS-2DTS aircraft will replace the obsolete An-2 aircraft built in USSR and abroad that are still massively used by regional airline operators. The vehicle was first demonstrated by the Rostec State Corporation at the MAKS Air Show in 2017.

RUSSIA-INDIA: MILITARY-TECHNICAL COOPERATION

The Russian Foreign Ministry's press center hosted presentation of a photo book titled Russia-India: Milestones of Military-Technical Cooperation. The event was organized jointly by the Russian Foreign Ministry and JSC Rosoboronexport, part of the Rostec State Corporation.

The event was attended by Sergey Goreslavsky, Deputy Director General of Rosoboronexport, Yury Kaptelkin, Director of the Office of the Company's Director General, Ambassador Extraordinary and Plenipotentiary of the Republic of India to Russia Pankaj Saran, as well as representatives of the Russian Foreign Ministry, Russia's Federal Service of Military-Technical Cooperation, Rostec State Corporation, and Russian defense enterprises involved in military-technical cooperation.

'The history of military-technical cooperation between Russia and India, which dates back almost six decades, is most clearly and exhaustively presented in the book. This cooperation began with a modest episode concerning a donation of two Il-14S aircraft in the de-luxe version by the head of the Soviet state to the Indian government. It has steadily evolved and today, within the framework of the strategic partnership between the two countries, shows the widest variety of the forms and types of relations: supply of military and dual-use products, joint ventures, licensed production of arms and military equipment, as well as joint R&D efforts on advanced weapons,' said Sergey Goreslavsky.

The photo book was prepared under the sponsorship of Rosoboronexport and with the assistance of the Company's employees, whose professional activities have been intrinsically associated with India for dozens of years. It includes previously unpublished photos of bilateral meetings and negotiations, including summits, ceremonies for the transfer of military equipment, its operation, joint exercises, and many others. Two hundred thirty pages of a peculiar photo record encompass the entire period of Russian-Indian military-technical cooperation. The text of the book tells about the formation, development and current status of the partnership between the two countries.

Russia at Defexpo India 2018

According to the Russian Federal Service for Military and Technical Cooperation's order, JSC Rosoboronexport (part of the Rostec State Corporation), has been appointed organizer of the joint Russian display at Defexpo India 2018, an International Land, Naval and Homeland Security Systems Exhibition. The exhibition will be held from April 11 to 14 in Chennai, Tamil Nadu, India.

'Rosoboronexport is a long-standing exhibitor at Defexpo India. Over the years, it has become the largest Asian venue showcasing weapons and military equipment for the land and naval forces. We consider our participation in the exhibition as a major contribution to the development of military-technical cooperation between Russia and India and an important area of the company's marketing activities,' said Sergei Goreslavsky, Deputy Director General of Rosoboronexport.

Defexpo India has been held biennially since 2000 with the support of the Ministry of Defense of India and the Federation of Indian Chambers of Commerce and Industry. In 2018, the organizers decided to move the exhibition from Quitol in South Goa to Chennai.

The exhibition focuses on armored vehicles, artillery, missile weapons and small arms, air defense systems, naval equipment, EW and communication equipment, army aviation, infrastructure security, border control and critical facilities protection.

'Today, Russia and India have good prospects for stepping up mutually beneficial cooperation in the supply of arms and military equipment for the land and naval forces, localizing their production in India and upgrading previously supplied military products. We are also carrying out approximately 100 joint R&D projects. Much of this was the result to our active work at exhibitions in India. The distinctive feature of the upcoming Defexpo India 2018 for Rosoboronexport is the use of the venue to promote, inter alia, Russian security systems, equipment for counter-terror forces,' added Sergei Goreslavsky.

Rosoboronexport in 2018

JSC Rosoboronexport (part of the Rostec State Corporation) will make active exhibition efforts in 2018 to expand the reach of Russian defense manufacturers' displays. 'We consider participation in international defense exhibitions as one of the key areas of the Company's marketing activities. In 2018, our delegations will visit 23 events in various regions of the world. Particular attention will be paid to the most promising markets such as the Asia Pacific region, the Middle East and Latin America,' said Alexander Mikheev, Director General of Rosoboronexport.

The Company will organize joint Russian displays and will also present its stands at five venues in the Asia Pacific region and in three Middle Eastern states. In addition, there are plans to participate in three exhibitions to be held on the territory of the CIS countries, two European countries, and also in the South African Republic.

'Clearly, the exhibitions held in Russia continue to be priority and probably most productive for us. This year, Rosoboronexport traditionally organizes its displays at the Army Forum, International Helicopter Industry Exhibition (HeliRussia 2018), Interpolitex and will exhibit its promoted products at the International Far East Naval Salon 2018 in Vladivostok for the first time,' said Alexander Mikheev.

Rosoboronexport is continuously working to promote military-technical cooperation with new partner countries and increase its presence in various regions of the world. To meet these challenges, the Company makes its debut at new exhibition platforms.

'To strengthen our military-technical cooperation with the Philippines that received a major boost in 2017, we will for the first time organize a Russian display at the Asian Defense & Security (ADAS) 2018 Exhibition and Conference, to be held in September in Manila. I am confident that our participation will strengthen Russia's position on the highly competitive Asian and Pacific arms market,' added the head of Rosoboronexport.

Rosoboronexport is the only state-owned arms trade company in the Russian Federation authorized to export the full range of military and dual-purpose products, technologies and services. It is a subsidiary of the Rostec Corporation. Founded on 4 November, 2000, now Rosoboronexport is one of the leading world arms exporters to the international market. Its share in Russia's military exports exceeds 85 percent. Rosoboronexport cooperates with more than 700 enterprises and organizations in the Russian defence industrial complex. Russia maintains military technical cooperation with more than 70 countries around the world.

FIDAE 2018

JSC Rosoboronexport (part of the Rostec State Corporation) was organizing the Russian exhibit at the International Air and Space Fair FIDAE 2018 (April 3-8? Santiago, Chili). The official Russian delegation at the show was headed by Deputy Director of the Federal Service on Military and Technical Cooperation Anatoly Punchuk. Rosoboronexport's Deputy Head of the Department on Defence Technologies and Space Stanislav Andrukovsky was appointed the head of the combined delegation of the Rostec State Corporation and the special exporter.

'Rosoboronexport is considering the Latin American region as one of the most important and promising for the development of military and technical cooperation. Currently we are interacting on different projects related to all the services and branches of the armed forces, including our active cooperation on the modernization and re-equipment of the regional countries' air forces. The models of the aviation equipment, offered to the customers, have competitive combat, functional and operational features and characteristics, and are fully adapted for the use in the climatic conditions of the Latin American countries,' said Stanislav Andrukovsky.

Among the displayed items, the most promising for the Latin American market are the multipurpose Su-30 fighters of different modifications, multifunction MiG-29M/M2 fighters, (combat) trainers Yak-130, combat helicopters Mi-28NE, combat attack and reconnaissance helicopters Ka-52, multipurpose Mi-17 type helicopters as well as light multirole choppers 'Ansat' and 'Ka-226T'. The great demand for the modern Russian combat planes is justified by their high airworthiness, technical and tactical characteristics as well as combat capabilities to perform different missions.

The popularity of the Mi-17 type helicopters is determined mostly by their multi-functionality, high transportation performance, outperforming competitors, and enhanced survivability. Many Latin American counties have already tested the efficiency of these helicopters in hard-to-reach mountainous areas with rapid changes of heights and atmospheric temperatures, as well as in dusty conditions without any reductions in the operational life of the main assemblies.

'An extensive business program is planned for the period of the exhibition, which includes meetings with representatives of the different region's countries to discuss promising areas in the area of space technology and outer space infrastructure,' added Stanislav Andrukovsky.

T-72BZ tank: modernization

The motor is developed for installation on modernized and new serial T-72BZ tanks. The forced diesel engine V-92S2F for tanks developed at ChTZ-Uraltrak which is a part of Uralvagonzavod of the State Corporation Rostec has successfully passed all kinds of tests and received documentation for serial production.

This is the first tank engine in the last ten years specially created for installation on the modernized and new serial tanks T-72BZ with a capacity of 1130 hp. As a result of its application, the mobility and operational characteristics of combat vehicles increased significantly, and the specific capacity of T-72B3 tank surpassed the specific capacity of the best Western models.

Despite the deep modernization, the V-92S2F is maximally unified with the predecessor – the diesel engine V-92S2: it is made in the same dimensions and is installed in the engine compartment of the tank without any modifications to the machine, which makes it possible to replace V-92C2 with V-92S2F without changes in the technological process. The motor is produced on the standard equipment. V-92S2F was first introduced during the Tank Biathlon international army games. The Russian team became the winner in these competitions for several years in a row and the motor was unofficially nicknamed sporty. Assignment of the 01 letter means its acceptance into the arsenal of the Ministry of Defense.

Uralvagonzavod is a diversified machine building complex that produces about 100 types of products, in particular, military equipment, road construction machines, all-metal open wagons, specialized wagons and railway tanks. The enterprise is the developer of the main Russian combat T-90 tank, as well as the newest Russian Armata T-14 tank.

After-sales service for military equipment

Rosoboronexport (part of the Rostec State Corporation) has discussed the issues of modernization and development of the technical readiness provision system for the military equipment supplied to foreign customers. The theme of the after-sales service of materiel was discussed at the meeting of the 'Equipment and weapons of the land forces' panel of the Science and Engineering Board of the 'Oreltechmach' public company, a part of the 'Proekt-Technika' Corporation.

'The present-day market of weapons and military equipment specifies very stringent requirements to the military products as far as the support of their technical and combat readiness for the complete lifecycle is concerned. This results in the desire of foreign customers to conclude total package procurement contracts, which clearly determine supplier's and customer's obligations on the after-sales service of purchased military equipment for the whole operating life. Rosoboronexport takes into account this trend in the global arms market and constantly develops its capabilities in relation to the offered products and services', said Rosoboronexport's Deputy Director Igor Sevastianov.

In the past several years the after-sales service of the exported military products has become a very important factor to provide a competitive ability, to which much attention is now paid both by the foreign customers and suppliers of those products. Rosoboronexport's experience in the area of foreign trade activities shows that the requirements of company's partners to the provision of successful and effective use of weapons and materiel are increasing.

Besides, Rosoboronexport is interested in the rise of attractiveness and effectiveness of the after-sale service of supplied products as fine-tuned business processes in this area are becoming a source of stable income and profit markup for the companies of the Russian defence industry.

'Today we are cooperating successfully with the 'Proekt-Technika' Corporation on the after-sales service of our supplied products. This is one of the global leaders on the development and production of solutions in the area of mobile and stationary infrastructure for special purposes. Within the concept of the comprehensive approach to maintenance, we have already successfully completed and continue to execute a number of contracts in Venezuela, the Republic of Cyprus, Uganda and the United Arab Emirates', noted Igor Sevastianov.

It was also acknowledged at the meeting that the companies of the defence industry should develop and offer to their foreign customers electronic operating documentation and electronic illustrated interactive catalogues, which now become an obligatory condition for purchasing the main nomenclature of the equipment.

CERTIFICATE FOR KA-226T

Russian Federal Aviation Agency (Rosaviation) has issued a supplement to the certificate for Ka-226T helicopter that allows the machine operation at high temperatures. The document makes it possible to start exporting the helicopters to countries with the hot climate. The Rosaviation issued certificate has become a result of testing, carried out by Russian Helicopters specialists and Iran Helicopter Support and Renewal Company technicians in Iran in September 2017. The testing was done in order to prove normal functioning of the machine at outdoor temperature of up to 50 °C.

