

RUSSIAN AVIATION & MILITARY GUIDE

Special analytical export project of Industrial Weekly

№ 06 (07) November, 2016

BRICS summit

*Strategic partnership is
a key of organization*



Military cooperation

*Russia retains leading
position*



Famous missile R-73

*A masterpiece of defense
from Russian 'DUX'*



Against any tanks

*The best in the world
multipurpose system*



Special partnership
AIRSHOW CHINA 2016

HIGH-PRECISION WEAPONS IN RUSSIA AND IN THE WORLD

ВЫСОКОТОЧНОЕ ОРУЖИЕ в России и в мире

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EDITORIAL



Defense partnership for peace

Political situation in the world makes nations once again reconsider their defense possibilities. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and 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 (in air too), solid after-sales service and proven reliability of products, Russia is honest and friendly partner for all countries, which ready for mutual work. Successful cooperation with Chinese partners confirms this.

Valeriy STOLNIKOV

[Special international analytical project]

SINO-RUSSIA CO-ENGINEERED HEAVY HELICOPTER

A heavy-lift helicopter jointly developed by China and Russia made its debut in China. On display at the Tianjin International Helicopter Exhibition, the chopper is specially designed to suit China's geographical conditions, and can operate smoothly at high altitudes and temperatures, said Huang Chuanyue, deputy chief engineer with the helicopter division of the Aviation Industry Corp. of China. With a maximum cruising speed of 300 km/h, and the ability to take-off carrying 38.2 tonnes, it can carry excavators, cargo containers and light tactical vehicles, Huang told Xinhua. China and Russia on May 8 signed a framework agreement agreeing to take the project to the next stage, which specified that all future models will be manufactured in China, Huang said. These heavy-duty helicopters will be used in rescue and disaster missions, as well as maritime affairs, Huang said.

FIRST OVERSEAS OFFICE IN CHINA

JSC Sukhoi Civil Aircraft (SCAC) announces the company's plans to open its first overseas client liaison office. Beijing office is the first step taken to implement the business strategy focused on the brand's global marketing and setting up corporate offices in other key markets. Beijing office, scheduled to be opened by the end of 2016, will specialize in marketing, promotion, certification and arrangements for financial support of Sukhoi Superjet 100, Sukhoi BusinessJet and SportJet by Sukhoi aircraft sales. Objectives set for the liaison office will also include the creation of maintenance depot, as well as the projects related to industrial cooperation with Chinese companies. The client liaison office will be building up relationships with local leasing air companies and carriers. SCAC's first overseas office will be headed by Mr Lee Li who has more than 15 years of professional experience in the aviation industry and has held executive positions in such companies as Embraer, General Electric Aircraft Engine, Sparkle Roll Aviation Group, etc. The Chinese office will report to SCAC's headquarters in Moscow. Launch of SCAC's first overseas office is the first step taken to implement the brand's global marketing strategy. In the years to come SCAC plans to open a number of new client liaison offices in other key markets.

俄罗斯直升机集团公司的设备为G20高峰会的 消防安全保驾护航

2016年7月由俄罗斯直升机集团公司下属的Rosvertol直升机厂生产并于2016年7月向中国供应的米-26TC号大型运输直升在举行G20高峰会的浙江省参加了三次灭火行动

米-26TC型是由中国Lectern Aviation Supplies公司购买,用于满足山东省森林保护与扩大项目的要求。该型直升机一到中国就开始执行灭火、设备和超大货物运输等工作,并用于保证九月初在浙江杭州举行的G20高峰会的消防安全。

米-26TC在2016年9月值班时熄灭了浙江省林区和山区内的三处起火点。其中一处起火点位于居民点附近。借助于这台巨大的直升机,中国的消防队成功阻断的火势向居住建筑物的蔓延。米-26TC直升机在两个小时内扑灭了森林火灾,期间共倾倒的120吨水。直升机上的官兵也因此行动的高效及出色表现得到了省政府领导班子的表彰。目前这台直升机在山东省值班。

俄罗斯直升机集团公司营销和业务发展副总经理亚历山大·谢尔彼宁表示,“保证举行政府首脑级活动区域的安全时很重

要的任务。俄罗斯制造的直升机能够有助于实现这个任务,使我们非常高兴。中国时我们在亚洲市场的战略伙伴,我们继续实行一下有前途的共同项目”。

除了Lectern Aviation Supplies所购买的新台Mi-26TC外还有三台类似的直升机被中国国有和私有企业使用。两台Mi-26TC属于青岛直升机航空有限公司机队。另一台被中国飞龙专业航空公司使用。四台Mi-26TC都为中

国林业部值班,每年参与灭火行动。按照大多数专家的评价,在最近几年内米-26TC是中国航空业的最好的采购之一。具有中国航空业规定的证书的米-26TC直升机是唯一能够在机外或机舱内承载总重量达到20吨的负荷的直升机。世界上任何其他的直升机都比不上米-26TC的载重量。该型号直升机在熄灭中国的最大火灾时多次证明了

自己的效率。紧急救灾时米-26TC的主要任务是,把消防队员送到火灾中心并在着火的林区上倒水。米-26TC的特点包括高效率以及在任何天气条件和客观困难下的工作速度的准确性。

俄罗斯直升机集团公司是世界直升机制造行业的领先公司,俄罗斯唯一的直升机设计于制造公司。本集团在2007年建立。总部在莫斯科。集团包括五个直升机厂、两个设计局、直升机配件工厂、航空修理厂以及一家在俄罗斯国内外提供售后服务的服务公司。

集团的客户包括俄罗斯国防部、俄罗斯内务部、俄罗斯紧急部、俄罗斯天然气航空公司、UT Air等国家部门以及国内外的航空公司。在2015年,按照财务报表国际标准结算的俄罗斯直升机集团公司的进款达到2200亿卢布,同比增长为29,5%,发货总额为212台直升机。



MC-21 FUSELAGE — TO TSAGI FOR STATIC TESTS

Irkut Corporation delivered to Central AeroHydrodynamic Institute named after professor N.E.Zhukovsky (TsAGI) the MC-21 fuselage designated for static tests to confirm the strength characteristics of the new aircraft and to provide certification of the type for static strength. The MC-21 fuselage was delivered to Zhukovsky from Irkutsk by An-124 freighter. In the near future other parts of the airframe will arrive to TsAGI. In particular, Irkutsk Aviation Plant, a branch of Irkut Corporation where MC-21 fuselage was assembled, will hand over auxiliary power unit compartment. Irkut Corporation's specialists, together with the employees of TsAGI and cooperation companies, will perform airframe assembly. The first stage of the airframe test includes leaks inspection. Then TsAGI specialists will initiate static tests which include simulation of structural loads in all flight modes with registration of stress-strain state of the aircraft structure. The purpose of tests comprises experimental verification of static strength, checks of correctness of calculation methods of strength, and fine-tuning of the finite element models based on experimental data. TsAGI has already conducted tests of a large number of elementary and structurally-similar patterns, including several types of panels, cross and longitudinal joints. Tests of fuselage compartment, structurally-similar patterns of tail and fin box are being held. The preparation for the isolated testing of composite-made wing box, stabilising fin and high-lift device is being performed. Ongoing and planned tests are performed to verify the ability of the new MC-21 aircraft structure to perceive design loads without breaking and without receiving unacceptable permanent deformations.

NEW BATCH OF SU-34 FRONTLINE BOMBERS

The Sukhoi Company handed over another batch of Su-34 frontline bombers to the Ministry of Defense of the Russian Federation according to the 2016 State Defense Order. The aircraft took off from the V.P.Chkalov Novosibirsk Aircraft Plant's airfield and headed to the place of their deployment. At the present time the aircraft plant operates with maximum efficiency. The State Contract with the Ministry of Defense of the Russian Federation for supplies of the Su-34s to the Russian Air and Space Forces up to the year 2020 guarantees a stable work load of the Sukhoi Company for the coming years and identifies long-term development prospects. Currently, Su-34s operate successfully in the military and demonstrate high performance.

Russia and India Sign Agreement

The joint Russian-Indian enterprise must arrange the localization of production of 200 multirole Ka-226T for 9 years

The signing of the agreement on creation of the joint venture is part of the Russian-Indian summit. For Russia, the agreement was signed by Russian Helicopters CEO Alexander Mikheev and the head of Rosoboronexport Anatoly Isaikin. Both Russian Helicopters and Rosoboronexport are part of State Corporation Rostec. The Indian side was represented by the Chairman and Managing Director of Hindustan Aeronautics Limited (HAL) Suvarna Raju.

The signing of the joint venture marks a new stage of cooperation between Russia and India in the helicopter industry, which was first defined by the intergovernmental agreement between Moscow and Delhi in December 2015. In addition, the joint venture will become a pilot project for the Russian-Indian part of the Make in India program, which is implemented by the Indian government.

"The joint venture is certainly a breakthrough project for us, because it fundamentally changes the model of our cooperation within the helicopter industry. India has been one of our most important strategic partners. For the first time we are ready to offer our deep localization of helicopters, including the set up for production of various helicopter components and assemblies. I hope that the Ka-226T assembled in India has a great future in the world market," said Russian Helicopters CEO Alexander Mikheev.

"The joint venture for local production of Ka-226T is a profoundly new and substantial step in the development of cooperation between India and Russia. The fleet of Russian-made helicopters in India is over 400 units. But this is the first of such large-scale complex agreements for delivery and production of new helicopters in the amount of 200 units, which is fully in line with the Make in India initiative," said Sergei Chemezov, Rostec CEO. — In addition, over the next 5 years there will be facilities set up for maintenance and servicing of the produced helicopters. Therefore the agreement represents not just a contract for production but for full lifecycle support."



"The joint venture agreement signing is the result of long time work with our Indian partners. The production of Ka-226Ts is a Russian-Indian project within the framework of the Make in India program and is a logical continuation of great collaboration to create high-tech industries in India. We are proud that we were able to agree on all details on time and thus to launch this project, which, I am sure, has good prospects," — said General Director of Rosoboronexport Anatoly Isaikin.

Under the terms of the intergovernmental agreement, the joint Russian-Indian enterprise created by Russian Helicopters, JSC Rosoboronexport and India's HAL Corporation must arrange the localization of production and supply of 200 light multirole Ka-226T for 9 years. The first 60 helicopters will be produced in Russia, and the production of the remaining 140 helicopters is being planned in India. In addition to the assembly, the agreement provides for maintenance, operation, repairs and technical support cooperation.

The joint venture is set to create facilities for repairs and maintenance of helicopters produced in India in 5 years, and facilities for the overhaul within 7 years after deliveries of the first batch of helicopters.

The light multirole helicopter Ka-226T with a coaxial main rotor system has a maximum takeoff weight of 3.6 tons and up to 1 ton payload. The main distinguishing feature of the helicopter is its modular design. A passenger cabin can be easily installed onto the Ka-226T, which allows to transport up to 6 people, or it can be replaced with various special equipment modules. The helicopter is characterized by simplicity of operation, high precision hover, excellent maneuverability and handling, easy maintenance, and also by large power capacity and maximum safety. The Ka-226T's flight performance characteristics, its reliability and efficiency, as well as its advanced technical equipment, such as modern avionics and safety features, have all made it one of the best helicopters in its class.

YAK-152 TRAINING AIRCRAFT

The maiden flight of the Yak-152 initial training aircraft took place at the airfield of Irkutsk Aviation Plant, the affiliate of Irkut Corporation (a United Aircraft Corporation subsidiary). The Yak-152 aircraft has been developed by the Yakovlev Design Bureau. The new aircraft provides initial pilot training at any time, at day and night. The Yak-152 is designated for training pilots in flying techniques, basics of navigation, simple, complex, and aerobatic pilotage, as well as group piloting. The Yak-152 will allow mastering of instrumental flying along the route and landing approach with the use of airfield landing systems, as well as pilot's performance in emergencies. The Yak-152 aircraft will provide professional selection and training of young pilots in military and civil training centres, and aerobatic pilots in flight clubs. Serial production of this new training aircraft is unfolding at the Irkutsk Aviation Plant. Development and production preparation of Yak-152 are based on state-of-the-art Russian design solutions in small aviation.

SU-30SM FOR 'RUSSIAN KNIGHTS'

According to the Russian Ministry of Defence press service, a welcome ceremony of 'Russian Knights' pilots was held at the Kubinka airbase. Famous Russian aces flew four Su-30SM fighters from Irkutsk Aviation Plant, an affiliate of Irkut Corporation. At the airfield pilots were met by the Russian Aerospace Forces commanding officer and aviation industry representatives. Colonel-General Viktor Bondarev, the Chief of the Russian Aerospace Forces, congratulated 'Russian Knights' team on occasion of receiving new Su-30SM fighter aircraft. 'Today you've got state-of-the-art fighters of 4++ generation, which confirmed their characteristics in combat units, and while performing combat missions,' — V. Bondarev said. According to him, in the next 10-15 years 'this aircraft will not be equal to other aircraft in the world.' V. Bondarev mentioned: 'Every year we buy 20-24 of these fighters annually.'

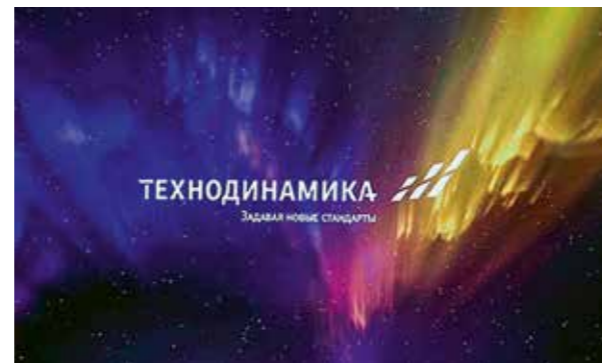
By the end of 2016 Irkut Corporation will deliver the second batch of 4 Su-30SM fighters to 'Russian Knights'.

Aviation Service Center Branch in Africa

To provide African operators of Russian aviation equipment with components, Technodinamika holding company intends to open an Aviation Service Center branch in Africa. The Maintenance and Repair Center is slated to open in 2018. Deputy General Director of Technodinamika's Innovations, Development and Sales, Alexander Litvinov addressed this issue at the African Aerospace and Defense 2016 International Exhibition of defense, aerospace and safety technologies. By 2020 the holding company's overseas maintenance service earnings will reach RUB 1 bln.

'At the first stage, the Center will render services on the detection and reception of aviation component. A parts warehouse will be organized in the same place. At the second stage we localize air component repair in Africa, making it possible to significantly expedite the servicing of aircrafts, — the Deputy Head of Technodinamika stated. — According to our strategy, as early as in 2020 the holding company's maintenance service earnings outside of Russia amounted to nearly RUB 1 bln. In addition, our presence in this region will increase the competitive position of Russian machines in the eyes of potential customers.'

There are plans for the Center of Technodinamika to cover customer demand for the service of Russian-made



aircrafts operating in Africa and the Middle East. More than 1,000 such aircrafts are being operated in Africa alone.

The most required consumables and frequently failing non-repairable items will be stored in the warehouse. Wheels and brakes, electromechanisms, starters, sensors, heaters and ground

equipment are planned to be repaired on site. The others will be shipped to the manufacturer plant for repair. We remind readers that the Technodinamika holding company has already opened its Aviation Service Center office in India, as well as announced the opening of its Aviation Service Center in Latin America.

KRET has placed in the Top 100

The Radio-Electronic Technologies (KRET) concern, a part of Rostec Corporation, took 48th place out of the top 100 largest global military industrial companies, which is annually composed by American newspaper Defense News. According to its company results, compared to last year, KRET increased its position in the top by four places, to take 48th place. It is well known that following the results of 2014, the concern came in at 52nd place in the rating of Defense News.

The reason was improvements in the company's financial indicators. In 2015, KRET's consolidated sales were USD 1.9 billion, including USD 1.6 billion from the sale of military goods. As the concern stated, after taking 48th place in the list of the largest military and industrial companies in the world, KRET is showing the right course of effective development despite the declining value of the ruble. According to the previous exchange rate, KRET's financial indicators would place the company in the top 20 global military and in-

dustrial holdings. Concern employees are confident that this could happen in the next few years as the company expands its export portfolio.

