

DEFENSE MARKET NEWS

RUSSIAN HELICOPTERS MADE A FORAY IN AFRICA



ARMORED VEHICLES AT EUROSATORY



RUSSIAN FAST MISSILE BOATS



BONUS DISTRIBUTION AT AFRICA AEROSPACE AND DEFENSE 2014

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What are the main missions of Mi-17 type helicopters?

- Rapid delivery of light weapons, ammunition and equipment, as well as of military units;
- Assault troops landing operations;
- Fire support for the landed assault troops in the battlefield;
- Medical evacuation of casualties from the battlefield;
- Search and rescue, as well as fire-fighting missions.

Rosoboronexport is the sole state company in Russia authorized to export the full range of defense and dual-use products, technologies and services. Rosoboronexport accounts for over 80% of Russia's annual arms sales and maintains military-technical cooperation with over 70 countries worldwide.



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WORD FROM PUBLISHER

Dear Reader,

We are proud to introduce 5-th issue of Defense Market News in 2014.

Our magazine is a media partner of the Africa Aerospace and Defense (AAD) 2014 exhibition which determines editorial concept of the issue. We gave the floor to companies who are interested to promote their latest technologies, systems and services for the Armies, Navies and Air Forces of the African Continent Nations.

AAD is the premier exhibition of Air, Sea and Land technologies in Africa and holds a prominent position within the international Aviation and Defense calendar. There is no better time to establish companies' presence in Africa than to exhibit with AAD2014.

We do hope that every reader will find interesting and helpful information in the issue.

Yours,
Yuri Laskin & Sergei Kirshin



Defense Market News, September 2014
Volume 8, Number 5

Registration Number PI FS 77-22570 of 07.12.2005

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We thank our partners among international publishers, as well as Russian journalists who contributed their editorials to the issue.

Shown on the front cover are Mi-17 helicopter, Mangust fast patrol boat and Typhoon armored vehicle.

Circulation - 5,000 copies. Distribution – free.

This issue covers Africa Aerospace & Defense 2014, Air force base Waterkloof, City of Tshwane, Centurion, South Africa, September 17-21.

RUSSIA IS BACK TO AFRICA

African States play an increasingly active role in the world politics and economy and directly participate in decision-making on key issues of global agenda in the United Nations and other multilateral fora. This trend is shaped by the emergence of new polycentric world order and Russia supports the strengthening of Africa's positions in the emerging international system that corresponds to realities of the 21st century.

Modern Africa already in the medium term perspective can be considered as the most promising continent and market expansion to which will determine the level of the global impact of a state.

Currently China, USA, UK, France, Germany, India, Saudi Arabia, UAE, Qatar, Canada, Australia and Brazil remain major players in a large African game. Russia is one of outsiders on this list - the annual trade turnover of Russia with the countries of the Continent is assessed in \$ 8 billion US compared to about 200 billion of China.

Sub-Saharan Africa

By sub-Saharan African (SSA) is usually meant region which unites 39 states, including Angola, Benin, Botswana, Burkina Faso, Burundi, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, DRC, Zambia, Zimbabwe, Cape Verde, Cameroon, Kenya, Comoros, Congo, Côte d'Ivoire, Lesotho, Liberia, Mauritius, Madagascar, Malawi, Mozambique, Namibia, Niger, Nigeria, Rwanda, Swaziland, Seychelles, Senegal, Sierra Leone, Tanzania, Togo, Uganda, Central African Republic, Equatorial Guinea, South Africa.

It is becoming more and more evident for many experts that the 21st century will see steady growth of sub-Saharan Africa importance in the world economy.

In these regards Russian Foreign Minister Sergei Lavrov reminded that «the significant potential of our economic cooperation is far from being exhausted and much remains to be done so that Russian and African partners know more about the capacities and needs of each other. Creation of a mechanism of the provision of public support to business interaction between Russian companies and African con-



Cooperation with South Africa remains a top priority for Russia

continent is on the agenda. The economic forum «Urals–Africa» held in Yekaterinburg in July 2013 and attended by delegations from about 40 African States confirmed that we have broad opportunities for enhancing cooperation».

Minister wrote in his article «Russia and Sub-Saharan Africa: time-proven relations» published in «Russian View» magazine (May of 2014): «Our country makes significant practical steps to assist sustainable development of African States. Russia provides to African countries broad preferences in trade, and contributes to alleviating their debt burden – the total amount of debt relief exceeds 20 billion USD. Debt-for-development agreements for a total amount of 552 million USD were concluded with certain States».

Relations with South Africa

South Africa, located at the southern tip of the continent, stretches with more than 2.500 kilometers of coastline along two oceans, the South Atlantic and the Indian Ocean. It is the 25th largest country of the globe and a world leader in mining. South Africa is rich in mineral resources. It owns the world's largest reserves of manganese and platinum group metals (PGM). In addition, the country possesses vast reserves of diamonds, gold, chromite ore and vanadium. South Africa's diamond industry is the 4th largest worldwide.

Russia's relations with South Africa were not always as good as they

are today. During Soviet times, the Soviet leadership disapproved strongly of the South African white regime's harsh apartheid politics. The Soviet Union supported the African National Congress in its struggle against apartheid. In 1956, the ties were severed completely by the USSR.

Diplomatic relations were restored in 1992. The South African President, Nelson Mandela, visited the Russian Federation in 1996, a landmark event in the relations of both countries. Another one followed in 2006, when Russia's President, Vladimir Putin, traveled to South Africa to sign the Treaty of Friendship and Cooperation between both nations.