'The potential users of our helicopter had a chance to learn about its capabilities at a news conference we had upon completion of the testing in Iran last fall. Naturally, the official approval will help us negotiate with companies interested to purchase the machine', Russian Helicopters Holding Director General Andrey Boginsky acknowledged.

MODERNIZATION OF 'TORNADO 2'

'Tecmash' Concern has modernized 'Tornado 2' combat complex for antisubmarine 'Zapad' type missiles firing. The modernization affected the Black Sea based 1124 and 1124M-series small antisubmarine battleships. The new 90P1 missile for RPK-8 "Zapad" missile firing complex provides the last line of a battleship's defense and is used to eliminate submarines, torpedoes and commando troops. A 12-missile salvo eliminates targets at up to 4,300-meter distances.

'Russian battleships complete missions in oceans all over the globe. It often happens that our surface ships are being accompanied by foreign submarines. Under such conditions it is crucial to constantly improve the ability of the Navy to withstand the submarine attacks and ensure combat survivability of the naval task forces,' – Conventional Armament, Ammunition, and Special Chemistry Cluster Industrial Director of the Rostec State Corporation Sergey Abramov commented.

He also said that the Ministry of Defense set the task of restarting the production and modernization of 90P missiles in 2014. "That task has been accomplished on time and now we are getting ready to upgrade the naval antisubmarine protection systems for the use of the modernized missiles", – Sergey Abramov commented.

The missile is safe for storing and is complete with three stages that discharge in turns during the flight of the unit. The Pacific Ocean based small antisubmarine battleships are supposed to get upgraded for the use of 90P1 missiles during 2018-2020.

Russian 'Viking'

JSC Rosoboronexport (part of the Rostec State Corporation) is starting the promotion to the foreign markets of the newest air defence missile system (ADMS) 'Viking' (a 'Buk-M3' type ADMS).

'That's good news for us and our foreign partners. The 'Viking' complex preserves the best characteristics of the famous line of the 'Buk' air defence missile systems and represents the milestone in the development of the medium-range ADMS. The producers allotted unique characteristics to it, which are in line with the current requirements in the area of force and infrastructure protection from the strikes of present-day and future air assault weapons in conditions of radio-electronic countermeasures and firing. The 'Viking' has no countertypes today in the world armaments market,' said Rosoboronexport's Deputy Director General Sergey Ladygin.

The multimissile highly mobile medium-range air defence missile system 'Viking' is the next step in the development of the famous 'Kub' – 'Buk' ADMS line. In comparison with the 'Buk-M2E' ADMS, its range of fire has increased nearly by 1.5 times – up to 65 kilometers. Besides, the number of simultaneously fired targets has also increased by 1.5 times, which is 6 by each self-propelled launching installation, and the number of ready-for-launch air defence guided missiles in one firing position made of two combat units has grown up from 8 to 18.

ADMS 'Viking' has received a number of unique features, which were not previously available in any air defence missile system. For instance, it has a capability of integrating launchers from the 'Antei-2500' ADMS, which provides for the capability of target engagement at a distance up to 130 kilometers and will boost the efficiency of the whole AD grouping in the fight against enemy's pilot-controlled aviation.

The 'Viking' was developed and designed with the account of the world market trends. Its technical characteristics allow the system to be adapted to the greatest possible extent for the priorities of Rosoboronexport's foreign customers. The combat control station of the 'Viking' has a possibility of integration with the organic radar system as well as with other radars, including the ones produced outside Russia, but possessing required characteristics. Besides, the ADMS envisages a capability of the autonomous use of the firing sections and even separate self-propelled firing installations, which enlarges the total defended area and increases the number of covered sites. In addition, it helps to minimize the expenses for the air defence configuration set up.

'Commissioned by the Russian Armed Forced 'Buk-M3' system and its export version 'Viking' have proved a very high level of combat efficiency during their daily operation and exercises. The 'Viking' has a very high kill probability in relation to enemy's aviation, attacking elements of precision-guided munitions, as well as tactical ballistic missiles, maritime and ground targets,' added Sergey Ladygin.

Next Generation Helicopter Engine

United Engine-building Corporation, a part of the Rostec State Corporation, has started works on development of a prospective helicopter engine of the next generation. New construction materials and additive technologies, as well as 3D-printing, will be used in the process of development.

In addition to proven effective technologies and materials, new design visions and aviation engines production methods will be implemented in the process of development. The contractor of the project Saint-Petersburg 'ODK 'Klimov' is planning to implement the technologies that were already used for other ODK aircraft engine models, such as PD-14 engine for civil aircraft MC-21, a prospective engine for Su-57 fighter of the fifth generation and BK-2500M helicopter engine. New construction materials and additive technologies, as well as 3D-printing, will be used in the process of development.

'While developing new products and technologies, the Rostec State Corporation has a unique chance to use the resources of not a single company or research center but employ the united effort of all companies that are parts of the corporation to contribute to the process of development of brand new equipment for aviation industry', Aviation Cluster Industrial Director of the Rostec State Corporation commented.

The sample engine is expected to be complete in 2021 while the power unit is supposed to be ready for serial production in 2025. The weight of the unit will be reduced by 15 per cent compared to existing competitive models while its operation costs will be 30 per cent lower.

FOR LAND FORCES

Around 1000 items of land forces equipment to the foreign customers

Rosoboronexport (part of the Rostec State Corporation) notes an unfailing interest in the Russian military products for land forces and the increase in orders for the civilian and dual use equipment.

'Land forces materiel and military equipment produced in Russia are very popular and have a well-deserved authority among foreign armies. Our military equipment turns out to be much more attractive than foreign equivalents due to its characteristics, 'effectiveness-cost' criterion and a capability to operate in difficult environmental and climatic conditions. The total volume of its export since 2001 until now has reached nearly 25 bln US dollars, and today we note the increase in demand in the countries of South-East and Central Asia, Central and Western Africa and Latin America,' said Rosoboronexport's Deputy Director Igor Sevastianov.

Russian military products for land forces take stable leading positions practically in all segments of the market. They correspond to the present-day requirements, keep up and, in many aspects, outperform competitors' products. Very much in demand are the small arms, close combat weapons, armoured and automotive vehicles, artillery, anti-tank missile systems and ammunition.

'Today Rosoboronexport offers a variety of land forces equipment and materiel to the foreign customers. The list of offered products includes around 1000 items. They are mostly designed for the armed forces, but there is a substantial part of civil and dual-use products in our portfolio of orders. For instance, over 18 thousand KAMAZ, URAL, GAZ and UAZ based vehicles designed for the transportation of cargoes and personnel have been supplied to the Asian, African and Latin American countries since 2001,' added Igor Sevastianov.

Besides, after the adoption of changes to the Federal Law 'On Weapons' in 2017 Rosoboronexport received the right to export non-military and service weapons. 'Given the fact that Rosoboronexport has all the necessary competences and a solid experience, these changes will allow us to increase the portfolio of orders and come to the new markets. We are also launching cooperation on this issue with the countries, which did not have an opportunity to buy Russian non-military and service weapons before due to different reasons. And we are already engaged in negotiations with a number of customers,' Igor Sevastianov noted. /RA&MG/

VLADIMIR PUTIN AND NARENDRA MODI

Relations between Russia and India continue to develop the most favorable way. As evidenced by the private meetings of the leaders of the two countries and their involvement in the implementation of projects of business cooperation. For example, it was well illustrated by the meeting between the two leaders in Chine during the BRICS Countries' Cultural Festival, in Tashkent, the transfer to the first blog for Kudankulam NPP and many other meetings.

On August last year in congratulations to India's leadership on the 70th anniversary of independence Vladimir Putin praised India's economic, social and other achievements, and noted that the country has earned the respect it deserved on the international stage.

'Russian-Indian ties have always been based on friendship and mutual respect. The two countries have a long track record of fruitful bilateral cooperation in all areas, and coordinating efforts in resolving important matters on the regional and global agendas,' the President of Russia said in the message.

Vladimir Putin confirmed Russia's readiness to continue joint efforts to strengthen the special privileged partnership between Russia and India in the interests of the friendly peoples of the two countries, and with a view to ensuring international stability and security.

These words were fully confirmed and within the framework of the BRICS summit and BRICS Countries' Cultural Festival which took place on September in Xiamen. The programme included a variety of exhibitions, concerts, presentations and film showings. The event's main purpose was to acquaint the public with the BRICS countries' cultures.

Year before in the framework of Vladimir Putin's working visit to Uzbekistan to attend the anniversary SCO summit, the Russian president met with Indian Prime Minister Narendra Modi. At this meeting the President of Russia noted in particular, than 'India is our privileged strategic partner. Relations between our countries are built on long-standing traditions of friendship. This is fully reflected in our close and effective cooperation in economic and international affairs.

I am sincerely glad that in the course of the SCO summit today, India signed a memorandum of obligations as a step toward its status as a member of this organization. I am sure that the membership will happen in the very near future and that next year we will work with India within the framework of the SCO as a full member of this organization. This will give us an opportunity to work even more closely with our Indian friends now also within the SCO.

This year India has taken over the BRICS presidency. We are counting very much on your leadership in the organization and hope that India's presidency will also help strengthen this widely recognized international organization, whose influence is steadily growing'.

Indian Prime Minister Narendra Modi in turn said then: 'I would like to thank you for your constructive support of India's membership in the Nuclear Suppliers Group. Today, we launched the process of India's acquiring full SCO membership. I know that you have played a highly constructive role and I thank you for this. All of this goes to show what it means for India to have a true friend. I thank you from the bottom of my heart'.

Also last year there was the event a very important for business relations of the two countries – inauguration ceremony of Unit 1 of Kudankulam Nuclear Power Plant. The ceremony took place in videoconference format, and Vladimir Putin took part in the inauguration from the Kremlin (Moscow), Narendra Modi was in India on the inauguration ceremony.

Prime Minister of India Narendra Modi said: «Today is indeed a special day. Today, Excellency Putin and I have the honour to dedicate Kudankulam Nuclear Power Plant Unit 1. I am particularly grateful to President Putin for

'Russian-Indian ties have always been based on friendship and mutual respect. The two countries have a long track record of fruitful bilateral cooperation in all areas, and coordinating efforts in resolving important matters on the regional and global agendas.'
Vladimir Putin

his presence at this event. And I am delighted that Jayalalithaa ji, Chief Minister of Tamil Nadu, is also present with us on this occasion.

Friends, in dedicating Kudankulam 1, we mark another historic step in India-Russia relations. Its successful completion is not just another fine example of the strength of our special and privileged strategic partnership. It is also a celebration of our abiding friendship. And it is only a start of our collaboration in this field.

It is perhaps not commonly known that at 1,000 megawatt, Kudankulam 1 is the largest single unit of electrical power in India. In years ahead, we are determined to pursue an ambitious agenda of nuclear power generation. At Kudankulam alone, five more units of 1,000 megawatt each are planned. In our journey of cooperation, we plan to build a series of bigger nuclear power plants.

Friends, today's event is also a joyful occasion for the team of Indian and Russian engineers, scientists and technicians. We salute their dedication and hard work and congratulate them for the fruits of their labour.

Friends, the story of human development has been of wide spread technological advancement and growing economic prosperity.

But, as we all know, it has not been without burden on our environment. I have a vision for India where achievements of our economic development are respectful to mother earth, and where the engines of our industrial growth are increasingly driven by clean energy. Kudankulam 1 is an important addition to India's continuing efforts to scale up production of clean energy in India. It also signals our joint commitment to build pathways of partnership for green growth.