It is well known that when making the Defense News ranking, brand awareness, quality, reliability and the traction of the company's goods are all taken into account. In addition, international experts study their financial parameters and growth rate in detail for the last few years based on the company's line of military equipment.

Over the last few years, KRET demonstrated solid progress. As per the results of 2015, the concern's revenues were about RUB 120 trillion, which exceeded 2011 by RUB 45 trillion. Net income at the end of last year was about 10 trillion rubles, which was 20% more than in 2014.

According to the concern's plans, the estimated volume of goods for sale this current year will be over 101 trillion rubles. In 2016, it is planned to increase supplies of ground, aircraft and marine EW and RS systems, as well as prospective IFF instruments.

CHINESE MARKET: PERSONAL VIEW

Interview with Yuri Ridzel, General Director of 'AVIAHELP'



Yuri Ridzel, General Director of 'AVIAHELP'

— **To what extent is Chinese market important and attractive for your company? What share does this area hold in your foreign economic operations?**

— AVIAHELP regards Chinese market of aviation spare parts dedicated to Russian-made helicopters as one of the most promising in the world. Even today China is the second largest export market of Russian-made helicopters in the world. The number of Russian-made helicopters in China now exceeding 300 aircraft keeps growing strongly. Meanwhile so far the Chinese market share in our foreign operations structure is not more than 10%. We are sure that due to our service quality in the coming years we will be able to significantly increase Chinese share.

— **What can you tell us about China and Asia-Pacific-related export history?**

— AVIAHELP entered the Chinese market in 2010. As early as 2014 our sales volume increased several times. It is worth noting the success, we think, has been achieved mostly due to us being involved in a partnership with Russian EXAR Insurance Agency and a contract concluded in this regard as to export credit insurance related to Russian-made aircraft spare parts supplied to China.

— **What is your main exclusiveness and competitive strengths for Chinese partners?**

— AVIAHELP is the largest Russian third-party supplier of aircraft spare parts and expendables delivering

only genuine products. The number of countries where our group transacts business through its subsidiaries as of year-end 2015 is 38. AVIAHELP operations meet every requirement of the company-implemented quality management system approved by Quality Management System Certificate of Conformity GOST ISO 9001-2011 (ISO 9001:2008), GOST RV 0015-002-2012, and EASA Part-145.

Besides, as a result of a voluntary certification in FGUP 'GosNII GA' we have received SDS OGA (Voluntary Certification System of civil aviation authorities) certificate, which confirms that AVIAHELP complies with requirements applied to aircraft spare parts suppliers.

Thanks to corporate ERP-system we are able to manage any goods item available in our Moscow and Cincinnati warehouses, maintain products life cycle including warranty and post-warranty repairs. Steady and long-term relations, authorized dealership and direct contracts with more than 100 Russian leading manufacturers and enterprises, retailer status and well-functioning logistics ensured that AVIAHELP has been maintaining delivery time and terms of delivery for nearly 20 years now.

— **What do you think is a special nature of working with Chinese partners?**

— I think it is the highest requirements to acceptance of aircraft parts in China including professional skills of Chinese personnel

who accept products and requirements to approved suppliers. The current Chinese acceptance system has become a rather efficient barrier against counterfeit goods. Taking into account AVIAHELP's approach based on products (supplied both by us and competitors) authentication carried out in cooperation with FGUP 'GosNII GA' and manufacturers, the above-mentioned of all others helps us be confident in AVIAHELP future on Chinese market.

— **What vectors of development of export supplies and cooperation with Chinese partners do you broadly consider as the most promising?**

— To increase China-oriented export by Russian leading holding companies and manufacturers of aircraft parts AVIAHELP has established 'Single Window Sales' program.

Within the frameworks of the project AVIAHELP takes up full export service in favor of a partner on Chinese market, i.e. from research of sales market and investments in exhibition participation to funding contracts and fighting counterfeit products.

— **What are your plans for near and long-term relations with China and Asia-Pacific region as a whole?**

— AVIAHELP suggests establishing a refillable pool of parts for Russian-made helicopters in China and in cooperation with China. In our opinion, this will decrease costs spent by Chinese operators to maintain Russian-made helicopters air worthiness.



MEETING IN HANGZHOU

On September President of Russia Vladimir Putin had meeting with President of China Xi Jinping. The two presidents discussed the current state of bilateral relations, prospects for developing cooperation, and current international and regional issues.

Beginning of meeting President of China Xi Jinping said: 'It is a great pleasure to receive my old friend President Putin and all of the Russian delegation here in Hangzhou. I wish you a warm welcome to the eleventh G20 summit. As one of the key global economies and leading countries with established markets, Russia plays a big part in promoting health and stable global economic development and developing global economic governance.'

Russia successfully hosted the G20 summit in September 2013. I am sure that your participation will help us to achieve positive results at this summit too.

You made a successful visit to China in June, when we celebrated the 15th anniversary of our major bilateral treaty [on friendship, good neighbourliness and cooperation], signed and announced three important joint statements and witnessed the signing of around 30 bilateral cooperation agreements.

This clearly demonstrates our mutual commitment to deepen our comprehensive partnership and cooperation, showed in full measure that our countries share common positions on current international and regional issues, and clearly stated our common call to support global strategic stability and work for peace and security in the world.'

President of Russia Vladimir Putin said: 'We celebrated the 15th anniversary of our friendship treaty this year and, during my visit to China

in June, discussed in detail all different areas of our cooperation. Our relations are developing just as well as we hoped. There are problems linked to the general global economic development situation, but there are positive aspects too. Our exports are growing overall, including in such important areas as exports of vehicles and equipment. We are grateful to you for the close attention the Chinese government gives to this work. This is improving our export and mutual trade situation in general. Of course, we do still have a lot of work to do, but I am confident that we are on the right track.



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have youth organisations working together, tourism exchanges, and we continue our cultural cooperation.

We certainly wish our Chinese friends and you personally success with holding this G20 summit. We see how much effort you have put into preparing this big event. We support the main agenda you have set for this summit and it will be our pleasure to take part in the discussions.'

I just met in Vladivostok with members of the Chinese business community. Overall, our Chinese partners are happy with the way we are building relations on the practical level, and I am pleased to hear that the political efforts we are making at the top are producing results for those who are engaged in the real economy and are at work on the ground in this area.

We will continue pursuing our contacts at the political, parliamentary and public levels. We



Valeriy Stolnikov

THE EIGHTH BRICS SUMMIT

Great prospects for mutual economic development

In the state of Goa (India) there was the eighth BRICS summit. On the summit's agenda were plans to strengthen the BRICS strategic partnership as a key international organization and develop multifaceted cooperation through the group. The summit participants also discussed fighting international terrorism and reaching a settlement in Syria, bolstering global economic and financial stability, and improving the global governance system. In follow up of the summit, the BRICS leaders adopted a number of documents, including the Goa Declaration and the Action Plan for its implementation. Among the documents adopted were the Provision on the BRICS Customs Cooperation Committee, the Memorandum of Understanding between BRICS Diplomatic Academies, and the Memorandum of Understanding for the Establishment of the BRICS Agricultural Research Platform.

President of Russia Vladimir Putin in his speech at the summit said: This BRICS summit, as always, is taking place in a constructive and businesslike spirit. Credit for this goes to Prime Minister Modi, who has created an atmosphere that is at once informal and at the same time very constructive and conducive to work. This might seem just a detail, but in reality

it creates the conditions needed for good and productive contact that brings us concrete results.

The BRICS countries share close positions on current global and regional issues, call for resolute action to fight terrorism, and joint efforts to counter other serious threats and challenges in today's world.

We believe that international conflicts should be resolved exclusively through political and diplomatic

means and we reject all forms of pressure using force and infringement of other countries' sovereignty.

Some very important agreements have been prepared for today's meeting. The Goa Declaration and the Action Plan for its implementation, which we will approve today, are comprehensive documents that set out the key tasks for the coming year and beyond. We also value greatly the fact that the Indian presiden-



Working together closely with business representatives, we developed the BRICS Economic Partnership Strategy, which, I remind you, was adopted last year at the BRICS summit in Ufa, in Russia. We will now build on this strategy with the new investment cooperation roadmap currently under preparation. We hope that business will take a most active part by giving our undertakings substance through concrete projects.

cy has ensured continuity and has taken into account the initiatives that Russia put forward in Ufa a year ago.

I note that the BRICS countries' role in the global economy continues to grow. In 2007, we accounted for less than 24 percent of global GDP, but this year, we account now for more than 31 percent. The five BRICS countries are active participants in developing multilateral decisions and agreements that will accelerate global growth and trade and help to resolve the unemployment issue.

The BRICS countries work together fruitfully within the World Trade Organization and the G20 and share common positions on global development and reforming the global financial and economic architecture.

The New Development Bank and the Contingent Reserve Arrangement





The BRICS countries represent a very large consumer market that includes three billion people, big reserves of raw materials and energy resources, and a developed science and technology base.

have begun their practical work. The Development Bank has already approved the first five investment projects in the clean energy sector, one project in each member country. We hope that the bank will actively develop project financing in the BRICS countries' national currencies.

One of the key tasks now is to adopt a development strategy for the bank. We must decide on the geographical and sectorial priorities and then start drafting the criteria for new members' accession to the bank and set the main parameters for its investment portfolio.

The launch of the Contingent Reserve Arrangement gives our countries opportunities to better protect our currencies from financial market fluctuations. Starting from February, the BRICS countries' central banks have opened special correspondent accounts in our national currencies.

At this time of intensifying international competition, we call on our partners to step up trade and investment cooperation between the BRICS countries. This will enable us to make use of the advantages we gain from

the mutually complementary nature of our economies and will reduce each country's vulnerability to unfavourable changes in the global economic situation.

I remind you that at the Ufa summit a year ago, our countries adopted the BRICS Economic Partnership Strategy through to 2020. We hope that the roadmap for BRICS investment cooperation and the action plan for its implementation will be ready for adoption very soon and we will be able to start the strategy's practical implementation.



We think that our countries could pursue more effective industrial and technology cooperation. We need to move to a practical plane the initiatives to establish a BRICS foundry industry union, build a centre for processing and storing electronic data, and develop professional training. It is important to continue work on the proposal to establish a BRICS energy agency. We support India's proposal to launch an internet resource for small and medium-sized businesses in the BRICS countries.

We see great potential for developing cooperation in the e-commerce sector. This is one of the fastest growing economic sectors in the world today. We therefore need to develop a unified approach to regulating activities in this sector and creating an environment for barrier-free online commerce between our countries.

We see good prospects too for cooperation in the peaceful use of outer space. To give just one example, if we unite the observation data from our remote Earth surface probe satellites, the BRICS countries could make a great contribution to resolving problems facing humanity today, such as global climate change, natural disasters, and protecting the environment.

We think it would be useful to speed up efforts to harmonize customs procedures, including exchanging experience on introducing a one-stop-shop approach for foreign economic actors, working together to unify anti-monopoly regulations, and move towards closer production norms and technical standards.

I note the active and practical contribution the BRICS Business Council

is making to our work. I think we need to bolster cooperation between our countries in the healthcare sector, with the aim of exchanging experience on preventing and stopping the spread of dangerous infectious diseases such as Ebola in Africa and the risks associated with Zika in a number of Latin American countries.

Moscow will host the High-Level Global Conference on Tuberculosis in November 2017. It will examine measures to fight this and other dangerous epidemics. We invite all of the BRICS countries to take part.

Our humanitarian cooperation is picking up the pace now. India has proposed a number of initiatives in the area and they have our support.

Russia's initiative, the BRICS Network University, has begun its

practical work, with 56 universities in our different countries joining the project over this first year of work. I am sure that the university will be an important tool for carrying out multilateral education, science and innovation projects.

Let me conclude by saying that we are ready to continue our close cooperation with our BRICS partners. I want to express sincere thanks to India's prime minister, Mr. Modi, for the enormous work our Indian friends have put in to preparing and organizing this summit.

On the sidelines of the BRICS Summit in Benaulim Vladimir Putin met with President of the People's Republic of China Xi Jinping. After a short one-on-one conversation, the talks continued in an expanded for-

mat. The heads of state shared their opinions on the situation in Syria. Vladimir Putin informed his Chinese counterpart on the latest developments. During the conversation, the parties noted the similarities in their positions on the need to fight terrorism, and emphasized the inadmissibility of any interference in Central Asia's affairs. They also stressed the necessity of further cooperation in preventing international terror from penetrating Central Asia and reaching the rest of the world through it.

Additionally, the leaders of the two countries discussed the situation on the Korean Peninsula and spoke out for its denuclearization. Overall, the similarity between Russia's and China's positions on key international issues was highlighted. President of Russia



We tried to find additional niches for cooperation. The options were broad, for example, more contact in space research, aviation, and mechanical engineering in general. As for military technical cooperation, the quality of that cooperation is quite high, maybe even better than with many other countries: we do not just sell India high-tech modern weaponry, but we also have joint research projects.

Vladimir Putin said: Mr. President, dear friend, colleagues, it is a pleasure to see you. I would like to stress that our contacts on the political level, at the level of governments, ministries, agencies and leading companies are developing very intensively. As always, we traditionally have an opportunity to hold a bilateral meeting on the sidelines of, in this case, the BRICS Summit, and we are very glad of it.

President of the People's Republic of China Xi Jinping said: I am also very glad to meet with you here, in Goa, once again, my old friend, President Putin. Elections to the State Duma of a new convocation have been successfully held in your country recently. United Russia won a convincing victory, which creates a good solid political foundation for Russia's further stable development. My sincerest congratulations. Stability in Russia in a rapidly changing world is beneficial both for the world and for China.

Last month you took part in the G20 Summit in Hangzhou, China, and made a huge contribution to the summit's success. We also held a productive bilateral meeting and reached important agreements on the development of Chinese-Russian relations, comprehensive partnership and strategic cooperation at a high level.

As permanent members of the UN Security Council, we must further consolidate our cooperation within multilateral structures. We must address key issues from the position of our joint coordination and coop-

eration, and hence work towards a more just and rational world order through joint efforts.

At the meeting of the BRICS leaders with members of the BRICS Business Council president of Russia Vladimir Putin marks: Business, as we know, plays a key part in resolving the BRICS countries' current tasks of ensuring sustainable development and speeding up economic growth. The BRICS countries' governments take into account their business communities' views when drafting plans for trade, economic and investment cooperation between the group's members. In this context, the Business Council, established in 2013 at Russia's initiative, has a particularly important role



to play. Not only did the Council start working smoothly, it also began proposing very useful ideas and initiatives.

For example, business representatives started sending in proposals on removing excess administrative barriers, optimizing customs and technical regulations, technical standardization, simplifying visa procedures for businesspeople, and many other problems that make it harder to do business.

Working together closely with business representatives, we developed the BRICS Economic Partnership Strategy, which, I remind you, was adopted last year at the BRICS summit in Ufa, in Russia. We will now build on this strategy with the new investment cooperation roadmap currently under preparation. We hope that business will take a most active part by giving

our undertakings substance through concrete projects.

We consider it important to establish close contacts and cooperation between the Business Council and the New Development Bank. We hope to see relevant recommendations from the business community on expanding project activity with the bank.

The BRICS countries represent a very large consumer market that includes three billion people, big reserves of raw materials and energy resources, and a developed science and technology base.

Russia will continue its efforts to facilitate economic rapprochement between the BRICS countries and lay the ground for launching new business projects, and we invite businesspeople from all of the BRICS countries to work on our market and develop partnership ties with Russian companies.



We will, of course, continue to do all we can to support the Business Council's work as an important means for strengthening mutually advantageous partnership between the BRICS countries.

At the other meeting of BRICS leaders — with heads of delegations of

BIMSTEC member states — Vladimir Putin had say about multi-sectoral technical and economic cooperation. He had say: Without a doubt, free trade zones, which are actively developing around the world, provide clear advantages to participants, with a greater flow of goods and

capital, higher rates of economic development, and new jobs. At the same time there are real risks that preferential and closed agreements could fragment and destabilize the global system of trade. This is why we strongly believe that regional integration processes should at all times be based on generally accepted standards, clear and transparent rules, supplementing, not substituting, the multilateral trade framework.