In 2013 President Putin flew to Durban for a second state visit and the 5th BRICS Summit. Before the regular meetings began, Vladimir Putin met with his South African colleague, Jacob Zuma, to renew the Treaty of Friendship and Cooperation of 2006. Some new clauses were added, as the mutual cooperation has been extended and intensified. The intergovernmental agreements pertain to the sectors of astrophysics research, culture, education, energy, ferroalloy production, fishery, flight safety, military, mining, solar energy and space research.

Although Russia recognizes South Africa as one of the most promising markets in the developing world, and the most promising and reliable part-

ner in Africa, the current trade and investment positions between Russia and South Africa are far below their potential.

Nevertheless, South Africa's representation in BRICS raises its profile with Russia and should stimulate political and economic awareness of possible channels for further co-operation. Co-operation between South Africa and Russia within BRICS might trigger mutual trade and economic co-operation on the one hand, and might become an important instrument for strengthening global governance on the other.

Military-Technical Cooperation

Military-technical cooperation with the countries of SSA has a long history. First the Soviet Union and later Russia assisted African states in the formation and development of the national armed forces. The majority of African countries have been operating Soviet/Russian-made defense equipment for many years. On the continent they have a well-merited reputation for effective, reliable and simple to maintain systems.

Having this in mind, Russia is ready both to maintain and upgrade previously delivered equipment, as well as to offer supply of more sophisticated systems. Recent delivery of Su-30MK2 fighters and T-90S MBTs to Uganda can serve an evident proof of this policy.

Leading role in the field of military-technical cooperation with the countries of sub-Saharan Africa belongs to the sole state exporter of defense products, technologies and services – JSC Rosoboronexport.

For Russia military-technical cooperation remains virtually the only area of cooperation with many SSA states. Analysis of bilateral relations with the countries of the region in this particular sphere shows a steady trend of growth over the past 10 years. According to General Director of Rosoboronexport Anatoly Isaykin in 2011 trade with SSA countries made up 7% of company's total sales. This share will definitely grow given positive momentum in development of cooperation in 2012-2014.

In the structure of requirements of African customers there is steady demand for aircrafts and helicopters, automobiles, armored personnel carriers, air defense weapons, small arms, airborne weapons, ammunition and spare parts.

A special position in the market of Africa is occupied by Russian helicopters. Market potential for modernization of Russian-made helicopters is explained by the fact that more than 700 vehicles have been delivered to the Continent, including 150 attack helicopters Mi-24/25/35.

Nowadays leading positions in Russian helicopter exports are occupied by new modifications of the Mi-17 type military transport and Mi-35 type combat assault helicopters. Their older versions have gained great popularity all over the world. In total more than 12,000 Mi-8/Mi-17 and 3,500 Mi-24/Mi-35 helicopters have been manufactured. These legendary helicopters are ranked among most effective fighting aircraft.

They took part in almost all conflicts of the late 20th and early 21st centuries in which they had earned pilots' respect for reliability, simplicity and effectiveness. They are also actively employed in peace-keeping missions. In Africa they have participated in operations carried out in Liberia, Sudan, Sierra-Leone, Democratic Republic of Congo.

Rosoboronexport is taking any efforts to spread geography of supplies in the region. In recent years a good basis has been created for cooperation with Nigeria, Cameroon, Mozambique, Tanzania, Equatorial Guinea. There are prospects for the supply of arms and defense equipment to Botswana, Niger, Kenya, Rwanda, Djibouti, Ethiopia. For example, at MAKS 2013 Rosoboronexport signed the first in the history of military-technical cooperation with this country contract with the Ministry of Defense of the Republic of Cameroon for the Mi-17 supply.

Rosoboronexport offers its African partners the establishment of modern servicing centers. Their establishment would involve technology transfers providing for partial repairs and overhaul of supplied materiel. This would not only give a boost to maintenance efficiency, but would open up new job opportunities for a highly skilled workforce. Rosoboronexport also attaches special attention to training personnel.

Russia's desire to improve after-sale servicing was illustrated this March when the South African company Denel Aviation opened the Mi-8/Mi-17 civil helicopters Servicing Centre in Johannesburg. The Centre was opened with the assistance of the Russian holding company Russian Helicopters which furnished state-of-the-art equipment and prepared its operation. Moreover, during the Paris Air Show, 2013 June the Parties concluded a new contract for the Centre development. As a result, it will accomplish not only all-inclusive servicing but also repairs and upgrading of the Mi-8/Mi-17 helicopters. It is planned that in future the number of helicopter models serviced will be increased.

South Africa was not chosen incidentally for that project. RSA is a state with very well-developed defence industries. Both countries see great potential in joint projects of defence companies in different spheres of production. Rosoboronexport will coordinate these activities from the Russian side. Relationships with South African partners are based not only on a bilateral basis, but as part of cooperation of BRICS members.



The Mi-26T with its 20-ton payload capacity has been widely used by UN missions in Africa

RUSSIAN HELICOPTERS MADE FORAY IN AFRICA



Nowadays there are about 600 Russian-built helicopters in Africa, mainly from the Mi-8/17 series and Ka-32s. Russian helicopters are very popular in this core market, so it is very important for Moscow to be able to offer repair and maintenance services on the spot.

Thus search for a partner capable of ensuring advanced service support to the helicopter fleet in the region became one of priorities for the Kremlin.

The cooperation between Russian State Corporation Rostec and South African Group of Companies Denel started in September 2012. Denel SOC Ltd is the largest company in the defense-industrial sector of the republic of South Africa, a key supplier of military equipment for the defense forces of the country. It was founded on April 1, 1992 on the basis of the production units of the Armscor Corporation. It includes several divisions, including Denel Aviation (aviation), Denel Dynamics (missiles and unmanned aerial vehicles), Denel Integrated Systems Solutions (anti-missile defense), etc. The company and its branches employ almost 10 thousand people. The company is 100% owned by the Government of the republic of South Africa.