Excellency President Putin, the success of our joint efforts in nuclear power generation is a proud achievement of our cooperation. It demonstrates our common resolve to grown and build on new dimensions of our ties.

Above all, it showcases your personal commitment, consistent support and strong leadership in transforming the substance and character of our relationship. For this I am grateful to you, Mr President.

The people of India associate naturally and with great ease with the people of your great country. And personally, I have always deeply valued our friendship. It is, therefore, only fitting that today we join together to dedicate the Kudankulam Nuclear Power Plant unit one to the strength and vigour of our friendship and cooperation. Long live Indo-Russian friendship!'

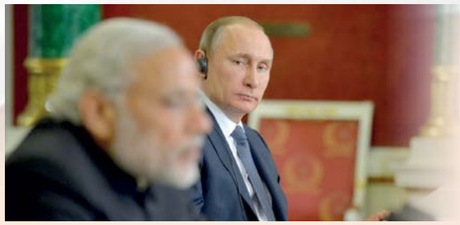
Vladimir Putin said: 'This is a big event for our Indian partner, for the Russian company that carried out this project, and for all of us. The power plant was built using the most advanced world technology, Russian technology, and was built by Russian and Indian specialists working together.

Cooperation in nuclear energy is an important part of the privileged strategic partnership between our countries. Our work together in this sector has great importance for our countries' development. This is not just about building a nuclear power plant and putting it into operation, but is a large-scale project to develop a new high-tech nuclear sector in India. This work involves transfer of skills and training of personnel and specialists in this area.

Russia is well known as a leader on the international market for nuclear technology and services. The nuclear power plants built by Russian specialists are reliable and meet the very highest safety standards. We are sharing with our Indian colleagues our experience and developments in this priority high-tech sector.

Unit one is starting work at its nominal capacity and a second unit will also come on line in the not so distant future, and this will substantially boost India's energy supply and bolster its economic position. Peaceful nuclear energy development will be essential for a vast, powerful and rapidly growing country like India to resolve its social and economic tasks.

Together with our Indian friends we have big plans in this sector. Work began on the power plant's third and fourth units in February this year. We plan to sign a general framework agreement and loan protocol for the construction of the third stage of the project by the end of this year. I would like to remind you that this project is being carried out using funds provided by the Russian Federation. Of the total project financing, 85 percent is in the form of a state loan provided by Russia'.



'India is our privileged strategic partner. Relations between our countries are built on long-standing traditions of friendship. This is fully reflected in our close and effective cooperation in economic and international affairs.'

Vladimir Putin

In relations between the two countries is always important stability. Russia and India demonstrates this stability of friendly relations for many years. Any difficulties cannot stop our friendship and our business ties. At one of a bilateral meetings Vladimir Putin stressed:

'As we all know, unfortunately, there has been a certain slump in our trade and economic cooperation. This is primarily due to external factors, of course: fluctuations in demand and supply, currency volatility. Therefore, our main task here is to use every opportunity to diversify Russian-Indian relations and to actively promote projects in such areas as high technologies, aviation and machine building, medicine and the diamond industry.

This is further promoted through regular contacts between Russia's Chamber of Commerce and Industry and the Federation of Indian Chambers of Commerce and Industry, between the Russian Union of Industrialists and Entrepreneurs and the Confederation of Indian Industry. I would like to note that leading Russian companies have gained a strong foothold on the Indian market and are actively involved in upgrading the Indian production base and developing its infrastructure. Among them are Rosatom, Gazprom, Russian Railways, Silovyie Mashiny, Lukoil, Sistema, Rosneft and Renova.' /RA&MG/

DEVELOPMENT OF MILITARY-TECHNICAL COOPERATION

President of Russia Vladimir Putin in recent years has paid much attention to the development of military-technical cooperation with foreign countries. In November last year in Moscow Kremlin he held a special meeting of the state Commission for Military Technical Cooperation with Foreign States. In addition, the issues of military-technical cooperation and arms exports became one of the themes of Vladimir Putin's autumn meetings with the leadership of the Russian Defense Ministry and enterprises of the country's defense-industrial complex.

Vladimir Putin began the meeting of the Commission for Military Technical Cooperation with Foreign States from the current situation in this sphere and then map further steps to strengthen Russia's positions on the global market of weapons and military equipment.

Vladimir Putin marked that based on the results of January to September 2017, Russian military-technical contracts portfolio exceeds $45 billion. Under the 2017 plan, Russian military export deliveries will amount to $15.3 billion.

'Russia is firmly committed to its obligations in the fight against terrorism, chooses its counteragents scrupulously and closely monitors the use of our equipment and weapons by our clients,' said Vladimir Putin. 'We must implement our plans in full, and we must also continue to enhance our efficiency in the sphere of military technical cooperation, including by tightening control over the implementation of our contractual obligations.

At the same time, I would like to point out that the Russian producers and suppliers of weapons and military equipment have to operate in difficult conditions and amid unfair competition, which has become obvious and includes hampered financial settlements, logistical obstacles and problems with protecting intellectual rights. Taken together, this results in increased spending and complicates the work of the Russian parties to military technical cooperation.

Arms exports are a huge responsibility for any country. Despite this, we have strengthened the economic and financial stability of our defence companies and increased their technological and production capacities over the past few years, which allows them to increase exports and improve the quality of exports, both military goods and high-tech civilian goods. In this context, I would like to remind you about the importance of diversifying our defence sector.

Of course, we must strengthen ties with our strategic partners, but we also need to develop contacts with new clients. We certainly want to profit commercially from the sale of our military products, yet the interests of global and regional security and stability will always be our top priority.

Russia is firmly committed to its obligations in the fight against terrorism, chooses its counteragents scrupulously and closely monitors the use of our equipment and weapons by our clients.

'In 2017, Russian arms have been delivered to 59 countries. Stable military contracts have been concluded with 80 countries. What is important is that the stock of orders of Russian military products is not declining. This is a result, among other things, of the timely steps taken by the government to fund military-industrial companies, issue loans or otherwise assist them.'

Vladimir Putin

Russian producers and suppliers of weapons and military equipment have to operate in difficult conditions and amid unfair competition.

Meanwhile, we have taken note of several alarming trends, which have been growing stronger lately. I am referring above all to the frequent violations of international law by some players on the weapons market, as well as direct threats made to sovereign states.

We see an imitation rather than a real fight against terrorist groups, and uncontrolled arms deliveries are growing in scale. Weapons that are delivered to the so-called moderate opposition here or there today can resurface in the hands of radicals and terrorists tomorrow.

It appears that the hot spots and conflict zones have become a profitable business for certain parties and links in the ramified grey network of arms deliveries to counties and regions with unstable military and political situation. As I have said, arms exports are a huge responsibility for any country, and all players on the global arms market must be aware of this.'

It should also be noted that the issue of arms exports was raised in Sochi at the meeting on resource support for Armed Forces technical refurbishment, which was the final session in a series of meetings Vladimir Putin with Defence Ministry and defence industry officials. President of Russia said about MTC:

'The potential of our military-industrial complex and the ongoing arms improvement, which I just touched on with regard to the use of such weapons in combat, is the reason Russia remains a leader in military exports and why it can strengthen its cooperation in military technology with other nations at a faster pace.

In 2017, Russian arms have been delivered to 59 countries. Stable military contracts have been concluded with 80 countries. What is important is that the stock of orders of Russian military products is not declining. This is a result, among other things, of the timely steps taken by the government to fund military-industrial companies, issue loans or otherwise assist them.

Still, we need to plan for the risks and assess the negative impact of the possible use of the external limitations that are already in place, and of the possible imposition of new limitations. We need to plan and undertake measures that will help us to respond to such a scenario quickly so that no harm comes from this possible outside influence.' **/RA&MG/**

RUSSIAN 'MANGO' IN INDIA

Andrei Bolshakov: 'Unlike foreign ammunition manufacturers JSC "NIMI named after V.V. Bahirev" (Mechanical Engineering Research Institute) is a unique and self-sustaining enterprise'

An India-based production of famous Russian 125-mm tank rounds 3VBM17 "Mango" is one of the biggest Russian projects in the context of military and technical cooperation with India. On the Russian side the project is being implemented by NIMI, a part of Tecmash Concern of Rostec State Corporation. This large-scale and technology intensive project being a part of state program "Make in India" shows a high level of relations between two countries in such a sensitive area. About the implementation features of the project told Andrei Bolshakov, Deputy Director General of JSC "NIMI named after V.V. Bahirev":

– Mr. Bolshakov, what is the India's profit from this project?

– To put it shortly, India will eventually create its own production facilities of 125mm armor-piercing sub-caliber rounds "Mango" for D-81 tank based on NIMI developments and receive the rights and capabilities to produce and assemble the ammunition. As a matter of fact we are making a new technology level of India's ammunition industry involving 100% tank armor-piercing rounds produced locally.

– Is the project complicated in terms of technology?

– The project is large indeed, long-term and technically challenging. Meanwhile we should consider that such projects may be implemented only in the countries which have their own ammunition industry, proper technological expertise, some machinery equipment, personnel, understanding of industrial and process discipline. Projects involving such level of local content cannot be implemented in countries with inadequate industry. In this regard India's defense industry is much more promising for us than such of many other countries which probably also wish to have it but are not ready for such projects in technological terms. Moreover India is successfully implementing state strategy involving switching from purchasing finished weapon systems including ammunition to establishing its own production capacities.

– Ammunition production is obviously both technologically intensive and demanding?

– Right you are. Ammunition industry is complicated and significant. However if a country has technological background and desire, and it is ready for investments, which evidently require much money to be spent, everything turns out all right. This project has resulted from desire and capabilities of the Indian part.

– When the contract was signed?

– It has taken a long time to get the contract prepared. It took about three and a half years from a day India showed certain interest and sent a request till the contract was signed. The contract for license transferring and setting up a production was signed by JSC "Rosoboronexport" and Ministry of Defense of India in March 2014. According to its terms NIMI is a general executor.

– Could you tell us about the contract progress?

– Now the contract is being successfully implemented step by step. I can say we are in the middle of the way. Thus, according to the contract the first batch of India-made rounds has been assembled using semi-knocked down sets and successfully tested. As to percentage ratio of local content approximately 40% of products are now surely made in India. This is a very good result! Generally speaking everything is going well and on schedule.

– Is local content going to extend?

– Certainly, it is! Our Indian partner is absolutely focused on all-round extension.

– What are NIMI's specialists involved in the project?

– For instance, currently NIMI's specialists are engaged in personnel training, setting up and commissioning of equipment and adjustment of necessary procedures at three Indian factories.

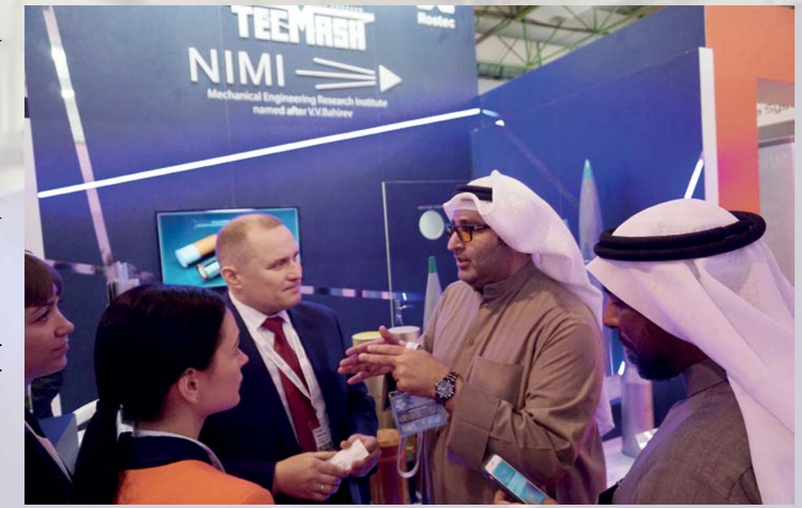
– Is Mango-related experience expected to be used for establishing other Russian ammunition production in India?