Russia is consistent in its efforts to promote bilateral trade and investment with Bay of Bengal countries. For example, Russia is proactively working with Bangladesh on peaceful nuclear energy power by implementing a major joint project to build the Ruppur Nuclear Power Plant.

The approaches used by BRICS and BIMSTEC are to a large extent in step with the international agenda. Our countries are committed to the prin-

Russia will continue its efforts to facilitate economic rapprochement between the BRICS countries and lay the ground for launching new business projects, and we invite businesspeople from all of the BRICS countries to work on our market and develop partnership ties with Russian companies.





ciples of international law, condemn double standards, and stand for equal and indivisible security for all.

We are stepping up cooperation with Thailand on conventional energy. Russian companies are working with PTT, a Thai oil and gas company. There are also other examples of cooperation on major projects.

In Myanmar, Tyazhpromexport is completing construction of a major iron and steel plant using unique Russian technology. It is expected to open by the end of the year.

Russia and Sri Lanka established an intergovernmental commission on trade, economic, research and technical cooperation, and its first meeting took place in February 2016. Last year, Russia helped Nepal over-

come the consequences of a destructive earthquake.

It is satisfying that the approaches used by BRICS and BIMSTEC are to a large extent in step with the international agenda. Our countries are committed to the principles of international law and the UN's central role in international affairs, condemn double standards, regime change by force, and stand for equal and indivisible security for all.

We know that the Bay of Bengal countries are seeking to step up counter-terrorism cooperation. BRICS countries are also working on this and have recently established a Working Group on Counter Terrorism to this effect. For this reason, we believe that it would be advisable to

think about coordinating our counter-terrorism efforts.

To conclude, I would like to express confidence that today's meeting will provide an additional impetus to reinforcing mutually beneficial, friendly relations between countries from the two associations based on the principles of equality, taking into account and respecting each other's interests.

After that BRICS Summit Vladimir Putin answered questions from Russian journalists. And said about his talking with partners from India and China: Indeed, India is one of our priority partners, and a strategic partner. I should not need to recall the time of the popular Hindi Rusi bhai-bhai slogan (Indians and



Russians are brothers). In fact, little has changed since then, and our relations have grown stronger if anything. But military technical cooperation is not the only area of interest to us. Unfortunately, we have not fully taken advantage of our capabilities in the civilian economy, and there is so much we could do there.

India is a huge market with 1.25 billion people. Moreover, a significant portion of the Indian population has fairly high living standards that match average European income levels. That is a very big and lucrative market for our products.

We tried to find additional niches for cooperation. The options were broad, for example, more contact in space research, aviation, and mechanical engineering in general. As for military technical cooperation, the quality of that cooperation is quite high, maybe even better than with many other countries: we do not just sell India high-tech modern weaponry, but we also have joint research projects.

The S-400 Triumf contract is worth not hundreds of millions, but billions of dollars. We have also agreed to improve the BrahMos missile, which

will be land-, air- and sea-launched. We will also work to increase its range. And we will work together on a fifth-generation aircraft. It has basically made its maiden flight, but there are some issues we need to work out. I am talking about the T-50 fighter plane.

As I have said, our relations in this area can be described by our willingness to help our Indian friends acquire additional competences. You know that we have organised the assembly and production of the latest T-90 combat tanks and the Sukhoi Su-30 aircraft here.

Finally, on the question of how our BRICS partners have responded to our response measures taken against the countries that imposed sanctions on us, I do not see any concern on their part because we have not and have no plans to set any restrictions on the goods they produce.

Furthermore, the restrictions that we introduced for the countries that imposed sanctions against us give our BRICS partners and other partners new opportunities on the Russian market. They are making active use of these opportunities too. I therefore see no problems and complications here.



Without a doubt, free trade zones, which are actively developing around the world, provide clear advantages to participants, with a greater flow of goods and capital, higher rates of economic development, and new jobs. At the same time there are real risks that preferential and closed agreements could fragment and destabilize the global system of trade. This is why we strongly believe that regional integration processes should at all times be based on generally accepted standards, clear and transparent rules, supplementing, not substituting, the multilateral trade framework.



Andrey Tarabrin

MILITARY AND TECHNICAL COOPERATION

Russia remains one of the world's top defense products suppliers

Since 2000, the Russian Federation has established a sufficiently effective system to manage military-technical cooperation between the Russian Federation and foreign states, incorporating the Federal Service for Military-Technical Cooperation ('FSMTC of Russia') as its critical enabler. The Federal Service for Military-Technical Cooperation is empowered with control and supervision functions in the MTC area. FSMTC of Russia shall be a decision making authority on import to and export from the Russian Federation of military purpose products as decreed by the President of the Russian Federation, also in the established manner and as authorized by the Russian Federation President, issue of licenses to military-technical cooperation-affiliated entities for import to and export from the Russian Federation of military purpose products.

FSMTC of Russia' granting in the established manner foreign trade licenses to (from) corporate developers and manufacturers of military-purpose products and arranging exhibitions and shows of specimens of military purpose products in the Russian Federation and foreign states as required by the Government of the Russian Federation; and in the established manner and as required by competent authorities of foreign states, issue of end user's certificates for import military purpose products to corporate developers and manufactures of military purpose products.

For example, on the conference on summarizing of the results of advertising and exhibition activity in the area of military-technical cooperation of the Russian Federation with foreign countries in 2015 and activity planning for 2016 with participation

of representatives of the interested federal executive authorities, military-technical cooperation affiliated entities and other Russian organizations was held on December FSMTC of Russia presented the departmental awards to the most active participants of the advertising and exhibition activity in the area of military-technical cooperation. Among the award recipients were the representatives of the Ministry of Defence of the Russian Federation, the Ministry of Internal Affairs of the Russian Federation, the Federal Service for Technical and Export Control, State Corporation 'Rostec', JSC 'Rosoboronexport', JSC 'UAC', 'Almaz-Antey' Corp., JSC 'Russian Helicopters', JSC 'RPC 'Uralvagonzavod', JSC 'SPA 'Bazalt', JSC 'KBP', FSUE 'Gamma Scientific and Production Enterprise', JSC 'Exhibition Companies Group 'Bizon', company 'International Congresses and Expositions'.

Military and technical cooperation between Russia and pacific region states is on the rise now. Pacific region nations account for considerable part of Russian defense products delivery. This number may quite possibly rise significantly. Besides, seeing the growing interest toward aviation and air defense equipment, we hope for stepping up of cooperation in this



regard. Russian planes and helicopters have proven themselves highly efficient during large-scale counter-terrorism operations worldwide. Their air superiority and anti-ground high-precision strikes capabilities are also well known to our partners in other states. Among others, in this region large export potential belongs to gunships and transport helicopters, various air defense systems, antiaircraft gun and missile system.

From recent examples of successful participation российско the equipment in the international exhibitions can remember a little. So, Russia takes part in the arms exhibition in Gulf Defence & Aerospace 2015, an international exhibition of arms and military equipment to be held from 8 to 10 December in Kuwait





City (Kuwait). 'Rosoboronexport seeks to intensify cooperation with the Gulf countries, which are interested in strengthening their armed forces. Russia has deservedly earned recognition as a reliable and independent partner while Russian weapons have proven their effectiveness and reliability in challenging combat and climatic conditions. The participation in the exhibition in Kuwait is another step to strengthen our position in the region,' said Rosoboronexport Deputy Director General Sergey Goreslavsky, who heads the Company's delegation at the exhibition.

The Gulf states are showing interest in Russia's army, air force and air defense weaponry. In addition, Rosoboronexport promotes naval equipment here such as patrol boats,

frigates, and coastal missile systems. The foreign delegations are expected to pay more attention to the T-90MS MBT, TOS-1A heavy flamethrower system, Typhoon-K MRAP vehicle, Kornet-EM ATGM system, Su-35 and MiG-29M/M2 fighters, Ka-52, Mi-28NE and Mi-35M attack helicopters, Mi-17 and Mi-26T2 transport helicopters, Yak-130 combat training aircraft, Il-76MD-90A military transport aircraft, as well as air defense weapons of various classes, including the Antey-2500 and S-400 long-range air defense missile systems, Buk-M2E medium-range SAM system, Pantsir-S1 air defense missile/gun system and Igla-S MANPADS.

At Gulf Defence & Aerospace 2015, Rosoboronexport will hold talks with the representatives of the armed forces of the countries from the

Middle East and other regions over the prospects for expanding military-technical cooperation.

The Russian delegation will also include JSC NPO Splav (part of JSC NPO Tehmash) and JSC High-Precision Systems (Vysokotochnye Komplekсы) represented by JSC Shipunov KBP Instrument Design Bureau, JSC Tula Arms Plant, JSC Kovrov Electromechanical Plant, JSC VNII Signal Research Institute and JSC Nudelman Precision Engineering Design Bureau (KBtochmash)

Military and technical cooperation with the region's nations tends to increase both in terms of quality and quantity. Thus, recently FSMTC of Russia experts have participated in 'DUBAI AIRSHOW-2015' international airspace exhibition held on November 8-12, 2015 in Dubai (United Arab Emirates). Russia has been an exhibitor at 'DUBAI AIRSHOW' since 1993. The Russian display area this year has been 678 square meters. The exposition involved 23 Russian enterprises including the largest ones like 'Rostech' State Corporation, 'Rosoboronexport', 'Almaz Antei', Russian aircraft Corporation MiG, 'Sukhoi', 'Vertoley Rossi' (Russian Helicopters). Altogether about 200 samples of Russian advanced defense products have been shown in Dubai.



During the exhibition Russia has held negotiations with delegations of UAE, Kuwait, India, RSA, Malaysia, Bahrain, Egypt, Iraq, Indonesia, Jordan, Oman and other countries. They discussed prospects for Russian armament supply including aircraft, air weapons and air defense equipment as well as issues of creating maintenance facilities and establishing after-sale service.

Russia considers Kuwait to be among the most significant partners as to military and technical cooperation in this region and in whole Asia. Military and technical cooperation between our two countries goes deep. It began in 1978 and advanced in a rather active manner. Thus, back then our country provided Kuwait with about 700 'Strela' portable anti-aircraft missile systems and twenty 'Osa' air defense missile systems.

Extending cooperation between Russia and Kuwait is spoken by the Memorandum of military and technical cooperation between 'Rosoboronexport' and Defense Ministry of Kuwait undersigned in November this year, which shows Kuwaiti military's profound interest towards purchasing Russian military equipment. In particular, Kuwait is interested in Russian battle aircraft and air defense systems. More details of types and purchases will go public later. So far only growing interest can

be observed. Besides, much attention has been paid to creation of heavy infantry fighting vehicle (IFV) based on Enigma IFV developed by UAE and Russian AU-220M weapon station equipped with 57mm gun.

In this year at the Bahrain International Airshow 2016 (January 21-23) many countries displayed an interest in buying Russian aircraft, helicopters and air weapons. The Su-35 and MiG-29M/M2 multirole fighters, Yak-130 combat trainer, Il-76MD-90A military transport, Ka-52 and Mi-28NE attack helicopters, Mi-35M transport/attack helicopter, and Mi-17 type military transport helicopters have great export potential in the region.

'Rosoboronexport's order portfolio for aviation equipment exceeds currently \$22 billion. Interest from foreign customers, including in the



Middle East and North Africa, is growing. This stems from both launching new aircraft models to the international market and high operational effectiveness of modern Russian military aircraft, including its capabilities for delivering surgical strikes on ground targets. Demand is supported by an excellent cost-effectiveness ratio and Russia's reputation as a reliable and responsible partner in military-technical cooperation,' said Sergey Kornev, Head of Air Force Equipment Export Department, who leads the Rosoboronexport's delegation at the exhibition. At the exhibi-

In conformity with laws of the Russian Federation, FSMTC of Russia shall perform control and supervision functions relating to:

- Compliance, of activities in the field of military-technical cooperation of federal government authorities, government authorities of the Russian Federation constituencies, and Russian organizations empowered in the established manner to carry out foreign trade activities regarding military purpose products, corporate developers and manufacturers of military purpose products, other legal entities, officials and individuals, with legal acts and regulations of the Russian Federation and key state policy guidelines in the field of military-technical cooperation, requirements of the Russian Federation laws on export control over procurement of military purpose products;
- Implementation of underlying state policy principles in the field of military-technical cooperation including state monopoly;
- Efficient functioning of state regulatory system in the field of military-technical cooperation;
- Fulfillment of international treaties of the Russian Federation in the field of military-technical cooperation;
- Activities in the field of military-technical cooperation of representative offices of military-technical cooperation-affiliated entities in the Russian Federation and foreign states, as well as those of other organizations;
- Marketing, advertising, and exhibition activities in the field of military-technical cooperation;
- Efficient application of funds allocated from the federal budget to finance activities in the field of military-technical cooperation, as well as efficient use of federal property by military-technical cooperation-affiliated entities;
- Level of foreign trade prices for export and import military purpose products with due regard to protection of economic interests of the Russian Federation;
- Level of local prices for military purpose products to be funded out of the federal budget, and supplied to foreign customers under international treaties of the Russian Federation.

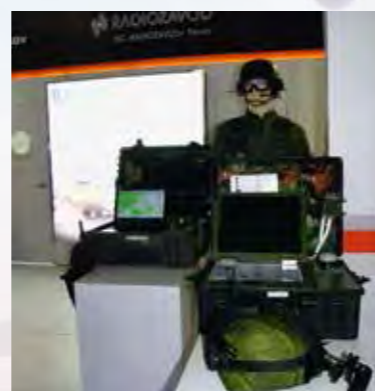
Major areas of FSMTC of Russia activities shall be:

- To perform control and supervision functions in the area of military-technical cooperation in compliance with laws of the Russian Federation;
- To participate jointly with other federal government authorities in elaboration of state policy in the area of military-technical cooperation and submit in the established manner relevant proposals to the President of the Russian Federation, the Government of the Russian Federation, and Defense Ministry of the Russian Federation;
- To ensure jointly with other federal government authorities implementation of key state policy guidelines in the area of military-technical cooperation as set by the President of the Russian Federation; and Within its competence and jointly with other federal government authorities, to implement state regulations in the area of military-technical cooperation.



Ministry of Defence, representatives of Armed Forces Headquarters (Air Force, Navy, Army), Indian enterprises concerned with operating, maintenance and repair of Russian origin military equipment.

During the Conference, its participants discussed the existing issues in area of after sale service of



tion, Rosoboronexport showed the open presentation 'Russian Military Aircraft Fighting against Terrorism,' which analyzes the Russian aircraft's capabilities for use in counter-terrorist operations.

The Bahrain International Airshow has been held since 2010. This year, along with Rosoboronexport, it was attended by Russia's Federal Service for Military-Technical Cooperation, Russian Helicopters and United Aircraft Corporation delegations.

The special story is demanded by a subject of the Russian-Indian relations. The Russian-Indian scientific and technical conference 'Effective after sale service — assurance of high operability of arms and military equipment' was held within the

International Aviation and Space Salon 'MAKS-2015' in Zhukovsky at the House of Scientists TSAGI under the aegis of FSMTC of Russia on August 25, 2015.

A.V.Fomin, Director of FSMTC of Russia, A.V.Potapov, Deputy Minister of Industry and Trade of the Russian Federation, representatives of JSC 'Rosoboronexport' and leading military-industrial complex enterprises, whose production is in demand at Indian arms market, took part in the conference work from the Russian side.

A.K.Gupta, Secretary (Defence Production) of the Ministry of Defence of the Republic of India, S.Garg, Joint Secretary (Defence Industry Development) of the Indian

Russian origin military equipment in India and exchanged opinions about its effectiveness increase. It was proposed to Indian partners a comprehensive approach for maintenance of arms and military equipment during the whole life cycle from delivery to utilization. During the Conference, held in close friendly atmosphere, the representatives of Russian and Indian military-industrial complex established direct contacts and achieved a number of arrangements on improving of maintenance quality of Russian origin arms and military equipment.