In September 2012 at the Africa Aerospace and Defense show near Pretoria Denel Aviation signed an agreement with Russian Helicopters (a Rostec company) on the establishment of a regional service center for Russian helicopters in the African region.

The MRO center was launched on 26 March 2013 in Johannesburg during the BRICS summit. The ceremony was attended by executives from Russian Helicopters and Denel Aviation, representatives of the South African

government, as well as heads of operating companies and potential clients for Russian-built helicopters.

Russian Helicopters supplied equipment and accompanying technical documentation for the MRO center in Johannesburg, prepared the center for operations, and also provided training for Denel Aviation technical staff at its aircraft repair center in Novosibirsk.

At Le Bourget 2013 international aviation salon Oboronprom United Industrial Corporation, which is part of the Rostec State Corporation and Denel Aviation entered into a contract to expand the possibilities of the service center for maintenance, repair and modernization of the helicopters Mi-8/17 established in South Africa. The agreement signed in Paris outlined the future development stages of the service center, mandated its fitting-out with advanced equipment and defined the transfer of supporting technical documentation that Denel Aviation needed to service the fleet of Russian-built helicopters.

The parties agreed to greatly expand the functionality of the service center. It will carry out not only compre-

hensive maintenance, but also complex repair and modernization of Mi-8/17 helicopters for civilian and military purposes. «Today, Africa has a significant fleet of Mi-8/17 helicopters that need qualified and professional maintenance. We see a great opportunity in our partnership with our Russian colleagues, and all African helicopter operators will benefit from us working together» - said Mike Kgobe, CEO of Denel Aviation. Under the plan, the Denel Aviation facility will become a leading regional service center, and in future will provide after-sales care and maintenance services for all Russian-built helicopters in the sub-Sahara region.

During MAKS-2013 aviation salon, Rostec and Denel signed a memorandum of understanding, which implied that the center capacities should be increased. Russian officials communicated the plans to increase the capacity of Russian Helicopters center in South Africa. It was mentioned that the first level capacities (maintenance) of the helicopter service center in South Africa may be increased in 2013-2014 up to the third level (repairs). «The facilities of the helicopter center in South Africa are sufficient for such increase».

Russian Helicopters officials consider creation of MRO center in South Africa as an important step in the development of our global after-sales support network for Russian rotary-wing aircraft. The high-quality service offered at service centers around the world makes Russian equipment even more attractive to customers.



RISING TO NEW DIMENSIONS



The Africa Aerospace and Defense (AAD) 2014 is the premier exhibition of Air, Sea and Land technologies on the African continent and holds a prominent position within the international Aviation and Defense calendar. There is no better time to establish your presence in Africa than to exhibit with AAD2014. The quality of attendees is unparalleled and the networking opportunities are endless. An investment in exhibiting at AAD2014 will pay off in the long run. AAD2012 hosted a good mix of first-timers and repeat exhibitors as well as attendees. Whether it is Defense and Security, Commercial Aviation, Maritime etc., AAD2014 puts you at the center of the world's fastest growing market.

This exhibition takes place biannually in September. The 8th AAD will take place at AFB Waterkloof, Centurion in the City of Tshwane, South Africa between 17 to 21 September 2014, and will once again bring together various industries from throughout the world so as to showcase the latest technological innovations within this sector. The first three days of the exhibition are traditionally trade days, followed by two airshow days that are open to the public.

AAD2014 has a NEW slogan: «The premier exhibition of air, sea and land technologies on the African continent».

AAD Exhibition proves to generate new business with African and Interna-

tional companies at your fingertips. It's where participants create

- Partnerships
- Showcase new innovations and products
- Network
- Speak to decision makers
- Get qualified sales leads
- Do deals onsite

All exhibitors have the opportunity to take advantage of the comprehensive international military delegations programme which will run at AAD2014. Exhibitors may be included in the programme of pre-arranged visits and meetings, which at AAD2012 had 61 Official Delegations from 26 Countries



- 7 Hangars
- 15 National Pavilions
- 347 Exhibitors from 26 Countries
- 40 000 Trade Visitors from 101 Countries
- 92 983 General Public Visitors
- 61 Official Delegations from 26 Countries
- 84 Aircraft Civil and Military Static Display
- 300 Accredited Journalists from All over the World
- 600 Pieces of Coverage about the Exhibition & Air Show



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CENTURION, CITY OF TSHWANE, SOUTH AFRICA**

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AAD2014 IS THE PREMIER EXHIBITION OF AIR, SEA AND LAND TECHNOLOGIES ON THE AFRICAN CONTINENT AND AN IDEAL OPPORTUNITY TO NOT ONLY GAIN A FOOTHOLD ON THE AFRICAN CONTINENT BUT TO EXPLOIT BUSINESS OPPORTUNITIES REGIONALLY AND INTERNATIONALLY



NEW ILYUSHIN IL-78MK-90: A TANKER BASED ON THE RESURRECTED CANDID



In recent years, the Russian aviation industry has never ceased to amaze us with new projects. Among its most extensive and ambitious programs is the start of production of the upgraded Ilyushin Il-76MD-90A military transport aircraft. The Il-76MD-90A made its maiden flight on September 22, 2012 and within a mere two weeks the Russian Ministry of Defense signed a contract with UAC to supply the Air Force with 39 such aircraft between 2014 and 2020. The upgraded Il-78MK-90 tanker and a number of advanced special purpose aircraft will also be built around it.

The new planes are a heavy upgrade of the well-known Ilyushin Il-76-series aircraft (NATO reporting name: Candid). But today they are manufactured

at Aviastar-SP's up-to-date production facility in Ulyanovsk, Russia rather than at the Chkalov Tashkent Aircraft Plant in Uzbekistan.