– I believe the volume of licensed production of Russian ammunition in India will increase, judging on Indian customers' interests. There is an Indian Armed Forces demand for our products. Local industry is increasing its technological capabilities while "Make in India" program is being implemented in a consistent manner. A positive experience of "Mango" being locally made is surely to be a proper background for other ammunition production. Objective factors at least are good for such scenario. Besides, there are obvious advantages of a licensed work in cooperation with Russian manufacturers of rounds including JSC "NIMI named after V.V. Bahirev" in particular. This is because we are a self-sustaining enterprise.

– Could you please explain it?

– The point is that unlike foreign ammunition manufacturers

NIMI is a unique and extraordinary enterprise. Russia has a historically formed ammunition industry which has always absolutely relied on national manufacturers. We have our own chemical and powder production facilities, as well as capacities to make components such as fuses, cartridges etc. It means Russia (NIMI) is a self-sustaining manufacturer. Take a look at our foreign counterparts and you will see almost every big company make its products in extended international cooperation, when components are supplied by different countries. In terms of prime cost it is perhaps justifiable. However, as to production protection and reliability, it may create high risks. Besides, with such model it is very difficult to manage a licensed production since it requires approval of many manufacturers. Unlike them Russia and NIMI have actually every development and production expertise gathered in a single pair of hands.



Mechanical Engineering Research Institute (JSC "NIMI named after V.V. Bahirev") is a leading developer of field, tank, anti-tank and naval artillery rounds, as well as a supplier of production batches of ammunition for the Armed Forces of the Russian Federation and for export. In addition to supply of finished goods JSC "NIMI named after V.V. Bahirev":

- **transfers licenses for production of rounds;**
- **co-develops round of tank, field and naval artillery to meet customers' requirements;**
- **conducts operations on ammunitions properties assessment and extension of rounds specified storage and operational life.**

– So it means Indian partners anyway feel safer if they work with us?

– Absolutely! There are no risks related to possible changes. For example, a company has a new executive or other policy; some extraordinary 'Brexit' shows up or a single component is not supplied any more to cause delays in production and so on. As far as NIMI is concerned, everything is concentrated in one place. The experience is great since our enterprise was found in 1932. Engineers and designers have been trained for generations. We create and develop our ammunition-related design schools, make scientific researches, develop and introduce innovations. Sometimes we are in the context of world trends and sometimes we go our own way, which, as a rule, leads to breakthrough. We are fully self-containing, that is why we are strong. This is also a big advantage for those, who wish to work with us in creating licensed production.

– When it comes to technology transfer is it surely about transfer of traditions?

– Yes, of course. While transferring technologies we also provide our partners with the rules of production discipline, industrial as well as fire and explosion safety principles which is very important for this area of activity. When we start a license-related project with another country there is always a section in the project which involves design and construction of production facilities such as buildings, engineering installations and communication lines. Thus, we say, "If you are going to manufacture our products you should meet certain safety requirements. So a number of strict standards must be met. And we will teach you how to do it". /RA&MG/

MASTERPIECES FROM RUSSIA

High-Precision Weapons holding company creates weapons of absolute accuracy

The role of high precision weapons is growing reasonably worldwide. These are high precision arms which primarily define reliability and efficiency of defensive and assault capabilities of modern armed forces including their tactical level above all. Among the largest manufacturers of the most advanced weapons of such kind is Russian High-Precision Weapons holding company within the state-owned Rostec group. The company is well-known all around the world thanks to its high precision weapons which outperform foreign counterparts and successfully serve in armies of all world continents. The weapons made by High-Precision Weapons are also known in India among other countries.

The main goal of High-Precision Weapons founded in 2009 was consolidation of technological capabilities of dedicated enterprises to create advanced weapons, defense and special-purpose equipment related to high precision weapon systems. Nowadays High-Precision Weapons company includes 19 Russian defense enterprises among which are trusted centuries-old leaders in their industries such as Tula Arms Plant which is more than 305 years old!

The holding enterprises are mostly involved in development, production, upgrade, repairs and sale of arms, military and special-purpose equipment. Besides, the holding is a world trend setter as to a number of some high precision weapons since many products were made at holding-owned enterprises and later recognized worldwide. The holding designers form a technological benchmark dedicated to advanced weapons development even today.

The holding activities increase every year both at internal market (it is a major supplier of high precision arms for Russian Armed Forces) and external market. Export to various regions of the world grows on a constant basis. Annual export gain is 25-40%. Such stability is also record-breaking for the whole Russian engineering industry. The holding purports to double military equipment supplies by 2020. Among the most stable export regions are Middle East, Gulf states, Northern Africa and India. Its export-oriented activity has been increasing lately at promising markets of South East Asia, Latin America, Central and South Africa.

The global success of High-Precision Weapons has been also proven by Stockholm International Peace Research Institute (SIPRI) which has given the holding 39th position in a global rating of world arms manufacturers.

Besides, some experts emphasize not only quantitative success of the holding company at world arms market but also good quality indicators of its products. The majority of defense products exported by High-Precision Weapons are best in class. Many of them are trend-setting and unrivaled in terms of efficiency, reliability as well unique price and quality criteria. Besides, the dimensions of product range are astonishing. The company makes items from brand new fire arms to antitank missile systems, assault weapon systems and guided artillery weapons.

According to experts the most world popular weapons made by the holding company include Pantzir-S1, Kornet-EM, Konkurs, Metis-M1, Krasnopol, Arkan, Verba, Sosna, Palma and many others. Let us now describe some holding-created inventions.

Antitank missile system Kornet-EM is the world's best-in-class system unrivaled in terms of combat efficiency and easy-to-use capability. As a matter of fact Kornet-EM is a multi-purpose high precision long-range missile system capable of effective fighting against both ground and airborne targets. There is no similar product worldwide.

Kornet-EM includes eight ready-to-fire missiles (full load is 16 missiles). Collective fire upon two targets significantly increases system's effi-

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ciency and rate of fire. It is capable of firing all existing Kornet-E missiles. The system meets every modern requirement as to advanced antitank missile systems by using state-of-the-art and at the same time relatively cheap engineering solutions which ensure brand new features.

Firing distance is between 150m (min) and 10,000m (max). Laser beam-guided control system is fully automatic with proper jamming resistance. Number of concurrent engagements is 2. Shaped-charge warhead armor-piercing capability is up to 1,300mm. High explosive warhead TNT equivalent is 7kg. Full load is 16 missiles including 8 ready-to-fire ones. Readiness time is 7 seconds.

Computer vision and automatic target tracker used by Kornet-EM ensure fire-and-forget principle. It features unmanned missile guidance and 5 times higher target tracking precision in real combat conditions as well as great hit capability within the whole firing range. Kornet-EM effective range is twice bigger than Kornet-E. Thanks to automatic target kill probability psychophysical load, qualification requirements and training time of personnel has been reduced.

Another 'best-of-the-best' example is grenade launcher Bur which is the lightest and the most compact launcher in the world. It can be successfully used by active units and special force including anti-terrorist ones. Length is 74.2sm, loaded weight is 3.5kg. The grenade launcher capable of being used day and night significantly increases combat performance of motorized, airborne and special force units. Bur is used by Russian Army and special force units.

Bur system can fire both high-explosive and thermobaric grenades. The other Bur advantages include the capability of being loaded with different types of rounds as well as capability of being used in small confined rooms, in lying, kneeling, stranding positions and restricted visibility conditions.

Another defense masterpiece by High-Precision Weapons is 30mm antipersonnel automatic grenade launcher AGS-30 dedicated to kill manpower and vehicles both on open terrain and in trenches, rooms, behind natural and artificial obstacles. The grenade launcher kit includes three ammunition boxes and 18 belts with 10 links each. Loaded rounds are placed in paper cartridges and put in sealed metal boxes 48 pieces each. Rate of fire is 400 shots per minute.

AGS-30 is equipped with mechanical and optical sights. According to customer's choice the launcher may be fitted with day-and-night sighting system. It can also use radar sight to monitor situation and conduct aiming fire in zero optical visibility conditions.

This grenade launcher has a number of advantages which ensure its uniqueness in close combat. Small size and its mount design features ensure quick firing position change, capability of shooting from windows and unprepared positions. Thanks to wide limits of traverse one can quickly switch fire upon a sudden target. In travel position mount and grenade launcher can be densely folded and carried on back slings. AGS-30 has been used by Russian Army and National Guard units.

The above-shown products are examples of the highest level and quality of weapons made by High-Precision Weapons company. So far High-Precision Weapons is certainly among the key designers of high precision arms worldwide. More details of its products can be learnt at the largest international exhibitions (including DEFEXPO INDIA 2018) and arms shows permanently attended by the Russian holding company. **/RA&MG/**

The holding enterprises are mostly involved in development, production, upgrade, repairs and sale of arms, military and special-purpose equipment. Besides, the holding is a world trend setter as to a number of some high precision weapons since many products were made at holding-owned enterprises and later recognized worldwide. The holding designers form a technological benchmark dedicated to advanced weapons development even today.

KORNET-EM

MULTI-PURPOSE LONG-RANGE MISSILE SYSTEM

Multi-purpose long-range missile system 'Kornet-EM' is designed to engage existing and future combat tanks protected by explosive reactive armor, light armored vehicles, fortifications, surface low-speed air targets (helicopters, UAVs, assault aircrafts) by day and at night in adverse weather conditions as well as in optical and radio jamming environment.

Advantages and Operating Features

- Targets engagement in automatic mode reduces psychophysical stress of operators, requirements to their skills as well as reduces their training period.
- Simultaneous salvo firing at two targets greatly increases rate of fire and firing effectiveness of the system.
- Firing by two missiles in one beam to engage extra dangerous targets including those protected by ERA.
- Two times (up to 10 km) as compared to 'Kornet E' ATGW increase of firing range and guidance accuracy increases up to 5 times.
- Wider possibilities for ATGW thanks to engagement of small-size air targets (helicopters, UAVs, assault aircrafts).
- 'Kornet EM' system can be installed on wide range of carriers with small loading capacity (1 pc AL 0.8-1.0 t; 2 pcs AL 1.2 -1.5 t).

System provides firing by all missiles of 'Kornet E' family.

AEROSILA ONE OF THE MOST EXPERIENCED COMPANIES IN THE WORLD

AEROSILA is a public multi-profile company possessing both the facilities for highly intensive R&D and its own production plant. Established in 1939 as a design bureau for the development of automatic air propellers, the company has also been designing and developing gas turbine engines for more than 60 years.

MAIN ACTIVITIES

- APUs and small size gas turbine engines
- air propellers and propfans
- lifting and propulsion mechanisms
- power converters for supersonic aircraft
- inflowing and exhaust fans, also jet axial fans

APUs and SMALL SIZE GAS TURBINE ENGINES (up to 1700 hp)

Modifications based on the family of new generation gas turbine engines are being operatively created for the APUs of new, advanced and modernized aircraft and helicopters, ships and hovercrafts, other vehicles and also for a wide range of usages.