In his interview for Russian Industrial Weekly newspaper Alexander Fomin, Director of FSMTC of Russia has described the extent to

which the current stage of military and technical cooperation with other countries is significant. Among other things he said the following.

'Today the situation of world armament and military equipment market depends on many factors. These are ongoing global economic crisis, complex military and political situation in Middle East and North Africa, stepping up of military production competitors which include first of all the USA, Germany and France.

We should recognize stepping up of such armament exporters as China, Republic of Korea, Israel and Turkey as well as entry of new ambitious players like Japan and Republic of South Africa. It is needless to say that development of military and techni-

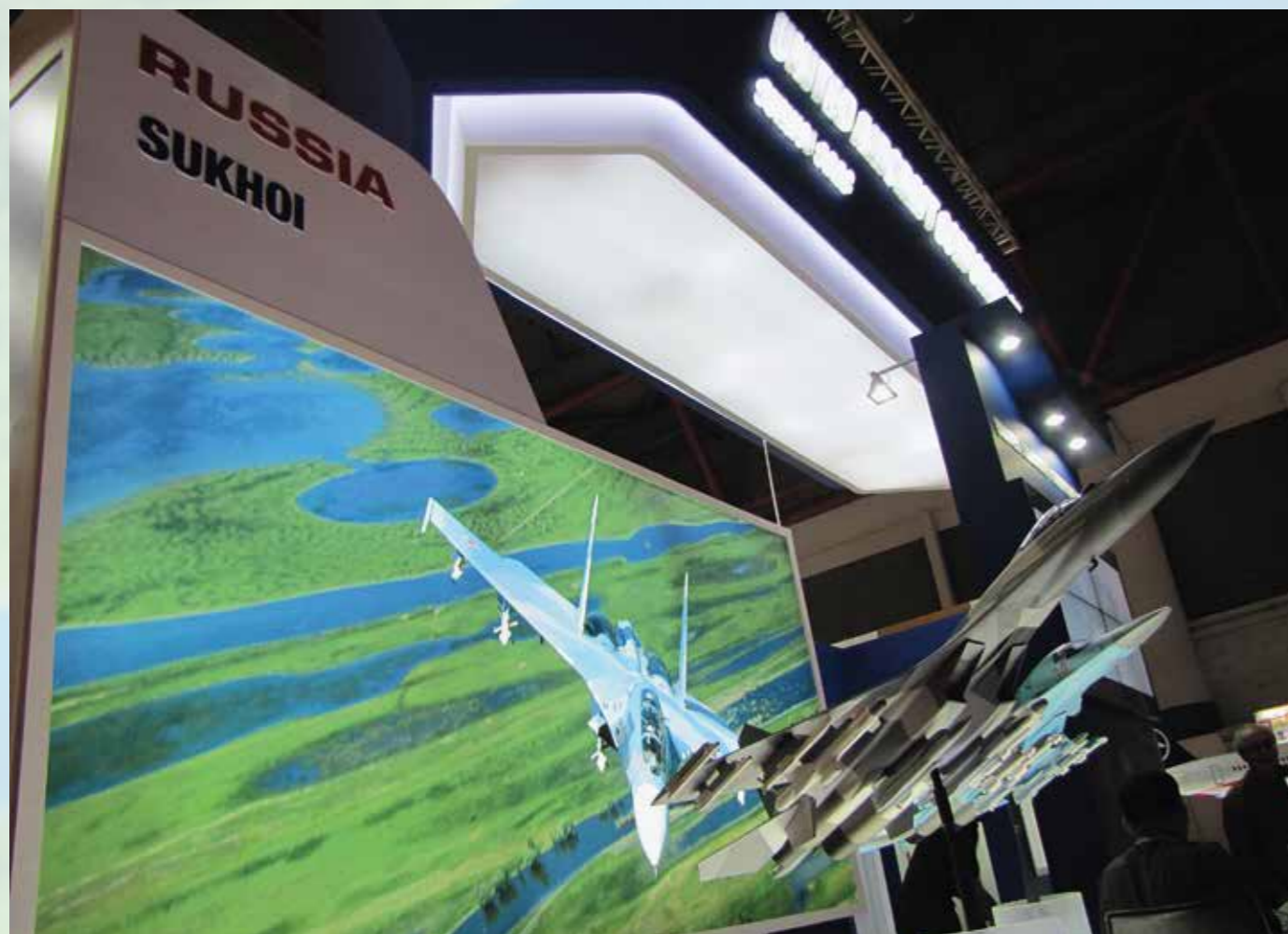
cal cooperation between Russia and other countries is to some extent influenced by so-called 'anti-Russian sanctions'. Nevertheless, Russia is still one of the largest global defense suppliers and it is keeping intensive military and technical cooperation underway.

Indian Air Force and Navy are armed with many Russian (Soviet) aviation equipment such as Su-30MKI, MiG-21, MiG-23, MiG-29 ground and ship-based fighters, Il-76 transport aircraft and Il-78 tankers, naval Tu-142M and Il-38, Mi-17, Mi-26, Ka-28 and Ka-31 helicopters. The mentioned aircraft are going to be used by Air Force and Navy of India for next decades and should be constantly maintained by Russia.

FSMTC of Russia shall:

- Submit in the established manner draft decisions of the President of the Russian Federation and the Government of the Russian Federation on deliveries of military purpose products to foreign customers, as well as on other foreign trade issues relating to military purpose products;
- Develop jointly with federal government stakeholders conceptual approaches for higher MTC efficiency, as well as review trends in the development of the world's market of military purpose products;
- elaborate jointly with federal government stakeholders draft international treaties of the Russian Federation in the field of MTC and submit in the established manner proposals for concluding and implementation of any such treaties;
- Elaborate and submit in the established manner proposals for working out a state defense order regarding export and import military materiel under international treaties of the Russian Federation;
- make analysis of effective long-term international treaties of the Russian Federation providing for export military materiel adjusted for mutual debts, ability to settle them through goods exchange, and, if necessary, submit in the established manner relevant proposals;

- participate jointly with federal government stakeholders in drafting proposals for establishment, suspension, termination and resumption of MTC;
- submit in the established manner proposals for creating, composition and arranging activities of bilateral and multilateral intergovernmental commissions relating to MTC;
- set up relationships in the established manner with international organizations relating to MTC;
- be in charge of Russian sections of intergovernmental commissions relating to MTC as instructed by the President of the Russian Federation and the Government of the Russian Federation;
- review orders of foreign customers for supplies of military purpose products, record them, appoint contractors among MTC-affiliated entities, agree with federal government authorities on contractors among corporate developers and manufacturers of military purpose products contracted for supplies of the said products, inform foreign customers on accepting their orders for consideration, and supervise preparation and approval of relevant draft decisions, monitor progress of implementation of orders of foreign customers for supplies of military purpose products by MTC-affiliated entities;
- maintain record of orders of foreign customers for supplies of military purpose products placed directly with MTC-affiliated entities, and monitor progress of their implementation;
- streamline and supervise activities of MTC-affiliated entities, review and summarize results of their activities;



Nowadays India is much interested in establishing production of Ka-226T helicopters in India. There are negotiations underway as to cooperation conditions under this project. There is a possibility of additional lots of Mi-17V-5 helicopters to be delivered and increasing the number of Su-30MKI planes being produced under license in India. All this makes

us enthusiastic in Russian and Indian cooperation in terms of battle aircraft. Main areas of cooperation with Malaysia in this regard include after-sale service of Su-30MKM aircraft. In 2012 a maintenance facility was established under the delivery contract. Besides, there are efforts to promote additional lot of Su-30MKM's to Malaysian market. Currently Malaysia

is considering proposals for upgrading MiG-29 planes delivered before.

Military and technical cooperation between Russia and China as to battle aircraft is also promising.

Answering the question of joint defense production to be established by Russia in partner countries, Director of FSVTS emphasized as follows:

'Decisions to establish joint defense-oriented enterprises are made by the President of the Russian Federation and the Government of the Russian Federation. Our Federal Service is responsible for implementing the mentioned decisions and monitoring.

In this regard I would like to state that while the decision to establish a joint enterprise is being prepared, the issue is to be addressed comprehensively in all departments and agencies including FSMTC of Russia, Russian Defense Ministry, and Ministry of Foreign Affairs, Ministry of Industry and Trade and other agencies in order to avoid losses for the Russian Federation. Besides, all factors like political, economic, military and technological ones should be taken into account. Targeted decisions are made as to each separate joint enterprise. Joint development and production are cross-pollinating and allow consolidating and developing technological potential of Russia as well as facilitate future innovation-driven growth'.

Nowadays, promotional and exhibition activity is becoming one of the most important mechanisms of strengthening political and economic positions of states-exporters of arms to different regions of the world and also a set of actions efficiently assisting in innovative development of economy, primarily, of all the military-industrial complex, manufacturing of competitive goods through attracting investments and new technologies.

From 2000 till 2010 FSMTC of Russia in association with the concerned federal bodies of the executive branch created a harmonic and effective system of exhibitions regarding military purpose products (further — MPP) in the Russian Federation. This system is based on 3 nationwide exhibitions, held in the Central Region of Russia and covering principal areas in the field of production of arms and military equipment:

The International Aviation and Space Salon MAKS held starting from 1992 in odd-numbered years at the grounds of FSUE Flight Research Institute named after M.M.Gromov in Zhukovsky, Moscow Oblast;

The International Maritime Defense Show IMDS held starting from 2003 at Lenexpo Exhibition Complex in St.-Petersburg;

The International Show of Weapons and Military Equipment MVSV organized since 2004 in Moscow, which in 2010 has become the core exhibition within the International Forum 'Engineering Technologies' held at the grounds of JSC 'TVK 'Russia' in Zhukovsky, Moscow Oblast.

The International Exhibition of Arms, Military Equipment and Ammunition 'Russian exhibition of arms. Nizhny Tagil' at the grounds of the State Exhibition Centre of FSE Nizhny Tagil Institute of Metal Testing held in odd-numbered years is an attractive show and a salon of significant interest for foreign customers and partners. The pivotal and obvious

advantage of this event is a unique test range which makes it possible to showcase in action a great deal of arms and large-sized samples of military hardware of the Land Forces.

The exhibitions organized in the Russian Federation proactively assist in promoting military-technical cooperation of the Russian Federation with foreign states and strengthening political and economic stands of Russia in various regions of the world.



- maintain the register of MTC-affiliated entities and issue to them appropriate certificates;
- maintain record and registration, approve contracts for foreign trade activities relating to military purpose products, as well as maintain control of implementation of those contracts;
- if necessary, participate in talks conducted by MTC-affiliated entities with foreign customers for supplies of military purpose products;
- submit in the established manner proposals for implementation of key objectives and performance of functions of representative offices of the Russian Federation in foreign states regarding MTC;
- make proposals in the established manner for empowering corporate developers and manufacturers of military purpose products to carry out foreign trade activities and revoke the same from them;
- arrange exhibitions and shows of specimens of military purpose products in the Russian Federation and foreign countries as required by the Government of the Russian Federation;
- participate in working out proposals for MTC development with CIS-member states, and draft international treaties with those states on MTC issues;
- maintain relationships with authorized authorities of CIS-member states relating to export of military purpose products to third countries;

- take interdepartmental joint efforts relating to supplies and control over intended use of military purpose products under the Agreement of MTC Fundamental Principles dated 15 May 1992 between member states of the Organization of the Collective Security Treaty;
- maintain record of man-portable air defense systems sold and acquired by CIS-member states and promptly notify stakeholder states and international organizations of man-portable air defense systems sold and acquired by the Russian Federation;
- elaborate a consolidated volume of export military purpose products for the next year and control its performance;
- sponsor research and development of MTC-related works including its information coverage;
- streamline specialty retraining and skill enhancement system for staff involved in MTC;
- communicate to foreign customers scheduled phase-out of spare parts, plants, units, devices, and completing articles, specialty, training, and support materiel required for operability of earlier supplied military purpose products, as well as report about results of such communications to MTC-affiliated entities; and perform as state customer for export and import operations in the field of MTC to be carried out under international treaties of the Russian Federation, as well as customer for research and development works on MTC information coverage.



SETTING A GOOD EXAMPLE

Vladimir Karnozov

Moscow/New Delhi relationship set an exemplary case for other BRICS members as their mutual ties and interdependence grows. At the summit, held 15-16 October in Goa, heads of BRICS member states - Brazil, Russia, India, China and South Africa - declared that they have a common vision of the many problems on the global scale and scene. In addition to such declarations, the summit provided a convenient platform for India to sign new deals with Russia on most advanced weaponry.

First off, let's look into the most recent purchases New Delhi made. For the first time in history, India has acquired long-range surface-to-air missiles (SAM) in the form of Almaz-Antei S-400 Triumph. Until recently, Indian armed forces operated far less sophisticated and shorter-range systems — the S-75 of the 1950 origin (acquired in the

1960s as part of an initial weapons package from Soviet Union) and the Kub of the 1960 origin. These were medium-range SAM with two-digit firing ranges, whereas the S-400 can defeat aerial and ballistic targets at ranges of several hundred kilometers. The second deal is that on license production of 200 Kamov Ka-226T helicopters. It is first-ever case in which India undertakes local assem-

bly of Russian helicopters. Before that, the country bought hundreds of Mil and Kamov helicopters, starting with the Mi-4 and Ka-25 in the early 1960s, and through to the most recent Mi-17V-5 with a glass cockpit. But it never made them at home. At the same time, HAL has long been producing French designs — the Alouette II/III and their derivatives — and, currently, the Dhruv, a home-

grown design based on BK-117 (a joint design from the Germans and the Japanese). Before the Ka-226T, India produced a long list of Russian designs, including MiG fighters and main battle tanks, but never helicopters.

Finally, New Delhi made decision on third consequent batch of the Project 11356 frigates, which are better known in India as the Talwar class by the name of the first such vessel. Two previous batches were of three hulls each. The current batch is of four vessels, with the first to be built in Russia, second in India using imported parts and sections, and the remaining two in India with a high degree of localization. This is also a



Some people in Moscow are concerned that sales of advanced defense equipment and technology to Beijing are fraught with consequences for Russia's national defense. Today, however, such fears are being talked away by the speeches of love and friendship from Vladimir Putin and Xi Jinping who seem to be all set to open a new page in the history of Sino-Russian relations.



solutions of international conflicts. The policy that focuses on application of force towards sovereign countries and other ways of harming their sovereignty shall be jointly marked as "unacceptable". Closer economic partnership calling for joint projects and encouraging investments across borders. Forming a joint energy agency that would coordinate various programs including those on reusable/replenishing sources of power that would be funded through the BRICS bank (with a capital base of U.S. dollar 200 billion). Encouraging

new practice in the domain of surface combatants for the navy.

Also in Goa, the Russians and the Indians agreed to form a joint committee at a high level that would see to science and technology. According to Russian vice-premier (deputy prime minister) Oleg Rogozin, this new body shall primarily target space technologies such as rocketry and satellites. With all expediency, joint programs in space was one of the points that Russian president addressed in his remarks at the recent BRICS summit. Vladimir Putin

said he considers space programs as a very promising area to joint efforts. He specially mentioned satellites purposely designed for distant probing and monitoring. Jointly, our countries can build a complete ecological monitoring system that would incorporate satellites and technologies they developed independently.

Other points that the Russian leader made in his remarks include the following. Putin stressed that BRICS members should call for resolute actions against the international terrorists and for politic/diplomatic



Weapons trade (or 'military-technical cooperation' in a more Russian fashion) has been an essential part in the Kremlin's foreign policy. For Moscow, it remains an effective tool to bolster Russia's military and economic might, and maintain her prestige on the global stage. Arms trade is among very few high-tech exports that supplement Russia's primary source of hard currency income through sales of oil, gas, timber, metals, coal and other mining resources.

E-commerce territory, for which the member states should work out a common policy that would ensure no barriers for the spread of it within BRICS. Joining forces in fighting new kind of deceases, such as Ebola. 'This summit makes me happy because I saw for the first time that all of the process participants show their interest in further development of ties between them. There are new directions of our interaction appear,' Vladimir Putin commented.