Experts note that the transfer of production will enable Russia to regain its position on the worldwide market in the segment of military transport aircraft and tankers, as well as significantly increase the attractiveness of new aircraft for potential customers. According to Russian arms exporter Rosoboronexport, there is already strong demand for them among foreign customers. This stems from both an impressive operational track record of the Il-76-series aircraft around the world and a heavy upgrade done.

Developers clearly indicate that these are actually new aircraft in terms of the number of changes. The main

differences from the previous series include: a redesigned wing with long caisson panels, a digital flight control and navigation system, a «glass» cockpit with eight displays, a digital autopilot, a satellite navigation system, a new power plant, as well as a reinforced landing gear. Compared to the «classical» Il-76MDs built earlier in Tashkent, about 70 percent of avionics has been refurbished.

The fuselage and systems have been dramatically redesigned using modern design approaches to reduce aircraft weight, streamline production and maintenance, and cut direct operating costs. In particular, the Il-76MD-90A and its derivatives carry a heavier payload (60 tons versus 40 tons) and have greater maximum takeoff weight (210 tons versus 190 tons).

The upgraded aircraft are powered by the PS-90A-76 fuel-efficient engines, which decrease fuel consumption by 17% and extend the range with a 52-ton payload by 18% to 5,000 km (ferry range is 9700 km). The takeoff field length required at maximum takeoff weight is also reduced to 1540 m.

The aircraft can be operated from paved and unpaved airstrips. Its service life is 30 years, 30,000 flight hours or 10,000 landings.

The Il-78MK-90 tanker is now equipped with an upgraded refueling unit, which pumps up to 2,500 liters of fuel per minute. The tanker can carry up to 109,500 liters of fuel in the main fuel tanks and 43,880 liters in additional tanks mounted in the cargo bay, bringing the total fuel capacity to 153,880 liters or 122,704 kg.

The tanker can transfer 75 tons of fuel to other aircraft at 1000 km away from the airfield; 58 tons – at a distance of 2000 km and 42 tons – at a distance of 3000 km. If refueling takes place on the ground, the amount of fuel transferred at an airfield located at 1000 km off the base airfield and with a landing weight of the aircraft of 160 tons reaches 40 tons. In the air, the Il-78MK-90 can carry out refueling at altitudes of 2000 to 9000 meters and at speeds of 440 to 600 km/h.



Certainly, the Il-78MK-90 tankers will primarily be of interest to countries that already operate earlier Il-76 versions, owing to lower maintenance costs resulting from commonality between the versions.

At the same time, according to Ros-

oboronexport, the revival of the legendary aircraft using the latest technology on a new technological base will not go unnoticed on new markets, too. After all, the competitive advantages of the new Candid are really impressive both technically and economically.



RADIOFIZIKA IS LOOKING FOR PARTNERS IN BRICS



On the eve of Africa Aerospace & Defense 2014 exhibition CEO of RADIOFIZIKA Boris Levitan was interviewed by the «Defense Market News» publisher Yuri Laskin.

What are the main areas of RADIOFIZIKA activities?

One of the highest priorities in our activities we pay to the development of radar with digital active phased arrays operating in various bands of wave frequencies.

Second area where RADIOFIZIKA is an undisputed leader in Russia is production of satellite communication systems for air traffic control. In this field, our company supports over 150 satellite communication sets, and their number grows constantly.

Our unique R&D and manufacturing potential provides for creation of the most advanced antenna systems and telemetric tools, microelectronics and radar components, as well as conducting tests in non-echoic chambers, while the biggest one of them (80x32x24 m) – is one of the largest chambers in Europe.

What was the reason that RADIOFIZIKA decided to participate in AFRICA AEROSPACE AND DEFENCE – 2014 and what exhibits have you brought to Pretoria?

Presently, along with Almaz-Antey Air-Defense Concern and ROSOBORONEXPORT, our company is actively promoting its products in the international market. BRICS countries are of a special interest for us in terms of

both, selling our products and joint developments. In these particular regions we are looking for partners because we consider them to be the most promising ones to establish cooperation. Thus, in February this year we participated in DEFEXPO INDIA – 2014, and today we present our developments in Pretoria.

RADIOFIZIKA's main exhibit at AFRICA AEROSPACE AND DEFENCE – 2014 is the mobile sectoral radar called «DEMONSTRATOR». The radar is intended to detect space objects, aerial vehicles and high-speed aerodynamic targets, as well as to monitor launch and landing of carrier-rockets and space-ships.

Radar equipment that includes a command/control post as well as receiving and transmitting units, is located on semi-trailers and can be transported by standard vehicles. The radar is distinguished by high mobility and short time of deployment that does not exceed 30 minutes.

The antenna systems are made as fully-digital transmitting and receiving active phased arrays which provide for the digital antenna pattern shaping and continuous radiation of signals with adaptive parameters. The radar coverage zone is 600 km in range, 120 deg. in azimuth and 75 deg. in elevation.



What are your most promising future projects and the main technological challenges facing the suppliers of radar technology?

First of all, it's the outer space radar monitoring system that is now under development headed by Almaz-Antey Concern. That system is of strategic importance because there is much of space debris orbiting the Earth these days. Keeping a close eye on that debris is an important pre-requisite to ensure safety of space flights and facilitating further development of the space industry. Besides, we are now developing several ground-, ship- and air-borne radar and telemetric systems. All of them use the active phased antenna array technology.