These APUs are equipped with an electronic system of control and adjustment (FADEC) and meet up-to-date requirements regarding dimension, weight, specific performance, noise level, emissions release, launch and operation altitude, and fuel economy and maintainability.

Currently, our efforts are concentrated on the development of:

- advanced small size gas turbine engines
- on-board power units with increased electrical power bleed including implementation of concepts such as "electric" aircraft and helicopters, ships and hovercrafts, vehicles, etc.
- base gas generators for small size main engines

AIR PROPELLERS, PROPFANS and HYDROMECHANICAL GOVERNORS

Air propellers and propfans ranging from 15 to 30,000 hp feature an aerodynamic efficiency of up to 0.9. The implementation of a multi-blade concept, using light composite blades, and the presence of an electronic control loop in the propellers' automatic control system have achieved the following advantages:

- Dimension & weight reduction
- Design service life increase & reliability improvement
- Durability of a repaired composite blade to the standard of a new one
- Expanded set of control functions & diagnostics
- Phase-synchronization with additional noise level reduction

LIFTING & PROPULSION MECHANISMS for HOVERCRAFT and WIG AIRCRAFT

Air propellers and lift fans are provided for creating an air cushion under a ship's body, also for direct and reverse thrust, enabling high speed, maneuverability, efficient landing and to aid a ship's movement on land.

INFLOWING / EXHAUST FANS, JET AXIAL FANS

A series of highly effective variable pitch fans for ventilation of tunnels and underground premises.

QUALITY & RELIABILITY of our products has been verified by users around the world

AEROSILA FEATURES

- Full cycle of new product creation from scientific research to pilot stage, plus comprehensive testing and technical support
- Modern technology to facilitate full-scale production and wide production cooperation
- Mutually-beneficial interaction and a personal approach with partners and customers
- Cooperation with the leading scientific centers and design bureaus
- High professionalism of its personnel
- Continuous quality improvement for developing and modernizing products/services

As a high-level integrator **AEROSILA** coordinates the creative efforts of developers with regard to materials, control systems, fuel devices, starting and ignition systems, heat exchangers, sensors, and other aggregates; it also shapes prospective requirements and sets long-term objectives

On CUSTOMER' DEMAND AEROSILA provides:

- Adaptation of serial products
- Design and development of new products
- Localization of manufacture under license agreements
- Technical audits

EFFICIENT USE is guaranteed by **MANY YEARS** of **EXPERIENCE** in **DESIGNING** such products, **MODERN TECHNOLOGICAL OPPORTUNITIES** for manufacturing and testing, a rigorous quality management system (to **ISO 9001:2015**, **EN 9100:2016** standards), and a **GLOBAL TECHNICAL SUPPORT** network

MEETING CUSTOMER REQUIREMENTS IS OUR HIGHEST PRIORITY

APUs and SMALL SIZE GAS TURBINE ENGINES

PROPELLERs / PROPFANs

LIFTING & PROPULSION MECHANISMs

TUNNEL FANs

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RELIABILITY, POWER, AGILITY

How Russia contributed to the creation of India's armoured troops

Sergey Suvorov
candidate of military sciences

The Indian Army currently operates over 3,800 tanks, in addiiton to more than 2,000 infantry fighting vehicles (IFV) and armoured personnel carriers (APC) of various makes. Most of these, while designed in the USSR and Russia, were actually built at Indian enterprises, which have been manufacturing armoured vehicles for decades. As of 2017, India commanded 2,400 T-72M1 Ajeya tanks, 1,250 T-90S Bhishma tanks and 242 Arjun Mk I and Mk II tanks, all dispersed between 63 armoured regiments.

India first got a taste of Soviet-made tanks back in the 1960s, when the country took delivery of T-54s and T-55s. These vehicles would prove to be fully combat-worthy subsequently, including in actual combat in the early 1970s. An armour repair facility was built at the Kirkee (now Khadki) army base to support prolonged operation of the vehicles. Until recently, the Indian Army Armoured Corps operated a total of over 1,000 examples of the T-54 and T-55 tanks. The Indian Army still operates T-55-based missionised vehicles and heavy APCs.

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In the 1970s, India decided to purchase a number of T-72M1 tanks from the Soviet Union in order to upgrade its armoured fleet. The original plan was to order just around 200 vehicles, but the figure was subsequently revised upwards. Furthermore, it was decided to launch licence production of the tank in the town of Avadi. The pilot batch was rolled out in 1987.

The first 175 Indian-made T-72M1s were assembled from knock-down kit supplied by the USSR, which was at that time helping India develop its heavy industry. The end goal was for India to maximally localise the tank manufacturing business, ultimately bringing the share of indigenous components up to 97%.

Indian production of T-72M1 tanks, locally known as Ajeya (Invincible), began at a rate of around 70 vehicles annually. The last production run came in March 1994. Overall, the Indian Army currently has 1,200 such tanks.

In the early 2000s, many foreign companies specialising in T-72 modernisation intensified their activity on the Indian front. The enterprises involved represented not just those countries in which these tanks used to be licence-built, such as Poland, Slovakia and the Czech Republic, but also those which had a fairly vague perception of what the vehicle was about. The latter enterprises included Texas Instruments (USA), SABCA (Belgium), Officiene Galileo (Italy), Elbit (Israel), LIW (South Africa), and Thomson-CSF (France).

The plan to upgrade at least a portion of the Indian T-72M1 got codenamed Operation Rhino. It called for installing a new fire control system, new engine, explosive reactive armour, navigation and laser illumination warning systems, communications equipment, and an NBC protection system.

Col-Gen Sergey Mayev, former head of the Russian Defence Ministry's Main Automotive and Armour Directorate, has this to say about foreign companies' attempts at upgrading Soviet-designed tanks: "Many of them turn combat equip-

Commissioned by the Indian Army Corps of Engineers, the country's designers also created the ERV engineer reconnaissance vehicle. The vehicle has the BMP-2 hull and turret, but is stripped of all the organic weapons for the exception of the smoke grenade launchers. Like the baseline, the ERV is amphibious. It has all the necessary equipment to collect, register and transmit intelligence, complete with information about the terrain parameters. The ERV can provide the command post with detailed information about the heights and slopes of stream banks, the soil bearing capacity, and the bottom profile for water barriers. The vehicle can leave tracing marks for upcoming vehicles with the use of a starboard dispenser.

ment into military commodity. Their upgrade efforts are not aimed at improving the vehicle's combat prameters but rather at selling it as quickly and profitably as possible. The seller does not care what happens next. As for those who buy such products, they have no idea about the possible consequences of the transaction."

Russia did not stay aside: in early 1997 it offered India to equip that country's T-72M1s with the Arena-E active protection system to counter Pakistan's recent purchase of a batch of Ukrainian T-80UD tanks, which somehow surpassed the T-72M1s, India's most advanced vehicles of that tine. However, the Indian government instead decided to procure modern T-90S tanks from Russia, and to launch their licence production.

One of India's subsequent indigenous developments was the EX tank, in which the Ajeya (read T-72M1) platform was fitted with an Indian-designed turret lifted off from the Arjun tank, complete with the 120mm rifled-bore gun. The resultant tank had no autoloader and grew in size somewhat, but got a thermal sight in return. The project never progressed beyond the single mock-up sample. India's new indigenous tank Arjun Mk II, for its part, failed to deliver on the expected role as the mainstay of the country's armoured troops. The vehicle was, inter alia, hugely overweight at around 70 t, and came with a price tag in excess of 370 million rupees ($6.27 million) apiece, or more than twice the price of the T-90S. Nevertheless, the Indian Army procured 118 Arjuns eventually.

In 2012, the Indian military staged local comparative trials of the T-72M1, the T-90S and the Arjun Mk II. The best crew and technical personnel were reportedly involved. The Indian media later reported triumphantly that the Indian vehicle had outperformed the Russian T-90S on every count. This, however, raises a question: if the Arjun is truly so wonderful, why did the Indian Army order just 118 of the type, against over 1,000 T-90Ss? The Times of India has recently reported that India's Defence Acquisition Council approved a contract to purchase 464 Russian-made T-90MS tanks for a total of $2 billion. Should more be said as to which of the vehicles is the better? All the more so as T-90 tanks have repeatedly proved their worth not only in India but also in several other countries known for their hot, humid and dusty environments.

India also licence-builds Russian-designed BMP-2 IFVs (locally known as Sarath) at Ordnance Factory Medak. The first such vehicle, assembled from Soviet-made components, was delivered to the Indian Army in August 1987. By 1999, the share of locally-built Saraths had reached around 90% of the country's total IFV fleet.

The Indian-built BMP-2 has undergone a series of upgrades since production launch, including the installation of a new radio station and improvements to the weapons stabiliser. According to some estimates, a total of some 1,200 such vehicles had been built locally by early 1999. Apart from these, the Indian Army also has around 700 (other sources say 350) Soviet-built BMP-1 IFVs.

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Like with the T-72M1, India used the experience accumulated during licence production of BMP-2s to develop indigenous derivatives. One such design is the AAV armoured ambulance vehicle, which is currently in production. The vehicle is intended for the treatment and evacuation of battlefield casualties. Perfectly mobile over any type of terrain, it can negotiate various obstacles and ford water barriers amphibiosly.

Commissioned by the Indian Army Corps of Engineers, the country's designers also created the ERV engineer reconnaissance vehicle. The vehicle has the BMP-2 hull and turret, but is stripped of all the organic weapons for the exception of the smoke grenade launchers. Like the baseline, the ERV is amphibious. It has all the necessary equipment to collect, register and transmit intelligence, complete with information about the terrain parameters. The ERV can provide the command post with detailed information about the heights and slopes of stream banks, the soil bearing capacity, and the bottom profile for water barriers. The vehicle can leave tracing marks for upcoming vehicles with the use of a starboard dispenser.

The two-crew AAD armoured amphibious dozer was also developed to the Indian Army Corps of Engineers specifications. Based on the BMP-2 chassis, it has the original turret removed and features a broad array of mission-specific equipment. The back-to-back arrangement of the driver and operator stations allows for dual control of the vehicle. The equipment includes a 1.5 m^3 hydraulic earth scoop mounted on the stern, a winch with 8 t tractive force, a mine plough, and a rocket-propelled self-recovery anchor with a firing range of between 50 and 100 m. The AAD travels at a maximum highway speed of 60 kph and a maximum water speed of 7 kph.

The Indian Corps of Army Air Defence also use the BMP-2 platform broadly. The indigenous Akash and Trishul SAM systems are based on a somewhat stretched BMP-2 chassis, with seven road wheels on each side. Each vehicle carries a rotating launcher for three surface-to-air missiles. The three-coordinate radar used in support of the Akash is also based on the BMP-2.

Indian engineers in 2006 presented the TBHA (T-55 Based Heavy APC) vehicle known as Tarmour. Based on Soviet-designed T-55 chassis, which are still available in abundance in the country, the Tarmoyr accommodates up to 10 troops. Its hull reportedly protects personnel from RPG-7 rounds. The Indian Army is currently believed to have some 900 such vehicles.

/RA&MG/

A SPLASH OF INTEREST IN RUSSIAN ARMOR

Vladimir Karnozov

The successful employment of the T-90A main battle tanks in the recent round of battles against the jihadists in Syria attracted attention of a few clients in Asia seeking to renovate their army arsenals. Vietnam, Iraq, Egypt and Kuwait have recently placed orders for several hundred units. India continues T-90S license production, while Indonesia is likely to place follow-on orders for the BMP-3F infantry fighting vehicle.