MILITARY-TECHNICAL COOPERATION

India and Russia are long standing strategic partners with many joint projects in the area of defense and military-industrial cooperation. Will the two great nations stay together in the changing geopolitical and economic reality? The October BRICS summit in Goa gives a positive answer to this question. And this is extremely important for Moscow taking account of the circumstances below.

The United States, European Union and their allies strengthen the regime of economic sanctions against Russia introduced in 2014 upon the pretext of the annexation of Crimea and hostilities in Donbass. This makes the Kremlin all the more interested in cultivating friendly relationships with China, India and other independent nations.

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Russia holds a quarter of the global export market for defense products. By the volume of arms trade she comes second after the United States. Deliveries of Russian military

hardware to foreign countries are worth ten billion U.S. dollars annually. Moscow uses the ongoing wars on terror in Syria and Iraq to demonstrate performance of her advanced fighting machines. This stimulates interest in Russian weapons from the side of importing nations round the world. As a result, the Russian industry has a healthy backlog of foreign orders, estimated at US dollar 50 billion.

Foreign orders provide a worthy addition to the Russian defense budget on procurement of new weapons. Together, they keep numerous enterprises of the Russian military-industrial complex occupied, and thus help the Kremlin solve social issues and ensure further progress of the military science and engineering.

In addition to earnings in the hard currency, the arms export has been an important instrument of keeping client states tied up to Russia logistically, technologically and militarily.

A BIG AND DEMANDING CLIENT

Together with Venezuela, Algeria, China and Vietnam, India is firmly in the top five customers for Russian weapons. New Delhi first applied to Moscow for weapons in 1963. The Soviet Union obliged by meeting most of the Indian requests for jet-fighters, airlifters, rotorcraft, armored vehicles, cannons and warships. Estimates made in 2014 indicated that the grand total of the arms trade between the two countries during the past fifty years totaled 57 billion U.S. dollars. Since then the figure passed the mark of 60 and is steadily approaching 70.

India, however, is by no means an 'easy' client. Historically, the coun-



try has been importing from the U.K., France and other European nations. At the turn of the century, Israel started selling into India. More recently, New Delhi began purchasing from the U.S. Noting the advent of these aggressive exporters into the Indian market, the international media started reporting on a decline in Russo-Indian trade. And yet, certain Russian sources insist that in dollar terms the Russian arms export into India has been growing. Rosoboronexport state arms trader said that in 2013 its shipments into India were worth more than U.S. dollar 3.6 billion. Beyond doubt today is the fact that New Delhi has a wider choice of suppliers and make them compete harder.

For Russia, the political, military and industrial importance of the Indian market exceeds that of any other country. Certain Moscow-based exports believe that in many ways, the Indo-Russian cooperation in the military-technical sphere represents 'ideal partnership of the two great nations.' They point out at harmony in economic ties between the Russian and Indian industries. At the same time, they say, commercial interests of weapons makers do not always coincide with the national defense considerations, — but this is not the case for India and Russia.

The Kremlin is interested in seeing the rise of new centers of military and economic power round the world provided they keep national identity and sovereignty. That set them

apart from the vassals and serves of the hegemonic superpower. The rise of India does not concern Russian generals and strategic planners, as they believe Russia and India are complimentary. Moscow observes the progress and expansion of the Indian economy and military-industrial complex with pleasure. At the same time, the rise of China does not always create the same feelings within the Russian elite.

Some people in Moscow are concerned that sales of advanced defense equipment and technology to Beijing are fraught with consequences for Russia's national defense. Today, however, such fears are being talked away by the speeches of love and friendship from Vladimir Putin and Xi Jinping who seem to be all set

to open a new page in the history of Sino-Russian relations.

Indian state officials sometimes call Vladimir Putin 'an architect of strategic partnership between India and Russia.' In our view, the president of the Russian Federation spares no time and effort to keep Indo-Russian cooperation growing. Meeting between Putin and his Indian counterparts take place on a regular basis. Several times a year the Indian PM and the Russian president meet to discuss various issues, including arms sales, license production and co-development.

Ritual hand-shaking and passionate speeches about mutual love and friendship might seem boring, unless you take into account that they are made in the background of the U.S.&E.U. sanctions regime. This new background gives them a new flavor and a new meaning. They testify that after the regime change in April 2014, New Delhi remains committed to Russia and her leader. Once upon a time India was under U.S sanctions, and so its leaders know what these are like.

Touching on the importance of arms trade and delivery of contractual obligations, Putin said: 'We all know that reliability in the sphere of military-technical cooperation is one of the major components of interaction in this very sensitive sphere. Should we fail one or twice, our reputation would suffer seriously... and may also bring some negative eco-





conomic consequences on us. [That's why] We must stick to our obligations and deliver them'.

NEW DELHI AS A MAIN CUSTOMER

In a number of recent cases, the Indian defense ministry has de-facto assumed and played the role of the main customer in relation to certain types of advanced weapon systems developed by the Russian military industrial complex. These include the Sukhoi Su-30MKI heavyweight multirole fighter, Mikoyan MiG-29K/KUB ship-borne strike fighter, the T-90S main battle tank, the Project 11356 Talwar-class frigates, Project 877EKM (08773) diesel-electric submarines armed with the Club-S missile system etc.

This role requires the customer to formulate requirements and specifications to new weapon systems or its customized versions. If live tests on prototypes confirm their compliance, the main customer gives Ok for series production, accepts a worthwhile number of deliverable examples and pays for them. To justify production of a modern aircraft, orders should measure in hundreds. The Indian MoD has placed orders for 272 Su-30MKIs, a quantity more

than just enough to justify R&D and manufacturing costs.

In some instances, Indian orders for a specific product numerically exceeded those fielded by the Russian defense ministry. This has been the case with the T-90 main battle tank, and its customized Indian version known locally Bhishma. A further evolution of the T-72, the T-90 (EIS 1992) provided base for more advanced T-90S which was selected by the Indian army in 2001. It differs in having a more powerful - through supercharging — diesel engine developing 1,130hp.

In 2004-2011 timeframe, the Russian land forces procured 350 T-90A/AM tanks in addition to 150 copies of the initial version. This compares to 657 T-90S MBTs New Delhi procured directly from Russia's UralVagonZavod (under two contracts, for 310 and 347 respectively, signed in 2001 and 2007) and 536 made locally at the Heavy Vehicles Factory in Avadi. Today, the Indian army operates twice as many T-90s in the Russian inventory, and is likely to have four times as many at the end of the license production run later this century.

The case of the T-90 is not the only one in which India procured more pieces of equipment than Russia her-

self. The foreign customer bought more thrust-vectoring Sukhoi fighters and Kilo-class diesel electric submarines armed with tubed launched cruise missiles. In the latter case, the Indian navy acquired ten Project 877EKM with the Club-S system against six Project 636.3s with further developed Caliber-PL for the Russian navy. Another example of the kind is that the Indian navy operates six Project 11356 frigates compared to just two (and one being completed) in service with the Russian navy.

Major Indo-Russian defense projects tend to be of a long term nature. For instance, the initial contract for the Su-30MKI was signed in 1996, and shipments are still ongoing. The framework agreement calls for direct shipments from the Irkutsk Aircraft Plant (IAZ) of the Irkut Corporation and setting up a second assembly line at the HAL Bangalore complex. Since then the sides signed a number of additional contracts detailing the framework agreement (and more are coming).

The Su-30MKI features the powerful N-011M Bars multimode phased-array radar, canards (foreplanes) and thrust-vectoring (none of which are present on less advanced 'Chinese' version of the Classic Flanker — the Su-30MKK/MK2). The aircraft pro-

vided base for the customized versions for the Algerian (Su-30MKA), Malaysian (Su-30MKM) and Russian (Su-30SM) air force variants, all of which are now operational.

President of United Aircraft Corporation (which controls Irkut and IAZ) told the media at Aero India 2015 that out of 272 Su-30MKIs contracted so far 222 were assembled or being assembled at the HAL Bangalore complex. According to other industrial sources, shipment of the kits under already placed contracts terminates in 2017. When this author visited IAZ plant in June 2016, he was told that the negotiations were ongoing so as to increase the grand total of Indian Su-30MKIs to 'over three hundred units'.

The Su-30MKI is also remarkable as it was the first large project on which a new trend in Indian procurement practice was tried, that for 'internationalized' weapons systems. The aircraft used a proven Russian platform with a large number of technology insertions, including those from French and Israeli firms. Such an approach stimulated Russian OEMs to establish industrial partnerships with their counterparts in other countries. It has brought a priceless experience for the Russian industry, and helped it integrate into the world's community.

In a number of instances, India ordered from Russia customized equipment with parameters exceeding those for factory standard ver-

sions. Hence with, meeting customer specification involved technological and technical risks. Let's take Talwar-class frigates. India placed order for three such vessels in November 1999.

Based on the proven Project 11356 warships, these (Project 11356)



Russia holds a quarter of the global export market for defense products. By the volume of arms trade she comes second after the United States. Deliveries of Russian military hardware to foreign countries are worth ten billion U.S. dollars annually. Moscow uses the ongoing wars on terror in Syria and Iraq to demonstrate performance of her advanced fighting machines. This stimulates interest in Russian weapons from the side of importing nations round the world. As a result, the Russian industry has a healthy backlog of foreign orders, estimated at US dollar 50 billion.



frigates featured a completely revised weapons suite employing the Club-N missile system, A-190E artillery piece, Puma fire control system, Shtil-1 SAM with extended firing range etc. Since these were brand-new and untried, performance shortfalls and electromagnetic interference occurred. These and other issues were discovered at the stage of sea trials and required a year to be resolved. Even though the Indian navy accepted these ships with a considerable delay to the original schedule, it chose to order three more hulls since the Project 11356 proved very capable. Most of the frigates ordered in October 2016 will be constructed at a local shipyard in accordance to the 'Make in India' program.

New Delhi was the launch customer for the MiG-29K/KUB deck fighter. India has ordered 45 navalized MiGs compared to 24 Russia takes for the navy of her own. Respectively, the Indian navy got hold of this advanced type ahead of the Russian navy. Today, these MiGs form the backbone of the Indian navy's Fleet Air Arm. Sixteen airplanes in the initial batch had been provided by mid-2011 under initial contract worth 752 million dollars. This year RAC MiG has to deliver the final batch of six MiG-29K/KUB deck fighters to India under the follow-on order for 29 such aircraft awarded in 2011.

AT SEA AND IN THE AIR

Among weapons systems India procured early from the Soviet Union there was the MiG-21F light-weight supersonic fighter. The type proved long-lasting. Interacting with the local media, RAC MiG general director — general designer Sergei Korotkov emphasized that the MiG-21 was inducted into the Indian air force back in 1963. Since then, the type remains in the Indian service, with twin seat operational trainers and MiG-21UPG 'Bison' multirole fighters continuing to solder on.

The Bison represents a MiG-21bis with a number of improvements, including replacing the original RP-22 unit with the Phazotron Kopyo multi-mode radar enabling firing at two aerial targets simultaneously with Vypel RVV-AE radar guided missiles. Upgrades were made in accordance to the 1996 contract worth U.S. dollar 0.6 billion. The Bison is expected to remain in service throughout this and next decades.

Starting with the MiG-21F, India has been (and remains) the largest overseas customer for MiGs. It took delivery of 64 MiG-29 single seaters and eight MiG-29UB operational trainers in 1986-1989, and added eight and two more respectively in 1994 to compensate for attrition. According to RAC MiG general director — general designer Sergei Korotkov (recently promoted to the post of general designer at United



Aircraft Corporation), 'We have always supplied India with the most advanced equipment. For instance, the MiG-29 went to India before the type become available to Warsaw Treaty countries'.

RAC MiG has won contracts for modernization and refit of 63 surviving MiG-29s into the MiG-29UPG variant. The deal is reportedly worth one billion U.S. dollars. An initial batch of six aircraft underwent refit and modernization in Russia and rejoined the Indian air force in 2011-2013. These serve as specimens for similar work to be done locally on the remaining 57 airframes. Shipments of kits for local upgrade into this version are ongoing.

A group of Indian technicians were trained in Moscow. Having passed exams, they are now implementing their skills at the 11-th Aviation Repair Base (11ARB) of the Indian defense ministry. 'We are trying to expedite the process so as to complete the work on the whole of the MiG-29 inventory in shortest time possible,' Korotkov says. 'We supply kits; the upgradation work is done by the MiG-qualified local technicians under supervision of the RAC MiG team working at the 11ARB'. RAC MiG is working with the local industrial partners to establish MRO in India so as to create more jobs for the locals, reduce logistic chains and cut maintenance costs.

In May 2007, the Indian navy published 'Freedom to use the seas: India's maritime military strategy'. It postulates 'the freedom to use the seas for our national purposes, under all circumstances'. Building the blue-water navy compliant to this strategy is a long endeavor. To be the primary power in the Indian Ocean, the Indian armed forces need force-projection capability. Arguably, this necessary capability is best provided by nuclear powered submarines and aircraft carriers.



The very special and exclusive nature of Indo-Russian military-technical cooperation can best be illustrated by the fact that the Indian navy is the only one in the world that operates a foreign made nuclear powered submarine. The Chakra (II), a fast-attack submarine of the Project 971I, exportable version of the Akula (Bars) class, has been made available for ten years under operational lease agreement. This case is second such in the world's history: India leased a Project 670 vessel for three years (1988-1990).



In November 2013, the Navy accepted its largest warship (and the largest ever exported) — INS Vikramaditya aircraft carrier of project 11430. She was declared completely combat ready in June 2014 when PM Narendra Modi inspected the ship after ten Indian pilots had qualified in MiG-29K/KUB deck operations.

INS Vikramaditya represents reworked ex-Russian navy cruiser 'Admiral Gorshkov' of Project 1143.4. Refit and modernization centered on enabling the ship to operate MiG-29K/KUB deck fighters. Today, local dockyards are constructing aircraft carriers which effectively represent a further evolution of the distinct Russian carrier concept.

REPAIR AND MAKING OF SUBMARINES

Visiting Severodvinsk in November 2013 to take delivery of the Project 11430 carrier INS Vikramaditya, then Indian chief of naval staff admiral

Devendra Kumar Joshi promised local shipbuilders some work on repair and modernization of Kilo-class submarines. Almost two years passed, and on October 14, 2015 the Ship Repair Center 'Zvezdochka' won a contract for major overhaul and modernization of INS Sindhukesari, a Project 877EKM boat.

She arrived in Severodvinsk aboard Rolldock Star on June 15, 2016. Two months later, the submarine was inspected at the dock by the Indian ambassador, who expressed satisfaction with the work being

the navy wants to operate a boat for a longer time, she shall be subjected to 'second overhaul'. If the hull and mechanisms look Ok, the design house and a repair plant it teams with offer lifetime extension of ten years.

Thus, India became the first foreign user of Kilo class submarines to have committed to their lifetime extension. The Russian navy has already done that on Kaluga (2013) and Vladikavkaz. Last year, the latter submarine of Project 877 rejoined the Northern Fleet following completion of the respective work at Zvezdochka. On the Pacific coast, Amurski Shipbuilding Plant (ASZ) overhauled Komsomolsk-upon-Amur which is in the process of rejoining the Pacific Fleet. The Russian navy wants all of the remaining Kilos to undergo major overhaul and lifetime extension though to 2025-2030.

Work on a second Indian boat shall commence in 2017. Further plans call for three more submarines (Sindhuvhaj, Sindhuraj and Sindhuratna) to be subjected to such a work. India wants to overhaul them locally with Russian assistance.

A circle of possible program participants was drawn last year. Public sector is represented by Mazagon Dock Limited (MDL), Goa Shipyard Limited (GSL), Hindustan Shipyard Limited (HSL) and Garden Reach



Indo-Russian partnership stands on a firm historic footprint of successful programs. Russian weapons systems dominate inventories of the Indian armed forces. But this leadership shall not be taken for granted. Aggressive exporters from other countries are keen to unseat Russia in this and other lucrative markets. As per a connection to BRICS, the exemplary case of lasting Indo-Russian relations in the highly-sensitive area of military-technical cooperation can serve a good example and specimen for other member states as their mutual ties and interdependence grow.