Certainly, there are several technological challenges in this work. First of all, it's shifting of radar and telemetric technologies to short wave bands. To resolve this task, we need to create a corresponding high-tech components base. Secondly, it's development of digital active phased arrays and related soft- and hardware solutions. Besides, it's important to improve the means of internal data transfer based on fiber-optic components. Resolution of these tasks would enable us to talk about creation of a qualitatively new generation of radar and we are working on that.

BEST SOLUTION FOR AFRICAN ARMIES

Short-range Surface-to-air missile systems (SAMs) one of the last defensive belts in the air defense system of any country. Defensive power and survivability of a country in response to a foreign invasion can be mainly assessed on the basis of availability and implementation of modern models of air defense system available and, first of all, short-range SAM systems used as a kind of «cleaners» for actually all modern and advanced air threats.

Systems of third-generation «Tor» family belong to such short-range SAM systems and feature unique characteristics and have no equivalents in the world in terms of combination of their combat and engineering performance: «Tor-M2E» with a combat vehicle (CV) on the tracked chassis, «Tor-M2K» with the CV mounted on a special wheeled chassis and «Tor M2KM» provided with modular-design combat and engineer-

ing facilities. JSC Izhevsk Electromechanical Plant «Kupol» that is a part of JSC Concern «Almaz-Antey» has been and still is the manufacturer of all generations of «Tor»-family SAM systems. The surface-to-air missile systems that have been produced by the Company for more than a half century are known all over the world, are operational in dozens of countries, and have been highly recognized not only as the systems capable to manage any assigned task, but as the products meeting the highest quality and reliability criteria.

«Tor» SAM system has been deliberately developed to fight different modern air threats including: high precision weapons (antiradar missiles, guided and gliding air bombs), different maneuverable, high-speed manned and unmanned air targets flying at extremely low, low and medium altitudes, day and night, flying at speed up to 700 m/s, including maneuvering targets or

the targets using active and passive jamming. The system enables effective air defense of military units on the move and at all mobile types of modern combat, as well as defense of the important single-point government and military facilities against air attacks. Capability of simultaneous destruction of four air targets by four guided missiles launched from one combat vehicle at the distance of up to 15 km has been implemented in «Tor-M2E», «Tor-M2K», «Tor-M2KM» SAM system for the first time; the highest level of automation of combat operation process has been achieved and resistivity to any types of countermeasures has been considerably improved.

The combat vehicle is capable of completion of assigned combat missions independently, within a group of two CVs in «Squad» mode and as a part of SAM battery consisting of four CVs under command of a battery command post (BCP).



Combat vehicle of the Tor-M2K ADS



Autonomous combat module of the Tor-M2KM ADS on automobile chassis



Combat vehicle of the Tor-M2E ADS

The process of lock-on and tracking of the targets is automated in the SAM system. Any target suggested by the CV can be selected for firing. After a target enters the killing zone and SAM is ready to launch commander presses the button «Launch». SAM is guided towards the target automatically and its combat part is exploded in the missile-target meeting point, that provides reliable engagement of the air target.

High accuracy and modern methods of guidance parameters calculation in combination with special-purpose SAM combat equipment provide high killing probability against all types of air targets.

The latest development of JSC «Concern «Almaz-Antey» and JSC Izhevsk Electromechanical Plant «Kupol» is the modular-design version of «Tor-M2KM» SAM system that provides combat and engineering means based on uniform containers-bodies mounted on any automobile chassis, semi-trailers, trailers, railroad and other carriages with corresponding load lifting abilities as well as in stationary version.

The Independent Combat Module (ICM) of the «Tor-M2KM» system, which is equipped with all special-purpose equipment, radar and optical

facilities, missiles, operators compartment, system of independent and supplementary power supply with own fuel range, life support system, conditioning system, is installed on the motor chassis and another platforms by three special-proposed, quick-disconnect brackets. Remounting of the ICM from one platform to another is performed by 25-tonnes crane and takes no more than 10 minutes. The ICM requires a carriage with load-carrying capacity of not less than 20 tonnes, width of not less than 2500 mm and length of not less than 7000 mm, technical facilities like transporter-loader, maintenance workshop, group SPTA set, battery command post require to have a load-carrying capacity of 8.5 tonnes, width of 2500 m and length of 6000 m.

Fully equipped independent combat module has a weight of no more than 15 tonnes, that provides its transportation on an external load of MI-26T helicopter with high lifting capacity or its foreign analogues. In such a way the ICM can be delivered and installed in the most hard-to-reach places: on highest elevations, on roofs of buildings and constructions, where the ICM will provide reliable defense of objects against all air threats, in range of 15 km killing zone.

SAMS Tor-M2KM mounted on serially produced truck chassis of Indian company TATA Motors was shown for the first time on International aviation fair MAKS-2013, and then became the main exhibit at the international fair «Defexpo India 2014».

Having all necessary licenses to develop, manufacture and repair armaments and military equipment, unique experience and highly-skilled personnel JSC Izhevsk Electromechanical Plant «Kupol» is always in the process of improving the present SAM system performance as well as creating new articles looking many years ahead.

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KORNET-EM MULTIPURPOSE MISSILE SYSTEM

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.

As of today the 3-d generation Kornet-E portable/transportable laser beamrider system developed by KBP and adopted in 1998 is the weapon definitively complying with the concept of advanced ATGW, being state-of-the-art specimen of multipurpose tactical short range weapon system allowing engagement 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.

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.



Fig. 1 Kornet-EM system

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.

MAIN PERFORMANCE SPECIFICATIONS OF THE SYSTEM	
Firing range, m: - minimum - maximum	150 10000
Guidance system	automatic, beam riding guidance
Jamming immunity	high
Number of targets engaged simultaneously by a salvo	2
Armour penetration by shaped charge warhead, mm TNT equivalent of high explosive warhead	1100 - 1300 7
Ammunition load, pcs including ready-to-fire missiles	16 8
Change-over from traveling to combat configuration, seconds	7

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 performance 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, as well as helicopters and assault aircrafts.