Together with U.S. and Germany, Russia is among the world's top three manufacturers of heavy armored vehicles. Historically, it began making road vehicles of 'iron-clad' type during the WW1. A hundred years from now, the epic moments of the October Revolution 1917 saw Bolsheviks leaders, with Vladimir Ulianov (Lenin) among them, using turrets of the armored cars to stand on while addressing revolutionaries and the mob with inspiring speeches.

First tanks in the Red Army's inventory were English and French examples captured from the invading foreign forces during the Civil War 1917-1923. Reverse engineering copies of the Renault FT-17 were followed by the MS-1 (T-18). It took part in clashes on the Chinese border in November 1929, making it the first case of the Russian tanks going into action in the Asia-Pacific region. The Soviet Union employed armor 'en mass' in the Battle of Khalkhyn Gol in August 1939 and then to defeat the Kwantung Army of Japan in Manchuria six years later.

Turkey became the first foreign country to import Russian-made tanks, taking 63 T-26s in 1935 along with 42 BA-3 armored cars also armed with 45-mm cannon. Shortly after, Mongolia procured a number of BA-6 and FAI armored cars and employed them in the aforementioned Battle of Khalkhyn Gol. The Soviets also supplied armor to the nationalistic government of Chiang Kai-shek during so-called 'China Incident', and later on to Mao Zedong – led communists.

China was the first Asian country to set up local assembly of armored vehicles, initially from kits arriving from the Soviet Union. When relations between PRC and USSR deteriorated, the domestic industry continued making evolved designs without license, and using reverse engineering to copy more recent specimen. Today, China buys a lot of defense products from Russia, but not armed vehicles, in whose domain the local industry has attained self-sufficiency.

The North Koreans employed 150 T-34 tanks to ram towards the southern end of the peninsula, which triggered a bloody war involving U.S. troops, Chinese "volunteers", Soviet MiG pilots and advisors. These days, DPRK deploys Russian-made armored vehicles and their clones in large numbers along the border with Republic of Korea, which, incidentally, also has Russian-made tanks. At the turn of the century RoK procured 80 T-80U/UK MBTs, 70 BMP-3 infantry fighting vehicles and 33 BTR-80A armored personnel carriers.

Vietnam

This country is another longtime customer for Russian equipment in the Asia-Pacific region. Viet Cong received thousands of Russian and Chinese made tanks and self-propelled howitzers during the war against the Republic of Vietnam and the U.S. Army that supported it. A T-54 tank ramming fence into the Independence Palace in Saigon in April 1975 remains the symbol of the North's victory and the reunification of the country that followed.

Until recently, the Vietnamese People's Army (VPA) was Ok with the armor it has inherited from these glorious days. Only last year it began looking for options to renew the outdated and worn-out arsenal. According to various sources, VPA runs about four hundred T-54/55/62 MBTs acquired from Soviet Union and three hundred T-59s, which are essentially Chinese-built T-55s. The Vietnamese also have hundreds of light tanks, primary PT-76s and their Chinese clones Type 63.

The Indian army made in principle decision for the T-90S as its future MBT in 1999. Russian specimens proved their merits on the Indian soil in the desert conditions. The trials involved replacing of an engine using a palm tree as an improvised crane. The customer was impressed, but not completely satisfied. It asked for the original fire control system to be improved through installation of French items including the Thales Catherine-FC (or -XG) thermal imager. At the same time, it demanded to remove the Shtora-1 countermeasure suite.

Hanoi spent little time considering clones of the T-72 MBT, including Polish and Chinese versions, before making the decision in principle in favor of the more recent T-90SK. These would be purchased new from the UralVagonZavod (UVZ). First news of Hanoi's interest in the T-90 acquisition came over a year ago. That time Moscow-based wire agencies reported about the intended foreign customer going to buy 'up to a hundred pieces'. In brief encounters with the media members, UVZ CEO Vladimir Roschupkin confirmed that talks were in process, but stated that, as of that time, a deal had not been struck yet because of pricing issues. The negotiating process is ongoing. [This intended order is] a medium quantity for us… up to a hundred. [The Vietnamese] want big discounts… to pay much less than we charge". He further collaborated that changes to the factory standard model shall be discussed after the sides come to terms on pricing.

Rumors about new orders for the T-90 emerged after UVZ's official website inadvertently put on display a classified Year 2016 Report to shareholders. Even though the document was quickly removed from the free-access area, the most interesting bits from it were reproduced by local and international news outlets. Useful information included a statement about two fresh foreign orders, one for 64, and the other for 73 MBTs. Local journalists figured out the first customer to be Vietnam, and second Iraq.

Soon after, the contract with Iraq was confirmed by a number of sources, including Vladimir Kozhin, Putin's advisor on military-technical cooperation with foreign countries. As per the second customer, a confirmation on it is yet to come from the official channels. A number of news outlets reported about the deal having been finalized, referring to unanimous sources in Moscow and Hanoi. The value of the deal is estimated at U.S.$ 250 million. Should Vietnam indeed go forward with the T-90 order, it will become the second user of this MBT in the Asia-Pacific.

Other users

Malaysia was offered, but refused the T-90 in favor in favor of the cheaper PT-91M Pendekar made in Poland. Derived from the T-72, it went to the customer in about fifty copies in 2010. Those who could not resist such proposals from Moscow include Turkmenistan and Uganda 44. They took 40 and 44 units respectively in 2009-2011. Algeria signed for an initial batch of the T-90SA customized version in 2006. With a follow-on order in 2011, it ordered over three hundred pieces worth in excess of one billion U.S. dollars. Plans calls for increasing the number up to half a thousand, including 200 to be assembled domestically. Egypt has been seeking to establish a T-90SK local assembly line using UVZ kits. Azerbaijan has acquired about a hundred such tanks. Baku holds an option to double the initial firm order, and may execute it any time soon.

Meantime, an initial batch of the T-90M is undergoing operational trials. Outwardly, this version differs in having a big ammunition storage box aft of the turret. It comes with a more powerful engine (1130hp) and a more cannon (2A82-1M in lieu of the 2A46M). Subsequently, the weight rose to 47 tons. Precision firing is provided by the Kalina fire control system. The T-90M shares a number of innovative solutions with the T-14 Armata first shown publically in a prototype form two years ago. In addition to buying a quantity of the next-generation tanks, the Russian land forces have also ordered modification work on four hundred T-90As to bring them to the T-90M level. They will receive additional shielding as well as Afghanit and Malachite dynamic protection suites to better withstand hits by cumulative weapons.

The T-90A modernization program follows that of the T-72B into the B3 version. The Russian land forces have placed repeated orders for the T-72B3s complete with the Sosna-U fire control system and improved explosive reactive armor (ERA). The data sheet for a specimen displayed at ARMY'2017 indicates the particular example comes with the [overhauled] 840-hp V-84M motor (as compared to 780hp on standard T-72/A/M). At the same time, in March 2016, UVZ won contract worth Rouble 2.5 billion to turn 150 tanks into the B3 version. The work shall involve refurbishment with the V-92S2F supercharged diesel developing 1130hp (as on the T-90M) and installation of the modern Relikt reactive armor bricks instead of the older Kontakt-5 ERA. Many foreign T-72 operators are likely to go for a similar modernization package, as some have already committed to.

Syrian experience

A recent splash of interest in the T-90 can be explained by the recent combat experience obtained by the forces supporting the central government in Damascus. The Syrian Arab Army received several dozen T-90As as part of a larger support package from Russia in 2015. Some of them went to Iran-sponsored Shia Muslim militants, albeit are likely to be manned by SAA crews attached to the Fatimiyun and other tactical groupings. Since the T-90A is considerably better protected against modern anti-tank weapons than any other armored vehicle in the pro-government forces inventory, even a small quantity of such tanks enabled the Syrian Arab Army to turn the tables in the six-year-long war. First successful employment took place early last year when the T-90As smashed the rebels' defenses northwest of Aleppo city to relieve siege on Shia towns of Nubl and Zahraa. The most recent combat use of these tanks took place in the October 2017 battle for the city of Mayadeen in the Euphrates river valley and for Damascus suburb Guta in February 2018.

In the process the T-90A demonstrated the ability to withstand hits by rocket propelled grenades and even ATGM, including the six-inch-caliber missiles of the U.S.-made TOW-2/2A ATGM. Admittedly, two machines were crippled (one got its turret jammed and tracks torn out) and abandoned by the crews in the battlefield. Subsequently, both were restored into a limited operational condition by the rebels. Tahrir-al-Sham (former Al-Nusra Front, al-Qaeda's Syrian branch) employed both in the September offensive towards Hama, during which one was destroyed by an armor-piercing discarding-sabot fired by a Syrian T-72M, and the other by the Russian airpower. In another interesting

As part of the license agreement, the Indian industry has been manufacturing 125-mm cannons and ammunition to them. There have been several deals between New Delhi and Moscow on this matter, with the more recent having been successfully implemented by Tecmash Holding. The generals prefer Russian products or their licensed copies because streamlined production ensures high quality of projectiles, which is not always the case with these of the local make. In 2014 the Indian press reported that New Delhi applied to Moscow for urgent sale of some 66 thousand fin-stabilized armor-piercing discarding-sabot pieces. In addition to those, the Bheeshma can fire the 9K119M Reflex (also known as the 3UBK Invar) laser-beam-riding missiles. Media reported that the government purchased ten thousand missiles from Russia along with the license production rights for fifteen thousand more. These will be made at a Bharat Dynamics factory as part of a larger deal with Russia signed in November 2012. Later, reports emerged that a deal was struck on an improved missiles called Mango.

development, the Syrian tanks began firing the 9M119M Reflex barrel-launched missiles to defeat enemy armored vehicles at large distances, up to five kilometers. Combat use of such expensive laser-beam-riding weapons had not been detected in the theatre until earlier this year.

It is believed that the generally successful T-90 combat employment in Syria prompted Iraq and Vietnam to finalize their orders. Shipments to Iraq of the T-90S main battle tanks along with BMP-3 infantry fighting vehicles commenced in February 2018. Kuwait is also looking to procure about 150, while Egypt is negotiating license production. Iran has also expressed an interest in manufacturing the T-90 at the Bani-Hashem Armor Complex in Luristan, where some 300 T-72S tanks were assembled in the late 1990s (in addition to 122 purchased directly from Russia). Earlier this year Iran demonstrated the Karrar MBT bearing a feasible resemblance to the T-90M. It may well be a localized version of the Russian specimen with some insignificant design changes.

Indonesia

Indonesia has placed new orders for Russian equipment in February 2018. As of this time, confirmation has come on 11 Sukhoi Su-35 multi-role fighters. Jakarta is also expected to go for a follow-on purchase of the BMP-3F infantry fighting vehicles. In May 2012, the customer signed contract worth U.S.$ 114 million for 37 such machines. Deliveries commenced the following year. The customer executed options to bring the grand total of IFVs procured so far to 54. All are in service with the Indonesian marines. The customer is expected to raise the figure up to one hundred.

The latter 'F' in the suffix stands for 'Flot' (Russian for 'Navy'). This version differs from the factory standard in having a larger buoyancy, as well as stability and controllability when afloat. It is optimized for use by the marines in the coastal areas. Provision has been made for the vehicle to move on water surface for hours and fire with 100-mm and 30-mm cannons when afloat. For accurate firing, the BMP-3F features a new optical sight with built-in laser rangefinder able to illuminate target for barrel-launched ATGM. At LIMA'2017 director for international cooperation and regional policies with Rostec Corporation Victor Kladov told DRA that Rostec member Tecmash will see to production of munitions in Indonesia, including 30-mm rounds and, possibly, 100-mm shells for the BMP-3F.