Shipbuilders and Engineers (GRSE). Of those, Hindustan Shipyard seems the best candidate, as it overhauled one Project 877EKM boat in the 2006-2015 timeframe. Out of private sector companies, Pipavav (recently acquired by the Reliance Group) and Larsen&Taubro were considered, with the latter having best chances to qualify for the job.

The Indian navy operates nine Russian-built Project 877EKM submarines. They were built in the 1986-2000 timeframe and later underwent modernization so as to employ the Club-S missile complex using three

types of tube-launched cruise missiles.

The Indian navy lost Sindurakshak to internal explosion in August 2013. Since then New Delhi has been considering buying one or two Project 636s to compensate for that loss. Doing so would not require any measures to do with training facilities and weapons arsenals. Due to the type commonality, the navy can make use of existing wares and infrastructure.

Russia was one of the foreign countries invited to present information on diesel-electric submarines

in frame of the international tender called Project 75I. This competition is about construction of six boats, of which one or two would be provided by the foreign collaborator, and the remainder assembled locally under license. Russia offered the Amur 1650, which is an export derivative of the Project 677 Lada developed for the Russian navy.

As it appears now, the selection process has been indefinitely suspended at the stage of Request for Proposals. Long expected, it has not been released yet. It seems increasingly likely that New Delhi may

instead go for a larger number of Scorpene submarines to be ordered from DSNIC of France and its local partner Mazagon Dock Limited.

Under the contract signed in 2005 and estimated at 3.2 billion dollars, the two companies are obliged to build six Scorpene boats including some with an indigenous AIP module. This program has been beset by repeated delays. Finally, INS Kalvari sailed for sea trials in 2016. This indeed long expected, cheerful moment prompted defense minister Manohar Parrikar to suggest that the original order might be extended.

Arms sellers in Moscow keep hope that sooner or later India would buy a number of Amur 1650 submarines from Russia, most likely after the majority of the teething problems with the Project 677 head vessel are resolved and the Russian navy takes some improved submarines for itself.

These hopes are based on the long history of Indo-Russian relations in the underwater domain. The Indian navy acquired its first submarines from the Soviet Union. New Delhi first inquired about a possibility of purchasing Russian boats in August 1964, during defense minister Y.B. Chavan's visit to Moscow. That time it took the Indians only twelve months to prepare all the necessary documents and permissions, and proceed to signing a firm contract in September 1965. The first submarine built under that deal, INS Kalvari, commissioned in December 1967. Fifty years past and... the acquisition process under Project 75I seems to take ages!

Four Project 1641 boats were delivered in 1967-1969, and became first-ever Soviet submarines of special exportable design made to the specification of a foreign customer. Then, India placed a second order, for four boats of the improved 1641K design. These were delivered in 1973-1975. Last of those — INS Vagli — was decommissioned in 2011, after 36 years in service.

Today, with all major dockyards of the public sector overloaded with orders, New Delhi has been encouraging the private sector



to get involved into the business of constructing warships as well as doing repair and maintenance work on them. It looks increasingly likely that the private sector may one day attempt to build submarines.

CHALLENGES

India is a large country with potent, combat-experienced army. Continuing confrontation with Pakistan and competition with China stimulate New Delhi to develop armed forces and equip them with most advanced weaponry so as to achieve and maintain a quality advantage over Pakistani and Chinese military. Continuing economic growth fuels these ambitions.

Today, Indo-Russian cooperation in the defense area faces new challenges. Russian OEMs fighting for Indian orders are placed in a highly competitive environment. Firms from the U.K., France, Sweden and Germany were represented in the Indian market with their products for decades. Israel joined them in the late 1990s.

Earlier this century, the United States entered the Indian market in a big way. Sales of the North American products include the C-130J Hercules, C-17 Globemaster III, P-8I Poseidon, AH-64D Apache. Aiming to include India into a global anti-Chinese circle, the U.S.A. is prepared to sell

advanced weapons systems and licenses for local assembly. North American defense companies expect to conquer a considerable portion of the Indian market. In many instances, they offer rather expensive, but the most technologically advanced equipment.

Another challenge for the Russian makers is to do with co-development programs together with their Indian partners. Local firms want to develop engineering capabilities of their own. Whereas the first such case — the PJ-10 BrahMos supersonic missile from BrahMos Aerospace joint venture — is often pictured as 'exemplary', others — Fifth-generation fighter aircraft (FGFA), Multirole Transport Aircraft (MTA) etc. — proceed too slowly.

Indo-Russian partnership stands on a firm historic footprint of successful programs. Russian weapons systems dominate inventories of the Indian armed forces. But this leadership shall not be taken for granted. Aggressive exporters from other countries are keen to unseat Russia in this and other lucrative markets. As per a connection to BRICS, the exemplary case of lasting Indo-Russian relations in the highly-sensitive area of military-technical cooperation can serve a good example and specimen for other member states as their mutual ties and interdependence grow.



R-73 MISSILE: A MASTERPIECE OF DEFENSE

Interview with Yuri Klishin, General Director of 'DUX', JSC

俄罗斯“杜克斯”（DUX）开放式股份公司 总经理尤里·彼得罗维奇·克利申（Yury Klishin）关于《面向亚太国家的俄罗斯航空航天产品与技术》特别项目（2016年中国航展）的采访纪实。



— **Mr. Klishin, to what extent do you think has the value of 'DUX'-made products grown in a current international climate as a deterrent for local wars threat?**

— R-73 is a dangerous weapon which has been many times tested during real operations. Available armaments have always been and will be a deterrent against ill-advised actions by a potential enemy. In this

regard our R-73 will provide a necessary protection and countermeasures in a menace of local war. So far the missile has been popular both in Russia and other countries.

— **R-73 is certainly among the best defense masterpieces. Thus, which operational and other values made it a world blockbuster?**

— It has a tested and reliable aerodynamic configuration, long

life. When performing scheduled repairs of old missiles we can see they are in a perfect operating conditions, though something has to be replaced. This missile can be developed further. Thus, fitted with new hardware it can have increased combat capabilities, range, speed and power. We are aware of a number of upgrade patterns to make the best use of the product.

— **What is the trend for 'DUX' upgrading of world-known products?**

— Our main goal is increasing weapons effectiveness. However, as recently as yesterday our priority task was to set up a mass production, but today we are making the range of products absolutely extended. We have plans to be engaged in development. Thus, in new capacity 'DUX' will be responsible for all armament life cycle stages, from development to disposal.

We use the best traditions of the best Russian engineering centers and cooperate with them, work closely with national aircraft manufacturers, provide 'DUX' designers with the latest technologies, adopt the latest production solutions. Besides, we

introduce computer-aided engineering systems.

— **Which 'DUX' innovations do you consider to be the most important and promising?**

— Today 'DUX' is making many efforts to upgrade R-73 missile and its launcher. The missile is getting better power system, control, dependability, G force, altitude and range capabilities. The new missile is going to be 1.5 times more efficient than the previous one. The launcher

being used by all front-line aircraft is also being improved.

We are engaged in developing new trends although today demand is exceeding production. Furthermore, it does not involve only missiles, but warning panels, all kinds of electric valves, high-pressure bottles, electric operating mechanisms and other items, the majority of which are components for other finished products. We are absolutely sure that manufacturing wide range

*Yuri Klishin,
Director General
of 'Dux', JSC*





R-73 is a dangerous weapon which has been many times tested during real operations. Available armaments have always been and will be a deterrent against ill-advised actions by a potential enemy. In this regard our R-73 will provide a necessary protection and countermeasures in a menace of local war. So far the missile has been popular both in Russia and other countries.

of products is a kind of protection during hard times.

— ***To what extent is Asia-Pacific region important for the enterprise? What forms of cooperation with China and other regional states are being or may be developed?***



— Asia-Pacific region is the largest customer for 'Dux'-made air weapons, both export version of R-73 (R-73E (R-73EL) and its heavy-upgraded version RVV-MD. Asia-Pacific region has already received many products. We have been cooperating until the present day.

— ***What principles does 'Dux', JSC follow in its maintenance policy? What new is added to after-sale support and maintenance pattern?***

— R-73 type missiles being within rated service and storage life with manufacturer's certificate available are involved in corrective maintenance system, which includes activities to keep products reliable, trouble-free and efficient according to standard technical and operational documents. Such activities

can be done both on the manufacturer's premises and in the field with technical support available. Faults happened during a warranty period should be repaired by a manufacturer, free of charge. Faults happened beyond this period (non-warranty) should be repaired at customer's cost. By deeper testing of separate missile compartments we can surely define failure origins and perform a dedicated preventive maintenance.

— ***How does the enterprise ensure optimized customer unit costs, i.e. good condition and overall operating costs? What signature formulas are used by 'Dux'?***

— To optimize good condition costs (per 1 working unit) and overall operating costs as to products with expiring

lifecycle we apply a corrective maintenance done on the manufacturer's premises (manufacturer's certificate executed similar to a new product), which involves general repairs for complete recovery of a product operating life with components replaced including basic ones, and both new and recovered units used (only once).

Besides, lifecycle and warranty liabilities are similar to those of the products equipped with currently-made components.

— ***Today 'Dux' is implementing a large-scale program to upgrade production capacities. What effect will it have on export products in the future?***

— Currently we are engaged in extensive equipment upgrading. We are purchasing new manufacturing machines, carrying out renewal and improvement of available machines, installing new attachments, let's say high-frequency spindles, holders, cutters, computerized numerical



opinion of technologists, those who directly specifies things required for production. Generally speaking, we base upon a flexible system which helps us accomplish upgrade on a real-time basis.

One of the principles which we follow when shaping 'Dux' develop-

So we have made a decision to improve our self-containment, viability and profitability using our own developments. In this regard, as I said before, we upgrade production, renovate personnel, establish cooperation with other research institutions and enterprises, both military and civil. That means that we try to make ourselves independent on the others, and on the contrary to determine new approaches and view of development of any given product both military and civil-oriented. We wish to enter new markets not because of dumping prices but thanks to better quality products and using 'Dux' proud brand. It is worth a lot.

— ***Aircraft systems of dozens of countries are equipped with your missiles. What helps your enterprise maintain competitive capability at world market for decades?***

— Our competitive capability depends on great quality and reliability of every product. In this regard a key role is played by age-old traditions of manufacturing advanced aircraft and armament. Thanks to highly qualified personnel tasks can be accomplished to a high standard.



control on durable cast frames of Soviet -Russian machines.

Meanwhile, we care about each production area and buy only certain equipment with required performance. When choosing machines and machining centers we rely on

ment strategy is a production self-containment in order not to become a hostage of circumstances. Currently it is self-containment that often makes enterprise stable and determines its readiness for hard times, especially when supply is restrained.

Asia-Pacific region is the largest customer for 'Dux'-made air weapons, both export version of R-73 (R-73E (R-73EL) and its heavy-upgraded version RVV-MD. Asia-Pacific region has already received many products. We have been cooperating until the present day.

— 在您看来，作为对局部冲突威胁的遏制因素，DUX公司的产品在当前国际环境下，其重要意义增加了多少？

— 作为一种威力强大的武器，R-73导弹经历了多次实战的检验。无论在过去和未来，拥有武器都是对潜在敌人肆意妄为的遏制因素。从这个意义来说，当出现局部冲突的威胁时，我们的R-73导弹能保证必要的防卫和反制水平，并至今受到俄罗斯和其他国家国防部的欢迎。

— R-73导弹毫无疑问是最耀眼的防卫武器之一。您认为，这



种导弹有哪些技战术优势和其他优势，令其成为国际热销产品？

— 完美而可靠的空气动力学结构，还有较长的使用寿命。我们会对已服役多年的导弹进行定期检修，发现它们仍处于完好状态，虽然服务政策的个别内容需要修改。这种导弹还有不少变型，可以在新的元件基础上安装新的“内芯”，从而大幅提高其战斗性能，加强其射程、飞行速度和打击威力。我们已经掌握了多种升级方法，它们能让这种武器发挥最大作用。

— 对DUX公司的全球著名产品，你们有哪些升级方向？

— 我们的主要目标是提高武器的使用效率。如果说，我们在昨天的主要任务只有武器生产，那今天我们完全扩大了自己的工作范畴。我们计划成为一家设计单位，并且以这个

新身份，DUX将负责从设计到销毁的武器生命周期的每个阶段。

我们不断用俄罗斯最佳工程中心的最优秀传统来武装自己，同它们合作，与国有飞机制造公司紧密协作，为我公司的设计师提供最新工艺，学习掌握最先进的生产技术，积极推行自动化设计系统（CAD System）。

— 您认为DUX产品的哪些创新最重要、最有前景？

— 在今天，DUX公司将很大力量放在R-73导弹及其发射装置的升级工作上。我们努力扩大导弹在动力、过载、可控性、可靠性、射高和射程方面的性能。总体而言，其性能比前一个版本要高1.5倍以上。我们还不断完善这种导弹的发射装置，它们安装在前线航空兵的各种飞机上。

即使产品目前供不应求，我们仍积极拓展新的工作方向。并且不光是导弹产品，还有信号板、各种电动活门、高压罐、电气机械及其他产品，其中大部分是其他终端产品的零部件。我们坚信，品种广泛的产品生产，在某种程度上是危机时期的企业发展保障。

— 亚太地区对贵公司有多重要？同中国和其他本地区国家的合作，有哪些现有的和潜在的发展模式？

— 亚太地区是DUX公司生产的航空武器的最大销售市场，其中既包括R-73导弹的出口型号R-73E（R-73EL），也包括其深度升级版RVV-MD。我们已经向亚太地区出口了很多产品，并继续发展该地区国家的伙伴关系。

— DUX公司的服务政策遵循哪些原则？在导弹的售后服务和维修服务模式中，公司增加了哪些新元素？

— 对于拥有出厂证明、仍处于规定的使用和储存期的R-73导弹，我们采用翻新服务体系，它包括旨在维持产品使用的可靠性、无故障性和有效性的一整套措施，以使其符合规范性技术文件的使用文件的要求。这些成套措施既可以在制造厂，也可以在拥有技术保障的野外条件下实施。如果产品故障发生在保质期内，则由制造厂家付费修复，在保质期以外则由买方付费。我们深化对导弹各个舱体的测试，从而诊断出具体

的故障原因，并采取一系列预防性措施。

— 贵公司如何优化用户的个别成本，比如维持产品的完好状态，以及总和使用成本？DUX有哪些独特的方法？

— 对于已经过了使用期的产品，为了优化用户维持产品完好状态的单项费用（换算为每件产品的费用）和总和使用成本，我们采用在制造厂的翻新体系（像新产品一样办理出厂证书）。这个体系包括对产品的大修，完全恢复产品的使用寿命，更换新的或翻新后的（不超过一次）零部件，包括基础元器件。



Today 'DUX' is making many efforts to upgrade R-73 missile and its launcher. The missile is getting better power system, control, dependability, G force, altitude and range capabilities. The new missile is going to be 1.5 times more efficient than the previous one. The launcher being used by all front-line aircraft is also being improved. We are engaged in developing new trends although today demand is exceeding production. Furthermore, it does not involve only missiles, but warning panels, all kinds of electric valves, high-pressure bottles, electric operating mechanisms and other items, the majority of which are components for other finished products. We are absolutely sure that manufacturing wide range of products is a kind of protection during hard times.