UAV on a reconnaissance mission lets enemy well in advance disclose



Vertical section of aerial targets engagement zone with missile

— target velocity 50 m/s — target velocity 100 m/s — target velocity 250 m/s

MAIN PERFORMANCE SPECIFICATIONS	
Flight range	150 — 10000
TNT equivalent, kg	7
Fuse	impact and proximity
Maximum flight speed, m/s	320
Weight with launch-tube, kg	33
Length of launch-tube, mm	1210

defence, give accurate target designation for firing over-the-horizon munitions, record 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.



Fig. 2 9M133FM-3 guided missile with high-explosive warhead

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

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 data (both from peer and higher level units) overlaid on the digital maps and automatic or semiautomatic generation 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 battery operation control aids is a vital need for Kornet-EM with its versatility of combat applications and ability to effectively counter aerial targets. Timely submission of aerial targets data to the fire units (Line Kornet-EM combat vehicles) directly influences both the efficiency of ATGW counteraction to aerial threats, as well as casualties in the units under air raid.

To provide operational surveillance/data exchange and control of Kornet-EM battery combat operation, a battery commander's surveillance&control vehicle 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.

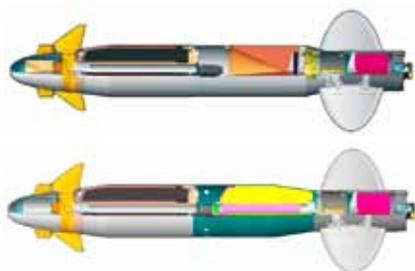


Fig. 3 9M133M-2 ATGM and 9M133FM-2 guided missile

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 control vehicle allows target detection at ranges significantly exceeding the firing range of line combat vehicles weapon systems. This provides efficient 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 target distribution among the line vehicles in order to avoid multiple firing at a single target.

The battery commander's control vehicle capabilities by day/night time and under any weather conditions are the following:

- detection, identification and tracking of moving or stationary air and ground targets, automatic measurement, generation and processing of the detected targets' coordinates;

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

MAIN PERFORMANCE SPECIFICATIONS OF THE SYSTEM	
Detection range, m by radar: - air targets: aircraft, helicopter, minimum UAV, minimum - ground targets, minimum by TV/IR sight - air targets - ground targets	18000 10000 10000 12000...16000 10000...12000
Surveillance Zone, degr - azimuth - elevation: by radar by TV/IR sight	±180 -15...55 -5...45
Firing range, m - guided weapon - PKTM machine-gun	up to 10000 up to 1500
Target designation transmission time, not exceeding, sec	2

- friend-or-foe identification;
- generation and transmission of target designation data from the anti-tank battery commander to line combat vehicles;
- maintaining radio communication within the battery, as well as with higher-rank and peer unit commander'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 vehicles – 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 firing primarily at the most threatening target;
- 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 entering the combat (from march) without prior area survey and missing information about enemy forces.

In case of countering aerial threats (UAV, helicopters) the combat efficiency of ATGW battery will increase by 2.5-5.0 times due to reduction of target detection time and increase of detection probability.



Fig 4. Kornet-EM Surveillance&Control vehicle

Shipunov A.G., Zakharov L.G., Yastrebov O. Yu.

SPLAV: TRADITIONS AND INNOVATIONS OF RUSSIAN MRLSs

There is an evident trend showing growth of proportion of fire tasks conducted by MRL systems in the entire range of tasks assigned to missile troops and artillery of Ground forces. When planning operations military experts allocate up to 60-70% of potential enemy targets for the share of MRL systems due to their high mobility and maneuverability, ability to a sudden concentration of high density fire.

Possibility of almost simultaneous launch of a large number of rockets allows a sudden massive fire. The simplicity of design and operation, the lack of heavy carriages, barrels, recoil devices determine the benefits of rocket artillery in comparison with the cannon artillery.

JSC Splav SPA is the leading Russian enterprise in Russia in the development and organization of production of the Multiple Launcher Rocket Systems (MRLS) for the Army and Navy, as well as non-guided aircraft-based armament for the Air Force.

Over Company's more than 70 years long history over 10 highly efficient MRL systems, such as Grad and Smerch, more than 50 rocket projectiles for different applications have been developed



Nikolay A. Makarovets, General director, Hero of Russia, Academician of Rocket-artillery Academy of sciences

and entered service, as well as over 70 artillery shell cases of calibers from 23 to 152 mm made of various materials have been elaborated.

Nowadays design and technological activities of the company is not standing still, and get a new boost. Specialists of the enterprise have developed modernization programs for the Grad and Smerch systems which ensured execu-

tion of the fire missions on destruction of the enemy over a distance of, correspondingly, 40 and 120 km, enhancement of capabilities of fire engagement against the typical targets, computerization of the fire preparation and delivery, upgrade of the launch vehicles.

Splav-developed MRL systems and company's scientific potential are demanded on the international market. Splav, being the world leader in delivery of ammunition for the Russian-produced MRLSs, conducts active operations in the field of military and technical cooperation via Rosoboronexport - the Russian state intermediary, as well as participates in joint R&D works.

Nowadays Splav offers at the international defense market upgraded Grad and Smerch MRL systems, including different-purpose warheads rocket projectiles with the range of fire of, correspondingly, 40 and 120 km, upgrade of combat vehicles for earlier delivered systems, rocket projectiles for the TOS-1A system, as well as the new generation of the 80-mm unguided aircraft rocket armament - C-80FP HE-Fragmentation penetrating warhead unguided aircraft rocket projectile with a small-type high energy solid rocket propellant motor.