It is interesting to note that the BMP-3F was developed specially for the aforementioned Asian customer. Such IFVs can be carried by the Makassar class landing platform docks of the local make, built by P.T. PAL Indonesia in Surabaya as well as smaller tank landing ships of several classes. Anticipating more orders, the Russians have developed the BT-3F armored personnel carrier on the same chassis.

Factory standard BMP-3s are in service with Shi Lanka (45 pieces). Myanmar has been mentioned among potential customers. Elsewhere else in Asia, Kuwait has bought nearly two hundred and United Arab Emirates about six hundred, of which at least one was lost during the ongoing hostilities in Yemen. Turkmenia operates a tiny number. Azerbaijan has one hundred on order, with shipments are soon to complete. Other operators include Cyprus, Venezuela and Algeria, with about three hundred units combined.

Russia itself operates about half a thousand copies, most built in the time of the Soviet Union. After a long break, shipments have resumed under an order for over 200 such machines in a new configuration. Wire agencies reported about "at least 22" pieces having been delivered last year to the army units stationed on the western border. Besides, Moscow is likely to re-export most of the seventy BMP-3s sold to Republic of Korea at the turn of the century. If such a plan materializes, these will be refurbished and pressed into service.

At ARMY international military-technical forums in Kubinka near Moscow, held on an annual basis starting in 2015, the Russian industry exhibited several BMP-3 versions. Some regain the 100-mm 2A70 and 30-mm 2A72 cannons, while others feature a 57-mm automatic gun or 125-mm 2A75 smoothbore cannon. The most recent version, the Dragun, features a re-arranged layout with the engine and gearshift moved forward to improve habitability for the infantry in the rear of the hull. This model features a more powerful UTD-32 turbocharged diesel producing 816hp instead of 500-660hp motors on earlier models.

The Indian dilemma

Attaining self-sufficiency in weapons was the national objective set by Jawaharlal Nehru, the first prime minister. Successive Indian governments have been trying to make it happen. At the same time, the ways of practical applications of that core idea appear to be patchy. There are many examples of the Indian weapons systems whose development ran into technical difficulties, experienced cost overruns and lagged behind original schedules.

One of such programs is the Arjun-1 MBT and its further evolution the Arjun-2. The former was built in less than 250 copies, the latter is said to be in a low-rate production. This effort has been aimed at developing national skills in the tanks, and, if necessary, providing a viable alternative to offers from Moscow. As it appears today, the Arjun series is no more than a supplement to the Russian mainstream products.

Meantime, New Delhi is preparing to launch an international competition for a next generation MBT that would go after the T-90S known locally as "Bheeshma". This endeavor is at the very early stage. It is speculated that the new tank would be produced by a public enterprise, but instead offered for manufacture to the burgeoning private sector. Larsen & Toubro, Tata, Mahindra and Reliance are among privately-held companies that are seeking ways to grow their defense businesses. The private sector producing tanks would mean a radical departure from the previous experience.

A lot riskier option is to continue producing Russian-origin tanks at the government-owned Heavy Vehicles Factory at Avadi in the southeast state of Tamil Nadu. Meantime, this enterprise continues license production of the T-90S under the framework agreement between New Delhi and Moscow signed in 2001 and renewed in 2006. It contains rights for assembly of a thousand tanks with gradual localization, the respective deal worth U.S.$2.5 billion.

The Indian army has already received over a thousand T-90S MBTs, a combination of Russian examples and local copies. New Delhi has plans to ultimately increase the number to two thousand units. Under the

Indo-Russian cooperation in the sphere of equipment for land forces commenced in 1963 with a package deal that included 178 PT-76 ambitious light tanks. Deliveries commenced two years later, just in time to enable the type take part in the 1965 war with Pakistan. Three hundred T-54 main battle tanks ordered on the eve of that war arrive after the hostilities came to an end. The PT-76 proved its merits in the mushy lands of Bangladesh, offering the advancing Indian infantry a meaningful technical advantage over the Pakistani troops with their M-41 Walker Bulldog light tanks of the U.S. origin.

GLOBAL MILITARY MARKET

commitments already made, the production line at HVF is loaded to capacity through to 2020. After that point, it may shift to the more modern T-90MS undergoing operational trials with the Russian army.

Historic background

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Unhappy with slow output of the British-designed, Indian-made [Vickers] Vijayanta MBTs, the government purchased 225 T-55s from the Soviet Union for delivery in 1968-1971, and 650 more by 1975. Over six hundred T-54/55s were acquired in Poland and Czechoslovakia where they were produced under license. Throughout 1990s a thousand of these tanks underwent modernization locally under the Gulmohar project centering on rearming them with the Royal Ordnance L-7A 105-mm cannon.

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In 1977 New Delhi placed an initial order for the T-72 MBT, initially seventy pieces, for delivery during the next two years. Having assessed them, the Indian army requested more of those. The intergovernmental agreement that followed called for six hundred T-72Ms to be delivered from Soviet Union staring in 1982 and more such assembled locally. Production would be established at the Heavy Vehicles Factory in Avadi near Madras that previously made the Vijayanta.

Upon a major reconstruction, HVF began assembly of the T-72M under the name of Ajeya, initially using parts from UVZ. The first one assembled from a complete kit rolled out in January 1988, followed by "localized" examples two years later. In March 2002 the number of Ajeya tanks exceeded that of the Russian origin (eleven hundred with follow-on orders included). The grand total came to thirteen hundred by 2007. At this point the factory ceased T-72M production but continued a go-slow output of its chassis for specialized vehicles. As part of the license deals, the Indian industry mastered production of diesel engines for MBTs and IFVs (with production run exceeding ten thousand copies) and smoothbore cannons of the 125-mm caliber.

Bheeshma

The Indian army made in principle decision for the T-90S as its future MBT in 1999. Russian specimens proved their merits on the Indian soil in the desert conditions. The trials involved replacing of an engine using a palm tree as an improvised crane. The customer was impressed, but not completely satisfied. It asked for the original fire control system to be improved through installation of French items including the Thales Catherine-FC (or -XG) thermal imager. At the same time, it demanded to remove the Shtora-1 countermeasure suite.

The manufacturer answered with the Item 188S of the 2001 origin powered by the V-92S2 developing 1000 hp. This motor was created by supercharging the original V-84MS V12 diesel producing with 840hp. India procured 657 tanks in two batches from UVZ including 223 in a knock down form for assembly in Avadi. The customized version of the T-90S is referred to as Bheeshma.

The local assembly line started functioning in 2009 initially using Russian kits. Under the framework agreement, HVF would produce a thousand copies. As of 2014, India had some 900 Bheeshma tanks in service. About that time a number of improvements were introduced, including replacement of the Kontakt-5 Explosive Reactive Armor (ERA) with the Kanchan composite armor, and installation of Israeli Kinetics environmental control system to cope with desert conditions. More recently, the Indian government approved in principle the army request for purchase of additional 464 tanks corresponding to the T-90SM standard.

As part of the license agreement, the Indian industry has been manufacturing 125-mm cannons and ammunition to them. There have been several deals between New Delhi and Moscow on this matter, with the more recent having been successfully implemented by Tecmash Holding. The generals prefer Russian products or their licensed copies because streamlined production ensures high quality of projectiles, which is not always the case with these of the local make. In 2014 the Indian press reported that New Delhi applied to Moscow for urgent sale of some 66 thousand fin-stabilized armor-piercing discarding-sabot pieces. In addition to those, the Bheeshma can fire the 9K119M Reflex (also known as the 3UBK Invar) laser-beam-riding missiles. Media reported that the government purchased ten thousand missiles from Russia along with the license production rights for fifteen thousand more. These will be made at a Bharat Dynamics factory as part of a larger deal with Russia signed in November 2012. Later, reports emerged that a deal was struck on an improved missiles called Mango.

Sarath

New Delhi purchased over a thousand of used BRDM-2 recce vehicles, BTR-152, BTR-60P and BTR-50 armored personnel carriers in the 1970s. These were the last such vehicles of the Russian origin to enter service with the Indian army, not counting 112 9P148 combat machines on the BRDM-2 chassis armed with Konkurs/Fagot ATGM. Indian army has procured these missiles in tens of thousands including both locally made and imported.

At the same time, India placed repeated orders for infantry fighting vehicles. Starting in 1976, it took 745 BMP-1s. In 1984 New Delhi and Moscow entered an agreement on the license production of the BMP-2. Local assembly line was established at the Ordnance Factory Medak (OFMK). It began functioning in 1987, and during the next four years the level of localization rose to 90%. Locally made IFVs are called Sarath. Production run through to 2014 exceeded fifteen hundred, when a follow-on order for over half a thousand was placed. The Indian army is seeking to upgrade in-service IFVs with more powerful engine (350-380hp instead of 285hp currently) so as to improve cross-country mobility.

While the Sarath production continues, the Indian specialists are developing the Abhay next generation IFVs with sandwich-style armor (with layers of ceramics, sand and other materials in between) for better protection against modern anti-tank weapons. If that project fails as many other pursuing "home-grown" products with the desired performance at the world's best level, the government is likely to go again for a Russian product. /RA&MG/

Under the auspices of the
PRESIDENCY OF THE
REPUBLIC OF TURKEY

Dear readers,

Although the aviation industry is susceptible to the vagaries of the global economy it is still able sustain its dynamism owing to its openness to international trade and competition. This first began with the unipolar new world order that emerged several decades ago, and which enables the discovery of new regions that offer new opportunities for the aviation industry.

In this regard, Turkey is situated in a geopolitically strategic position. As is the case in all other areas of trade, Turkey also serves as a bridge between the aviation industries of the West and the East. While the global aviation industry's growth rate has been 5 per cent in the last 13 years, Turkey's aviation industry achieved 15 per cent growth during the same period. Moreover, Turkey is still far from reaching its saturation point in the aviation industry.

Once the Istanbul's third airport is completed in 2018, this investment will become a hub for global air traffic, as the world's largest airport. The airport, which will offer employment opportunities for 225,000 people, is expected to host 3,500 flights and 200 million passengers annually.

"The Eurasia Airshow brings together Global Aerospace Industries' brands and their executives in Antalya, Turkey."

Taking advantage of high potential and the developments in the Turkish aviation industry and its region, we are adding a new air show to the premiere league of international exhibitions.

The Eurasia Airshow, which will be Turkey's first biennial international commercial and military aviation exhibition, is preparing to bring together global brands and their executives in a massive event that will take place in Antalya between April 25 and 29, 2018. We expect the Eurasia Airshow to create a business volume of approximately $40 billion in the commercial and military aviation industry.

We are organizing the Eurasia Airshow under the high auspices of His Excellency President Recep Tayyip Erdoğan. Our aim is to make the Eurasia Airshow (Turkey's first show-based aviation event) one of the most important Turkish global brands in the international aviation industry, along with Turkish Airlines and Turkish Aerospace Industries.

"Eurasia Airshow brings together aviation giants of the West and East."

We will hold the Eurasia Airshow in Antalya, which is Turkey's most popular tourism destination, and one that hosts very important events, such as the G-20. At the Antalya International Airport _ which, with its enormous size and tremendous infrastructure, is one of Turkey's three busiest airports _ there will be a 50 square metre indoor area, 65 chalets, and a static display area for 100+ aircraft with a total area of 300 square metres. At the Eurasia Airshow, our aim is to host 150 military and civil delegations, 100,000 professional visitors and more than 400 distinguished companies plus many airlines and aircraft maintenance companies. Alongside the airshow there will be an aerospace summit which already has 12 senior airline executives confirmed as speakers.