与此同时，产品的使用寿命和保质期同使用新零部件生产的产品一样。

— 目前DUX公司正在实施产能升级的大规模计划。这对公司未来的产品出口有何影响？

— 目前我公司工厂正在实施严格的设备升级计划：我们采购新机床，对现有机床进行更新和完善，安装新的连接设备，比如说，在结实耐用的苏式及俄产大型铸造机床的床身上安装高速主轴、夹具、切削工具和数控系统等。

与此同时，我们还考虑每个工段的成本，根据需求参数采购我们需要的设备。在选择机床和加工设备时，我们会征求直

接决定生产需求的工艺师的意见。总的来说，我们实施一个富有弹性的体系，它能让我们实时解决升级任务。

在制定DUX公司的发展战略时，我们所遵循的原则之一，就是生产的独立化和自给自足，以免受制于外部形势。在目前条件下，正是独立化在很大程度上保证了企业的生命力，使企业能够适应复杂的形势，特别是在采购订单减少的条件下。

我们决定利用自有研发来提高企业的独立性、生命力和利润率。为此，正如我之所共说的，我们进行生产优化，整顿人力资源，组织同军用和民用产品科研机构及企业的协作。也就是说，我们努力让自己不受

制于外部因素，而是相反，独立确定发展某种产品的新方法和新视野，这既包括武器，也包括民用产品。我们希望不是通过价格倾销，而是通过更高的质量、使用令人骄傲的DUX品牌进军新的市场，这弥足珍贵。

— 贵公司的导弹装备几十个国家的空军。是什么让你们数十年如一日地保持在国际市场上的较高竞争力？

— 我们公司的竞争力是由所有产品的最佳质量和可靠性来保证的。在这其中起到关键作用的，是一个多世纪的先进航空设备及武器的优良生产传统。工厂的高素质专家让我们能够高水平地解决任务。





Tatiana Valeeva

AGAINST ANY TANKS

The best in the world Kornet-EM multipurpose missile system

As of today the IIIrd generation Kornet-E portable/transportable laser beam-rider system developed by KBP and adopted in 1998 is the weapon de-finitively complying with the concept of advanced ATGW, being state-of-the-art specimen of multipurpose tactical short range weapon system allowing en-gagement of virtually any small-size target within the system's line of sight. Aiming for further enhancement of Kornet-E ATGW combat capabilities, KBP Instrument Design Bureau developed a new multipurpose missile system — Kornet-EM.

Antitank guided missile systems (ATGM) have been developed and produced globally for already half a century. Since then they became the most popular and wanted type of high precision weapons (HPW) thanks to their usability and relatively low cost. A future ATGM system must be a versatile defensive-offensive guided weapon, whose portable and combat vehicle transportable modifications ensure a wide range of applications in close range tactical zone in various combat environments.

The weapon is designed as an automatic combat system, incorporating, besides the firing unit itself, both reconnaissance and control assets, and ensuring full automation of all combat operation constituents

— target detection and distribution, issuing and processing of target designation, missiles' guidance. The operator's task within such system is limited to supervision of its proper functioning and launch of missiles.

The open architecture of the system in terms of data exchange with higher-rank and peer units along with its combat capabilities makes it a vital element of Army network-centric system.

Kornet-EM multipurpose missile system provides for engagement of modern and future tanks, various fortifications (pillboxes, bunkers) and low-velocity aerial targets (helicopters, assault aircrafts and UAVs) in day&night and adverse weather conditions under enemy ECM and optical jamming at ranges up to 8-10 km.

The Kornet-EM system comprises:

- combat vehicle with two automatic launchers and operator's panel with a display;
- battery commander's reconnaissance and control vehicle, equipped with combined surveillance system including TV, IR and radar reconnaissance aids, navigation, communication and data exchange systems, automated control suite and weapon system (Kornet-EM ATGM and PKTM machine-gun),
- guided missile with HE warhead with impact and proximity fuses and firing range of up to 10 km;
- an antitank guided missile with a maximum firing range of 8000 m and shaped charge warhead armour penetration of 1100-1300 mm which enables the Kornet-EM system to



engage modern and future tanks bearing in mind the tendency to growth of their armour protection.

Due to implementation of state-of-the-art but, however, low cost technical solutions, Kornet-EM acquired a number of new features, allowing significant broadening of its combat capabilities to counter both conventional ground targets, as well as non inherent to this class of systems ability to engage low-velocity aerial targets:

- the use of computer vision along with automatic target tracker makes it possible to exclude an operator from missile guidance process and in fact implements the 'fire-and-forget' principle, thus giving a 5-times increase in accuracy of target tracking during real combat.

- engagement of targets in automatic mode reduces psychophysical stress to operators, requirements to their skills and duration of their training.

- automation of guidance process along with automated target detection and distribution, target designation commands generation and processing result in virtually fully automatic combat system, limiting the operator's task to supervision of its proper functioning and launch of missiles.

- combat vehicle with twin-launcher ensures simultaneous salvo firing at two targets, thus significantly increasing the system's firing rate and number of targets handled and at the same time allowing two-fold reduction of combat assets required to complete a mission. Such perfor-

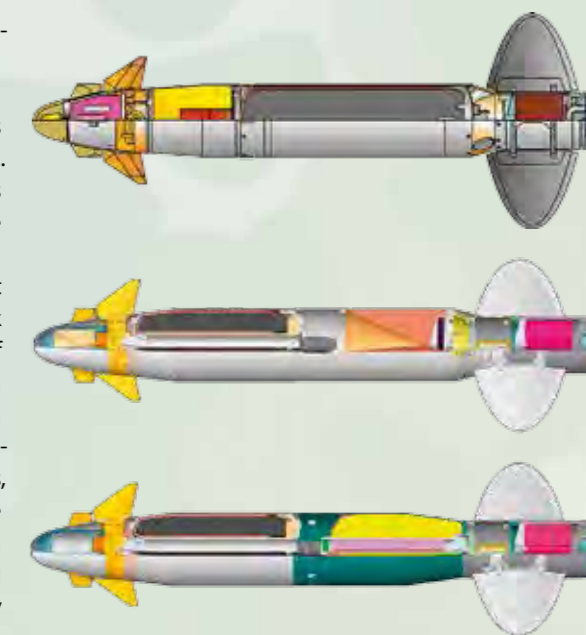
mance specifications endow Kornet-EM with the highest target handling capability among similar existing and future systems — min. 3-4 targets per minute at ranges up to 5 km. Thus, in case the weapon systems are positioned at a stand-off range from enemy tanks (more than 4 km) a single Kornet-EM battery of 9 combat vehicles is able to repulse an attack (i.e. destroy min. 50% of targets) of enemy tank (M1A2 class) battalion (58 tanks). Actually, such mission may be accomplished by two battery salvos, destroying 32-34 tanks, i.e. 55-60% of the battalion. The time required to accomplish the mission will not exceed 1 minute, allowing to avoid casualties, since the enemy

tanks will not be able to reach their effective firing distance.

- new capability for ATGW — effective engagement of small-size aerial targets — reconnaissance and reconnaissance-attack unmanned aerial vehicles being the enemy's crucial and mass combat support tool,

Main Performance Specifications

Flight range	150 — 8000
Armour penetration, mm	1100 — 1300
Maximum flight speed, m/s	300
Weight with launch-tube, kg	31
Length of launch-tube, mm	1210





as well as helicopters and as-sault aircrafts.

UAV on a reconnaissance mission lets enemy well in advance disclose de-fence, give accurate target designation for firing over-the-horizon munitions, rec-ord and transmit information on army relocations both during operations near the line of contact with enemy and in the rear. This results in significant increase in casualties and possible failures of combat mission performance. From the point of view of engagement, UAVs are difficult targets due to low altitude of flight. Moreover, in case of mass application they are a teaser for

the air defence assets, causing high consumption of expensive surface-to-air missiles.

Attack helicopters and tactical aircrafts are by now the highest threat for land forces, as they can inflict maximum damage in minimum time. For example, a helicopter is able to destroy a company of armoured vehicles (10-14 armoured vehicles) with one ATGM load.

To efficiently counter the UAVs, attack helicopters and tactical air-

Another distinctive feature of modern combat operations is deployment of sophisticated surveillance and networking technologies in the tactical units. Wide application of integrated surveillance aids (various combinations of optical, radar, TV and IR systems), sophisticated automatic assets of tactical units operation control, communication and navigation allows continuous monitoring of the battlefield, real-time reception of reconnaissance



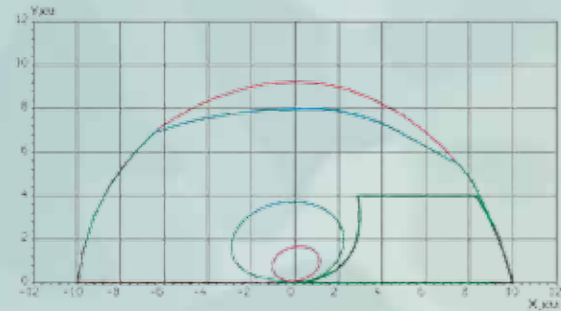
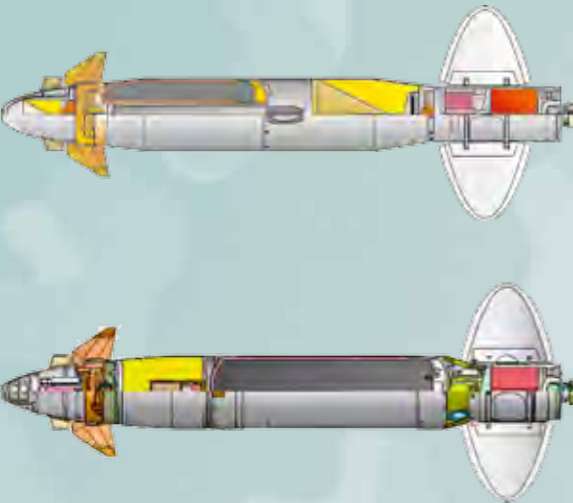
crafts the air defence assets should be available right in the combat formations, because at-tack or reconnaissance flights are performed at low altitudes, impeding due-time detection with medium and short range air defence systems which are usually sta-tioned deep in the home front. Kornet-EM is the system able to efficiently ac-complish low-velocity aerial threats repulsion tasks.

data (both from peer and higher level units) overlaid on the digital maps and automatic or semiauto-matic genera-tion and transmission of target&firing data to the fire units, thus, determining the efficiency of high-precision tactical weapons and ATGW employment.

Availability of surveillance systems providing detection of wide range of targets and automatic bat-

Main Performance Specifications of the System

Firing range, m:	
• minimum	150
• maximum	10 000
Guidance system	automatic, beam riding guid-ance
Jamming immunity	high
Number of targets engaged simultane-ously by a salvo	2
Armour penetration by shaped charge warhead, mm	1100-1300
TNT equivalent of high explosive war-head	7
Ammunition load, pcs	16
including ready-to-fire missiles	8
Change-over from traveling to combat configuration, seconds	7



Kornet-EM multipurpose missile system provides for engagement of modern and future tanks , various fortifications (pillboxes, bunkers) and low-velocity aerial targets (helicopters, assault aircrafts and UAVs) in day&night and adverse weather conditions under enemy ECM and optical jamming at ranges up to 8-10 km.

tery operation control aids is a vital need for Kornet-EM with its versatil-ity of combat applications and ability to effectively counter aerial targets. Timely submission of aerial targets data to the fire units (Line Kor-net-EM combat vehicles) directly influences both the efficiency of ATGW coun-teraction to aerial threats, as well as casualties in the units under air raid.

To provide operational surveil-lance/data exchange and con-trol of Kornet-EM battery combat operation, a battery commander's surveillance&control vehi-cle is designed based on standard line Kornet-EM CV.

The Surveillance&Control vehicle is special-purpose unit combining both reconnaissance/control and fire unit functions.

The control vehicle comprises:

- Integrated surveillance system featuring TV, IR and radar aids;
- navigation aids;
- communication and data exchange system;
- automated control suite;
- weapon system.

Employment of radar in the con-trol vehicle allows target detection at rabges significantly exceeding the firing range of line combat vehicles weapon systems. This provides effi-cient control of Kornet-EM battery combat operation along with wide sector surveillance by Kornet-EM control vehicle.

Provided with such surveillance capabilities the task of the control vehicle limits to target detection, friend-or-foe identification and tar-get distribution among the line vehi-cles in order to avoid multiple firing at a single target.

The battery commander's con-trol vehicle capabilities by day/night time and under any weather condi-tions are the following:

- detection, identification and tracking of moving or stationary air and ground targets, automatic mea-surement, generation and processing of the detect-ed targets' coordinates;
 - friend-or-foe identification;
 - generation and transmission of target designation data from the anti-tank battery commander to line combat vehicles;
 - maintaining radio communica-tion within the battery, as well as with higher-rank and peer unit com-mander's;
 - real-time control of battery fire, relocation and firing pattern planning in case of changing deployment area with data overlaying on the digital map.
- These capabilities allow:
- reduction of ground targets detection time for line combat vehi-cles — by 2-3 times at daytime and by 6-10 times at night (if compared to target search using IR sight), aerial targets — more than 10 times;

- automatic determination and fir-ing primarily at the most threatening tar-get;
 - maintaining balanced target load on the combat vehicles to avoid multiple firing at a single targets by several vehicles;
 - timely readjustment of battery firing pattern in case of casualties.
- As a result, the Surveillance& Control Vehicle is able to double the combat effectiveness of Kornet-EM battery while countering enemy tanks attack in properly arranged defence formations, or increase it by 2.5 times in case of enter-ing the combat (from march) without prior area survey and missing information about enemy forces.
- In case of countering aerial threats (UAV, helicopters) the combat effi-ciency of ATGW battery will increase by 2.5-5.0 times due to reduction of target detec-tion time and increase of detection probability.



SECURE RESCUE AT ANY HEIGHT



Unique autonomous rescue parachuting back-pack system for emergency escape

The innovative Russian private Space Rescue Systems Ltd. (SRS Ltd.) company (www.cosmic-rs.com) proposes a unique and unrivalled emergency rescue vehicle SPARS® — an Autonomous Rescue Pneumo Transformable Chute Back-pack System — a validated forefront rescue solution for guaranteed secure individual emergency escape from nearly any high elevation structure (skyscrapers, offshore platforms etc.). The SPARS® project is resulted in a creation of a brand new pneumo-framed aerodynamic devices technology. There is no doubt in the near future this solution is going to be a must-have in skyscrapers construction all over the world

The SRS Ltd. proposes a SPARS® high rise escape technology that has a global nature. It is uncovered market niche with an obvious but unrealized human requirement to be and to feel safe while living or working in high elevation buildings. In case of emergency than traditional evacuation is impossible or ineffective those people all over the world have practically no means of urgent secure rescue from the height and need an alternative solution.

Actually the technical reviews shows that at present there are practically no means for secure alternative escape starting from 60÷80 m height and higher available on the market. But according to the said firefighter's statistics about 3÷5% of people being caught in alarm situation on the high-rise building used to try escaping from the windows and

usually perished. On the other side homeland security analytics says that in average an every skyscraper in the world is expected to be subjected to a fire case (terroristic attack or other emergency) once in every 47 years.

So the SRS Ltd. has decided to resolve the problem in finding an alternative to traditional evacuation methods technical solution. It takes about eight years of R&D to resolve the task. Finally it is resulted in creation a brand new escape technology — an Autonomous Rescue Pneumo Transformable Chute Back-pack Solution for secure personal rescue from high-elevation structure in case of emergency than traditional evacuation methods are impossible.

The SRS. Ltd company in outsourcing cooperation with 18 leading Russian and foreign aerospace companies has fulfilled full-scale research and development activities to devel-

op the project from conceptual proposal stage to releasing operating prototypes unparalleled anywhere in the world.

The SPARS® escape technology is based on a synergy of sophisticated aerospace technologies such as Air-Aspirator Rapid Inflation; Elastic Pneumo-Frame Catapult Ejection; Air-Drag Deceleration; Air-Bag Shock Absorbing and others. Such technologies were invented for space probes deceleration during descent in atmospheres of Solar system planets and its landings on surfaces.

The SPARS® device provides a secure individual escape of untrained person or valuables cargos with weights 45÷120 kg. from about any of existing high-rise (50÷1000m) facilities (skyscrapers; towers; offshore platforms etc.) with guaranteed safe landing on any underlying surface in urban terrain or water in

case of emergencies than traditional evacuation methods are impossible.

The SPARS® solution meets the Russian Ministry of Emergency Situations (EMERCOM) requirements for high-rise emergency escape apparatus (GOST R 22.9.08-2005; GOST R 12.4.206-99) and provides for the following unique capabilities, never implemented before:

1. Alternative of emergency escape (so-called 'last resort rescue')
2. Emergency evacuation of an untrained person having weight of 45÷120 kg, from heights of 50÷1,000 m;
3. Ready-for-use in 45÷60 sec;
4. Self-sustained operation and independently selected escape route;
5. User-friendly operation for untrained persons and fully automated rescue procedure right from start;
6. Personal protection against external hazards during evacuation;
7. Appropriate weight of a back-pack-type carried device;
8. Secure injury-free landing on any underlying surface.