Launch of Smerch MRLS on KAMAZ chassis



Fire of RPK-8 leaves no chances for saboteurs



Salvo of the TOS-1A RPs is capable of destroying any target



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Helicopter launch of non-guided airborne rockets

Presently the following systems are being offered for export:

1. Rocket Projectiles (RPs) for Grad MRLSs: 9M521 RP with increased power warhead, 9M522 HE-fragmentation separable warhead RP, 9M218 shaped-charge fragmentation submunitions RP.

2. M0.1.01.04M RP with increased range of fire for the TOS-1A heavy flame-throwing system.

3. Rocket Projectiles for Smerch MRLSs: 9M525 fragmentation submunitions warhead RP, 9M528 HE-fragmentation separable warhead RP, 9M529 fuel-air explosive warhead RP, 9M531 shaped-charge fragmentation submunitions warhead RP, 9M533 sensor-fuzed fragmentation submunitions warhead RP, 9M542 extended range HE-fragmentation warhead RP.

Since 2003 the enterprise has been granted the right to independently carry out foreign trade activities with respect to the products for military purposes to the extent concerning delivery of spare parts, aggregates, assemblies, devices, completing units, special, training, and auxiliary equipment, technical documentation for the earlier delivered products for military purposes, carrying out of works on technical inspection, repair (including modernization subject to carrying out of R&D works), and other works ensuring complex service maintenance of the earlier delivered products for military purposes, as well as training of the foreign specialists in carrying out of the above works.

Specialists of the company have developed an algorithm of upgrad-



Shipborne MRLS - a reliable protection for Zubr air-cushion landingcraft

Nowadays Splav is a subholding company of JSC Machine Engineering Technologies which was established by Russian Corporation Rostec in 2011 as a holding company operating in the ammunition and special chemicals sector.

History of many enterprises and research institutions that are included in the holding company goes back several decades. For example, Splav Scientific & Production Association which joined the holding company in summer 2012 is one of the world's leading manufacturers of multiple launch rocket systems. The history of this organization can be traced back to 1945. Using its high scientific and technical potential, Splav was able to establish production of the high-tech civilian goods on the basis of traditional military technology.

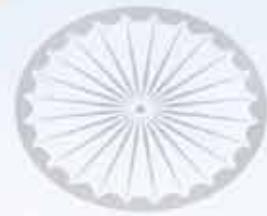
JSC Splav cooperates with many companies in different regions of Russia, such as Vannikov Shtamp Engineering Plant, Tula region; JSC Bryansk Chemical Plant named after 50th Anniversary of the USSR, Bryansk region; Poisk Research Institute, Leningrad region; JSC Novosibirsk Synthetic Fiber Plant, Novosibirsk region etc.

ing regular RPs for Grad, Grad-1 and Prima MRL systems with an increase in the maximum range of up to 40 km, as well as repair documentation for the overhaul of 9M27F and 9M27K rocket projectiles with expired service life for Uragan MLR system and established for them after the repair the warranty period of storage for another 10 years.

Further development of MRL systems and ammunition for them demands increase in range and precision of fire by introduction of advanced technologies in the field of solid-fuel engines and powders, as well as flight control systems of rocket projectiles enabling improvement in the effectiveness of operation near the target. Future progress also demands increase in automation and control of combat vehicles, reduction time of their reloading, increase of their mobility and survivability in combat, conjugation with the means of intelligence and information support.

The tireless work of the creative team of Splav aimed at the improvement of rocket systems enables Russia to keep holding leading positions in this field.

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A MULTIPURPOSE AMPHIBIOUS AIRCRAFT



The Russian Beriev Be-200 amphibious aircraft is primarily known as an effective fighter against large-scale fires. In 2004, production Be-200s began to enter service with Russia's Ministry for Emergencies (EMERCOM) and actively be used to extinguish large fires not only in Russia but also in Greece, Indonesia, Ireland, Italy, Portugal and France. In a number of cases, it is the Be-200s that helped cope with the elements efficiently. And it's no wonder: the Be-200 can scoop up to 12 tons of water into its tanks in just 14 seconds while skimming the water surface and drop an average of up to 240 tons of water per mere one fueling, which is far beyond the capabilities of any other aircraft. During these missions, the Be-200s was piloted by not only Russian but also foreign crews, who noted their high performance enabling the crew to accurately and safely perform compound maneuvers at high g-loads and rolls.

However, the Be-200, capable of taking off from both any open water area

at least 2.6 meters deep and land airfields with a 1,800 meter long runway, can be successfully used to perform a number of other civil and military missions. These include participation in search-and-rescue operations in the maritime zone, environmental monitoring, transportation of goods and passengers. In this case, the baseline model of the aircraft is additionally fitted with special equipment. For example, its search-and-rescue version may be equipped with an electro-optical system having TV and infrared channels and a laser range finder, a searchlight and on-board rescue equipment. The plane can evacuate up to 57 victims. A special ambulance version of the Be-200 is equipped with outpatient facilities and accommodates 30 lying-down or seriously ill patients.

Military versions of the amphibious aircraft offered by Russian arms exporter Rosoboronexport on the international arms market are equally of interest as well. They will be ideal for the Navy for performing specialized missions. After all, the Be-200 has precisely «military»

roots as its hydro-and aerodynamic layout derived from its unique predecessor – the biggest-ever A-40 Albatross jet amphibian, whose efficiency was confirmed by 148 world records. Like the Be-200, the A-40 was developed at the Taganrog-based Beriev Aircraft Company for the Russian Navy. Since its foundation in 1934, the Company has specialized in seaplane design and has gained enormous experience in developing and building this class of aircraft.