The air show will serve as a business development platform, where the aviation products of our country, as well its partnerships and business models in this field, will be introduced. Furthermore, all parties concerned will come together to talk about business, learn about each other's capabilities, and establish business contacts.

The Eurasia Airshow will also be a platform that will be attended by the industry's decision makers, the producers of commercial and military aircraft, sub-components and systems.

We are honoured to invite you to attend the Eurasia Airshow, as our guest, which will be a gathering point for the aviation industries' key players, from West and the East.

Ferhat Yenibertiz
CEO of Eurasia Airshow

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PRESIDENCY OF THE
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UAC, RUSSIA

High prospects in the civil and military segments

The United Aircraft Corporation (UAC) is the major Russian aircraft manufacturers and one of the biggest in the world. This Corporation unites more than 80 per cent of design and production assets of Russian aircraft industry. She also manages all key and most promising programs of development of the industry. UAC, which under one company represents the most well-known Russian aviation brands such as Sukhoi, MiG, Tupolev, Yakovlev and others, is today one of the world's biggest manufacturers and suppliers of aircraft.

Thanks to the success of its products UAC is one of the world's leading aircraft manufacturers. UAC's revenues have been lately growing on average more than 30% per year. Sukhoi Superjet 100 civil airliners, Su-30 and MiG-29 fighters, Yak-130 operational trainers are among the most popular aircraft exported by UAC. The document received by UAC is to much more simplify foreign market procedures, which is good news for present-day and future UAC's partners worldwide.

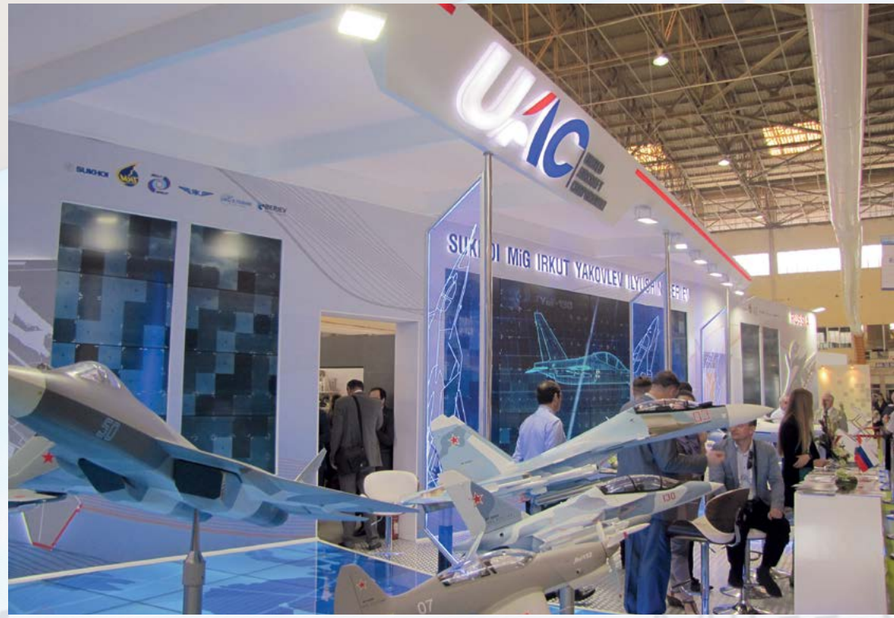
Moreover, one year ago as part of an effort to expand foreign presence UAC was given a military-dedicated foreign trade license to be implemented on a direct basis. The military-dedicated foreign trade license has been issued by Federal Service for Military and Technical cooperation. This helps UAC improve maintenance and repairs of equipment previously delivered abroad, which includes every Su, MiG, Il, Yak and Tu airplanes.

Alongside with the right for direct maintenance and repairs of the equipment previously delivered abroad, the document also specifies UAC's capabilities to update such equipment and train foreign personnel to maintain and repair UAC products. Besides, the license authorizes UAC to establish joint ventures abroad which can maintain and repair aircraft.

The license enables UAC to proceed to coordinated efforts in this area, develop a single enterprise after-sale service system based on current experience and ensure the most efficient activities at markets with several brands available.

The new capabilities confirm there is a steadily growing demand for UAC aircraft. Moreover, operational reliability and relatively low prices become increasingly significant. In this regard there is a reasonable increase of export of Russian aircraft having better reliability, up-to-dateness and well-balanced prices both for airplanes and further maintenance.

According to experts, it is Russian aircraft which in terms of life-cycle cost appear today as the most attractive in international markets.



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UAC products include many aircraft which are proven international bestsellers. Thus, Su fighters exported by Russia number in the hundreds making these fighters come second and first worldwide. In 2011-2014s Su planes were the first in amount: in four years customers have received 139 aircraft, while Lockheed Martin delivered only 89 and Boeing delivered 60 planes.

UAC places big stakes on supplying fighter planes given that many countries plan to have their aircraft fleets upgraded. Among the most world popular planes is Yak-130 operational trainer which has been already delivered and being deliv-

However, Russian aviation export is notable not only for military aircraft. In recent years rather good results have been shown by civil segment for which UAC has been making big plans. Among Russian civil aircraft the Sukhoi Superjet 100 regional aircraft of a new generation is the most popular at foreign markets. The aircraft combines new aircraft engineering technologies, passenger convenience, significant economic advantages for airlines, proper environmental specifications.

ered to many countries. This is a top-class aircraft. It can be upgraded as a light fighter or close support plane which is highly demanded by Indian Air Force.

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The key advantage of Sukhoi Superjet 100 is lower operational costs as compared to its 100-seat competitors. Operational costs are minimized due to higher fuel efficiency and lower take-off weight. According to the aircraft operation study, its ownership cost is averagely 15-20% lower than the other similar class aircraft. The highly competitive lease rate supported by a state guarantee of depreciation value is also worth being taken into account.

SSJ100 capable of carrying 98 passengers is the first in its class aircraft featuring five-across seating, with big 32 inch distance between seats. Thanks to a combination of wider seats and higher cabin (over 2 meters) SSJ100 has more cabin space and bigger stowage bin capacity than such of competitors. The airplane has been built with the use of the latest design procedures and technologies by leading manufacturers such as French Snecma (engines) and Thales (avionics), US Goodrich (wheels) and Honeywell (APU). The interior has been designed by Italian office Pininfarina. In February 2012 the aircraft was certified by European Aviation Safety Agency (EASA).

According to UAC President Yuri Slyusar the Corporation has stable rate of mass production of Sukhoi Superjet 100. There are plans that every year more than 30 such aircraft shall be delivered to customers. Today about one hundred SSJ100s are being operated including those in other world regions, from South America to Southeast Asia.

Currently with available manufacturing capacities UAC enterprises are capable of producing up to sixty Sukhoi Superjet 100 per year. The Russian aircraft sparkles profound interest in Southeast Asia and Latin America. Experts confirm that in the context of 70-100-seaters this aircraft is becoming the most attractive for many international airlines. When interviewed Yuri Slyusar says UAC is intended to focus on further development of the Sukhoi Superjet 100 aircraft family to offer customers a range of regional planes.

It is worth noting that today a business jet version of the SSJ100s is also available. Following the results a number of measures, including auxiliary fuel tanks installation and other engineering solutions the range of the business version of the SSJ100 is increased to about 8,000 km-long nonstop flight.

At the Dubai Airshow 2017, which was held from November 12 to 16 in Dubai, United Arab Emirates, The United Aircraft Corporation became one of the major exhibitor. UAC had a strong presence at the show with an extensive product lineup at the show's static and aerial displays.

The Corporation demonstrated its Sukhoi Superjet 100 aircraft with a VIP interior, a premiere for the Middle East is the participation in the show's flying programme of the Su-35C supermaneuverable 4++ generation fighter. The static display was also host a Be-200ES multipurpose amphibian and an Il-76 heavy transport aircraft.

The region's airlines have established very high comfort standards. The Sukhoi Superjet 100 aircraft as well as the new Russian MC-21 aircraft family that was showed at the UAC's stand both demonstrate an optimal combination of commercial effectiveness and maximum passenger comfort. The Sukhoi Superjet 100 in its VIP configuration enjoys high demand – 8 aircraft have been delivered to customers to date. After a number of enhancements such as installation of additional fuel tanks and other system improvements the flight range of the VIP-version of the Sukhoi Superjet 100 was increased to 7,000 km that should satisfy the needs of most demanding customers.

Middle East customers also show interest in the Be-200ES multipurpose amphibian that, considering the region's geographic and climatic features, can be used in a number of unique configurations. The Be-200ES capabilities allow using the aircraft with maximum effectiveness and flexibility.

The show's flying programme was also brightened up by the "Russian Knights" aerobatics group on their new supermaneuverable multifunctional Su-30SM fighters that were supplied to the group in late 2016. Before that the group that was created in 1991 was using Su-27 and Su27UB fighters.

The Middle East is one of the most important regions for promotion of UAC's civil product lineup. According to the UAC's Market Outlook the region's average annual growth rates of passenger air transportation in 2017-2036 will be around 6%. In the long term the demand for new aircraft will be largely made up of narrow-body aircraft with more than 120 seats and wide-body aircraft. The total demand for aircraft by the airlines of the Middle East is forecast at 2,975 units for the next 20 years.

The demand for UAC's military product lineup is stable, however, lately, the interest in the world and in the Middle East in particular has risen considerably after successful performance of such aircraft as the Su-35C, Su-34, Su-30SM and MiG family fighters in real combat missions. Russian-made aircraft have once again proven their high combat effectiveness and flight and technical characteristics. /RA&MG/

INTERNATIONAL AEROSPACE, MILITARY, NAVY AND TECHNOLOGY GUIDES IN 2018

	Release dates	Additional distribution
'RA&MG' №01 (19)	March 09th	**DIMDEX 2018** (12-14.03.2018, Qatar, Doha)
'RA&MG' №02 (20)	April 10th	**DEFEXPO INDIA 2018** (11-14.04.2018 Chennai, India)
'RA&MG' №03 (21)	April 23th	**Eurasia Airshow 2018** (25-28.04.2018, Turkey, Antalya)
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'RA&MG'№04 (22)	May 04th	**SOFEX 2018** (08-10.05.2018, Jordan, Amman)
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'RA&MG'№06 (24)	August 20th	**ARMY-2018** (21-26.08.2018, Russia, Moscow)
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'RA&MG'№11 (29)	October 15th	**Future Forces 2018** (15-19.10.2018, Czech, Prague)
'RA&MG'№12 (30)	October 22th	**EURONAVAL 2018** (23-26.10.2018, France, Paris)
'RA&MG'№13 (31)	November 05th	**Airshow China 2018** (06-11.11.2018, Zhuhai, China)
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'RA&MG'№24 (42)	December 01th	**EDEX 2018** (03-05.12.2018, Egypt, Cairo)
'RA&MG'№25 (43)	December 03th	**Expo Naval 2018** (04-07.12.2018, Valparaiso, Chile)

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

The 'Russian Aviation & Military Guide' magazine subscription can be ordered after any issue of the magazine with the delivery anywhere in the world. The price of any one issue of the magazine is $8,88 plus the cost of postal delivery.
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MINISTRY OF DEFENCE
OF THE RUSSIAN FEDERATION

ARMY

INTERNATIONAL MILITARY-TECHNICAL FORUM "ARMY-2018"

21–26 AUGUST
PATRIOT EXPO

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