The SPARS® unit for individual use had required a special certificate basis. In this regard the National Standard (GOST) 4240-001-2012 specifying medical and technical requirements for injury-free operation by untrained persons rescued by means of new type SPARS® shock-

absorbing systems entered into force in 2013.

To have certification tests performed a special Hybrid-III (USA) crush test dummy-based anthropomorphic (bionic-like) instrumentation station has been developed and created by the SRS Ltd., which has no equals in Russia.

A full cycle of comprehensive calculations and testing to validate design properties and performance has been performed. Up to now the SPARS® device technical operational reliability is 98.7% but further testing is under way.

New SPARS® escape solution provides the following advantages:

1. Alternative (a 'last resort') escape mean for ordinary person in case of emergency in the high-rise structure;
2. Secure rescue of untrained personnel (18÷70 years old) from high elevations from 5 till 1000m (no practical means available starting from 50 m height);
3. Off-line capability of the system provides mobility that helps to find optimal self-escape way of out from emergency situation;
4. Smooth automated ejection from the emergency object after manual initialization of the system;
5. Guaranteed deploy of the canopy with 3÷5 m loss of height irrespective of air flow speed pressure;
6. Protection from dangerous external factors (fire, hits, smoke) during descent;

The SPARS® General Specifications

1. Total Assembly Weight — 25 kg
2. Rescue Payload Weight — 45÷120 kg
3. Descent Elevations — 5÷1000 m
4. Landing Velocity — 5÷7 m/s
5. Landing Angle — < 30°
6. Footboard Barrier Elevation — 1.5 m
7. Descent Time — 3÷150 s
8. Ready-to-use Time — 45÷60 s
9. Launch Initialization Time — 15÷20 s
10. Inflating Gas — Air;
11. General Dimensions:
 - a. Assembled — 900x450x300 mm
 - b. In Descent mode — 6,500x2,700mm (without canopy)

Actual Landing Impact Loads:

Acceleration directions:

'chest-to-back' — up to 8÷10 g

'side-to-side', 'head-to-pelvis' — up to ± 6 g

Acceleration Exposition Time — less than 0.5 s

Acceleration Growth Velocity — less than 500 1/s

User's age — 18÷70 years

7. Safe landing on any underlying surface in urban terrain;
8. Reusable and does not sink.

In packed and assembly complete mode the SPARS® system weights 25 kg with back-pack dimensions





850x450x350mm and has easy- to-use suspension system.

The SPARS® has its Technical Data Sheet (TU 801130–5047075064–01–10) and working design documents issued. Under the SRS Ltd requirements Russian gas-filling systems (GFS) manufacturing company has mastered Autonomous Two-Stage GFS for SPARS® (TU 8042–017–45307693–2013).

The SRS Ltd. Intellectual Property Rights on SPARS® and its 'know-hows' have been completely protected within Russia (9 Patens, 3 Trade Marks) and abroad under PCT (Patent Cooperation Treaty) procedures 2 'umbrella' requests for SPARS® have entered national level in 15 countries and covered 78% skyscrapers and

95% potential SPARS® manufacturers. 13 Patents of the US, China, Japan, Canada, South Korea, Singapore, the Ukraine, Indonesia, Malasia and Australia have been already received.

Three Russian EMERCOM Certificates of Conformity were received for the SPARS®. 'Aerospace medicine and military ergonomics' R&D Institute of the Russian Air Force has granted an official approval for the SPARS® physical adaptability.

The SRS Ltd. company now is looking for cooperation with a strategic Partner and/or investor in order to industrialize the brand new SPARS® product; to make it commercial; to prepare and set up its production and to enter with it into a global commercial market having all nec-

essary intellectually property rights protected.

An accurate assessment of the terms, timeframes and investments required for the SPARS® industrialization it is foreseen that a Partner from the region where product itself (or its production) could be demanded (Middle East, China, US, Europe, Asia-Pacific etc.) could formulate and provide the SRS Ltd. Company with the regional authority technical requirements to upgrade the product specifications and also could determine the necessary level of licensing.

At the same time in order to reduce production costs it is desirable to find and select a local manufacturer taking into account its technical capabilities and possibility to use appropriate production process technologies.

Upon receiving necessary information from a Partner the SRS Ltd. Company could finalize the design documentation, to fabricate a prototype with specifications meeting local needs and to determine expected investments and timeframes necessary to prepare and to run mass production of the product in the region.

Shares and Conditions in the business organization is a matter of further negotiations. The SRS Ltd. Company would be ready to demonstrate its good willing approach and to meet a Partner in negotiations halfway with necessary flexibility in some critical questions aiming to achieve mutually beneficial cooperation.

Such forms of cooperation as Joint Venture, Technical, Manufacturing or License Agreements are feasible.

For a strategic industrial Partner sought who would be interested to

run mass production of the SPARS® in the region and enter an empty market with protected rights it would be necessary to have production technology experience in the fields of:

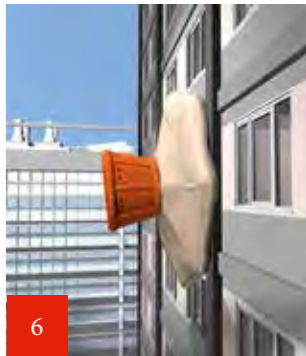
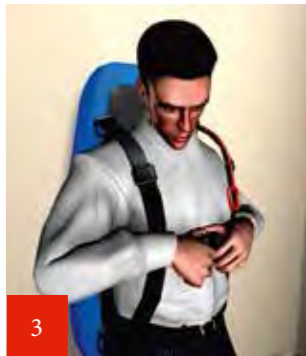
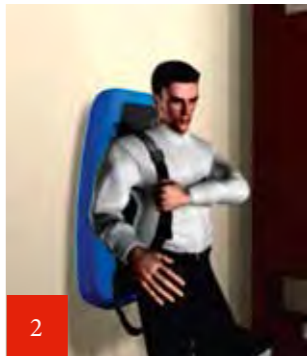
- thin coated/laminated fabric manufacturing;
- assembly from these fabrics a complex air-beam-frame air-proof inflatable structures;
- parachute canopy manufacturing;
- air-aspirator gas filling manufacturing;
- plastics (carbon) manufacturing and forming
- human field (air-borne) tests plastic forming and others.

A Partner sought may be expected to undertake part of those activities or provide financing for already SRS Ltd. Company existing outsourcing manufacturing solution in Russia on a mutually beneficial basis.

As for the SPARS® solution operation such a potential entity sought (hotels, profitable houses; skyscraper's management company; offshore platform management; airborne attractions & entertainment companies etc.) should only require a free window exit sized 1000x500 mm at the appropriate height to use Autonomous Pneumo Transformable Escape Chute and propose to its clients an additional exceptional secure service with limited warranty.

General market estimations shows there are over 7,303 finished and 2,500 under construction skyscrapers worldwide with the heights of 100÷828m, over 100,000 buildings having height of 50÷100m and more than 800 offshore platforms. Taking that analysis into account the SPARS® may have potential market capacity of up to \$700-850 million annually.

Furthermore, the SPARS® estimated potential market capacity is worth over \$3.5 billion in commercial sector alone. The Governments market is bigger but for accepting that new technology implementation it may require some updates of the appropriate local norms and regulations.



There are following innovations in the proposed SPARS® technology:

1. A brand new free parachuting technology (means and escape method) was created for emergency escape from heights higher than 50 m where practical methods for safe evacuation of a person are not available on the market.
2. Sinergy solution based on specially designed and produced from film-laminated fabric a rapid inflatable air-beam single volume frame structure for:
 - Elastic catapult ejection of a human from a window of an emergency object;
 - Forced deploy of the canopy with only 3÷5 m loss of height and irrespective of air flow speed pressure for deployment (usual parachute requires of 25÷100 m free fall and/or 250÷350 km/h speed of airplane to be deployed);
 - Guaranteed safe landing with 5÷6 m/s vertical velocity on any underlying surface in urban terrain using integrated air-frame shock absorbing pneumo dumper.
3. Fully automatic mode of usage (after manual initialisation of the apparatus) and all the descend envelope accelerations bearable for an ordinary person make the escape solution available for use by untrained people from 18 till 70 years old;
4. New type of light weight air-proof film coated fabric for air-beam inflatable frame structure was created.

The Special National Standard (GOST) for shock acceleration limits for untrained human using new type of lodgment Rescue Parachuting Systems was issued.

The Crash test dummy Hybrid-III 50% percentile was instrumented, calibrated with the help of centrifuge, certified and used as anthropomorphic instrument for human acceleration checking during field tests and validation of the Autonomous Pneumo Transformable Escape Chute.



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GALAND OFFERS COOPERATION IN SEVERAL AREAS WHICH WILL CONTRIBUTE TO YOUR COMPANY DEVELOPMENT:

- organizing advertising and exhibition activity, including:
 - preparation and issue (in Russian, in the language of the hosting country or in both languages):
 - of special newspaper issues;
 - of special magazine issues;
 - catalogs of the Russian participation;
- development of exhibition booth designs;
- production and building of booths;
- development and production of souvenir handout products
- development and issue of printed products (leaflets, brochures, catalogs, etc.);
- development and implementation of your PR campaign (before, during and after the performance);
- photography, video recording of the work of the exhibition, preparation of plots and videos after the exhibitions;
- preparation and holding of events within the framework of the exposition (press conferences, briefings, roundtables, presentations, contests, etc.);
- organization and performance of group tours and trips to the exhibition;
- preparation, writing and execution of reports on exhibitions;
- arrangement of the press center activities of the collective Russian expositions;
- organization and release of daily shows during the work of the exhibition;

- placement of publications in various industrial editions, including:
 - Oboronno-promyshlenny kompleks RF journal (Russian defence industry complex) (in Russian, 96 pages, circulation 15 thousand copies). Performance analysis of the state defence order by the Russian defence industry enterprises, innovative solutions in the interests of the Russian MoD, import substitution program in the defence complex, cooperation in R&D, procurement of advanced arms for army and navy, engineering infrastructure, etc.



- Russian Aviation & Military Guide journal (in English, 48 pages, circulation 10 thousand copies). Each issue of the journal is dedicated to export proposals made by enterprises of the Russian defence industry complex, achievements in foreign economic activity, analysis of the service policy, issues of creating joint production in the territory of the partner countries in armaments cooperation. Additional distribution — embassies of the countries •
- Russia's partners in armaments cooperation, international business cooperation organization;
- Promyshlennyi Ezhenedelnik (Industrial Weekly) (In Russian, A2 format, 8 to 16 pages, average circulation 35 000 copies) — an independent all-Russian inter-industry newspaper. It was first published on December 16, 2002. It is an official publisher of acts of the Russian Ministry of Industry and Trade;



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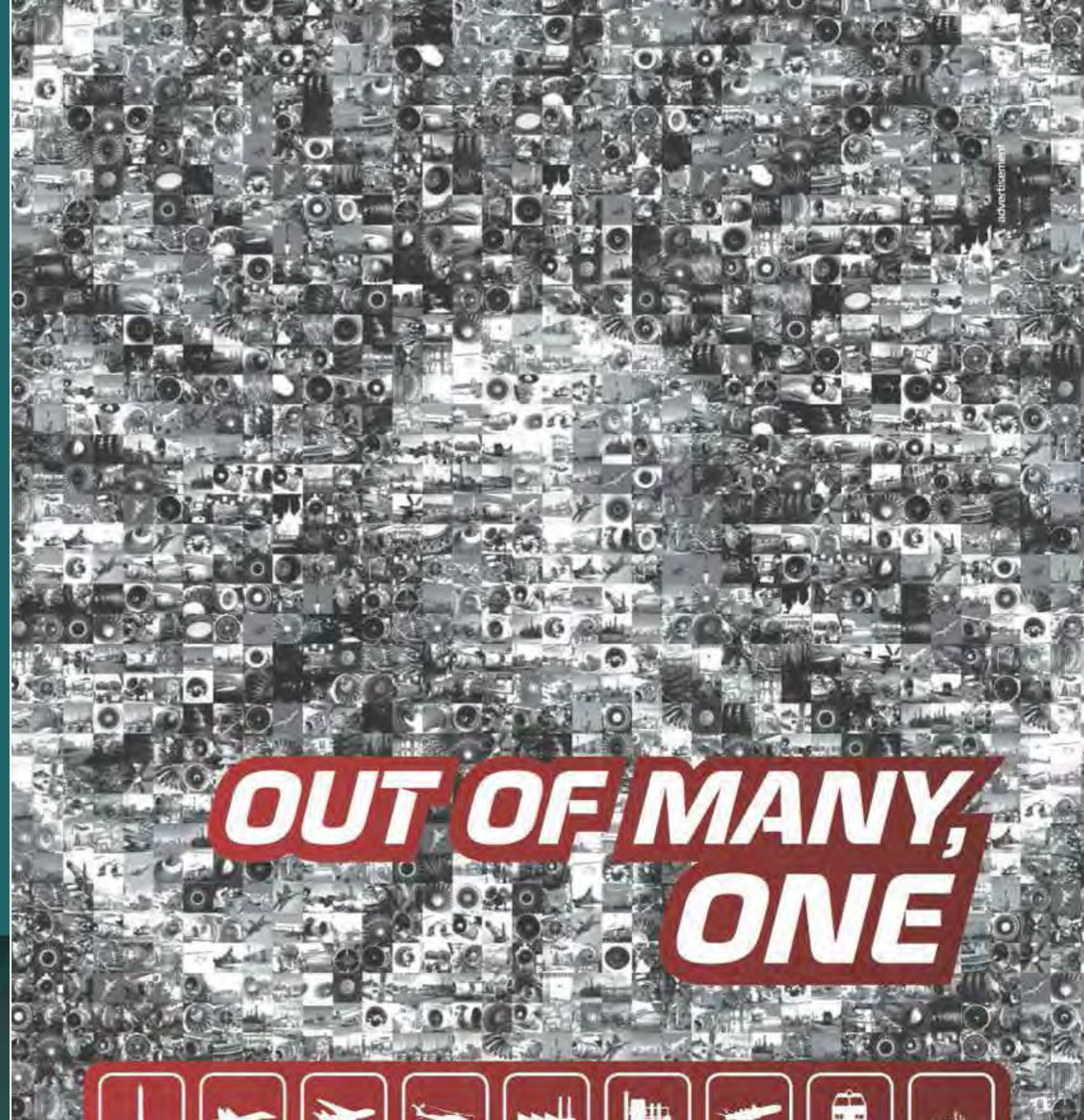
- creation of films about company/enterprise (history, today, prospects and development, etc.), video interviews with the management and best specialists, product videos, production process and presentation video sketches about propose services;
- organization of various events with photography and video recording dedicated to the subject;
- producing and performance of corporate films and videos of various formats;
- production of educational videos, trainings, video support during conferences;
- selection of experts and specialists for receipt of the necessary information and comments on any subjects and events.

Galand possesses qualified creative and technical human resources who have the skills and experience of television production, and also has advanced technical facilities.

The form and procedure of work in all areas of cooperation will be defined in each certain case subject to the set objectives.

Galand has business contacts with ministries and departments, Russian defense and law enforcement agencies, civil and defence enterprises and mass media which is a guarantee of an effective result of our joint work.

We are interested in mutually beneficial cooperation and are always open to discuss any business proposals.



***OUT OF MANY,
ONE***



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HIGH-PRECISION WEAPONS



- Russian holding 'High-Precision Weapons' is the world's largest developer and a producer of high-precision types of arms for the land forces, the navy and the aviation.
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- Being one of the largest suppliers of the latest arms, 'High-Precision Weapons' provides to Russian Army and to the armies of other countries high-precision arms according to their requirements.
- 'High-Precision Weapons' is a founder and a producer of the most effective samples of precision weapons in the world, such as Pantsir-S1, Kornet-EM, Palma, Sosna, Igla-S, Kapustnik-B and others.



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