The patrol version of the Be-200 is of most interest to the Navy. It provides the detection and tracking of surface, underwater, air and ground targets, and then produces targeting data for naval ship strike groups. Owing to its capability for long-term loitering missions in specified areas, the Be-200 is very effective for control of the 200-mile maritime economic zone. The aircraft can perform patrol missions for nearly six hours. In this case, the mix of equipment is tailored solely to meet customer requirements. The designers have also studied the external attachment of weapons and other



BE-200 PERFORMANCE

Maximum take-off weight, kg:	
from land	42,000
from water	40,000
Service ceiling, m	8,000
Maximum cruise speed, km/h	680
Economy speed, km/h	560
Rate of climb, m/s	12
Ferry range (one-hour fuel reserve), km	3150
Take-off length (water/land), m	1,000/1,350
Landing length (water/land), m	1,300/1,020
Seaworthiness:	
wave height, m	1.2
sea state	3
Crew	2

special equipment, including airborne torpedoes, anti-ship guided torpedoes, air-to-air missiles, sonar buoys, and a photographic equipment pod.

And, of course, the Be-200 will be of interest to military as a transport aircraft for rapid airlift and airdrop of per-

sonnel (up to 42 people), transportation of military supplies and weapons. Moreover, the amphibious qualities of the Be-200 give new tactical capabilities as well, particularly in delivering special purpose or combat swimmer teams. In addition, the Be-200 has the largest

payload (up to 7,500 kg) for this class of aircraft and can handle a wide range of freight containers.

The Be-200 is equipped with modern avionics – an upgraded ARIA-200M integrated avionics suite developed jointly with leading Western manufacturers and enabling round-the-clock operation in any weather. All information is displayed on six liquid crystal multifunction displays and two customized navigation displays, which greatly facilitates flight control of this sophisticated plane. By the way, the crew of the Be-200 consists of two pilots and effective training aids are available for their training.

The Be-200 also features the D-436TP fuel-efficient bypass corrosion-resistant engines with a capacity of 7650 kg each complying with all ICAO requirements. They provide the maximum cruise speed of 680 km/h, which is higher compared with all its counterparts. In addition, the developers have also studied the possible installation of engines from other manufacturers.

The Be-200 is also equipped with an auxiliary power unit, which allows its fully autonomous operation. Moreover, there are no special requirements for its basing. This can be either off-aero-



drome basing on the ground – in that case only an equipped onshore ramp to the water surface is needed or the aircraft can remain afloat moored to a ramp. Preparation of these basing facilities can be carried out in a short time and will not involve significant costs. In addition, there are no restrictions on its use at sea, as the developers have made it completely resistant to corrosion.

During ten years of active service, the Russian Be-200s have demonstrated the highest reliability of their airframes and systems and their serviceability in any weather conditions. High-altitude trials that took place in Armenia serve as a good example. During the tests the Be-200 took off and landed on the land aerodrome Gyumri (1580 m above sea level) and high-altitude Lake Sevan (1950 m) where water scoops and drops

were also carried out. In addition, a single-engine takeoff of the Be-200 was successfully practiced at the same time.

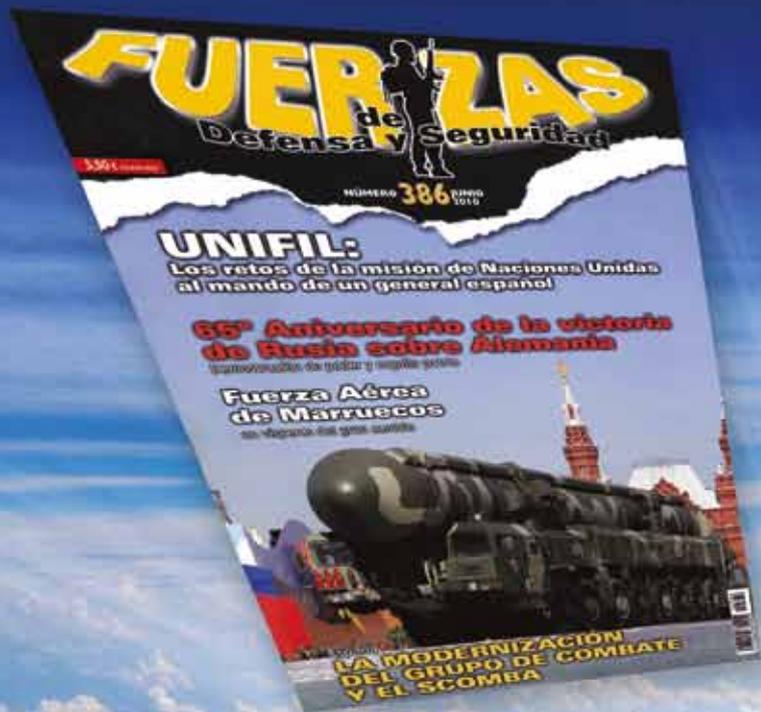
According to some experts, the Be-200 is really a symbol of new capabilities in the world of aviation. The plane has flown around many countries in Southeast Asia, Europe and South America, where it took part both in fire extinguishing and in dozens of exhibitions and demonstrations. And everywhere the Be-200 was accompanied by rave reviews.

But even greater export prospects will become available to these unique amphibians after their adoption by the Russian Navy. In May 2013 the Russian Ministry of Defense signed a contract for the purchase of six planes. Of these, two will be delivered in the basic Be-200ES configuration (similar to that supplied

- Be-200 versions:
- Fire Extinguishing
 - Search & Rescue
 - Transport
 - Passenger
 - Ambulance
 - Patrol
 - ASW

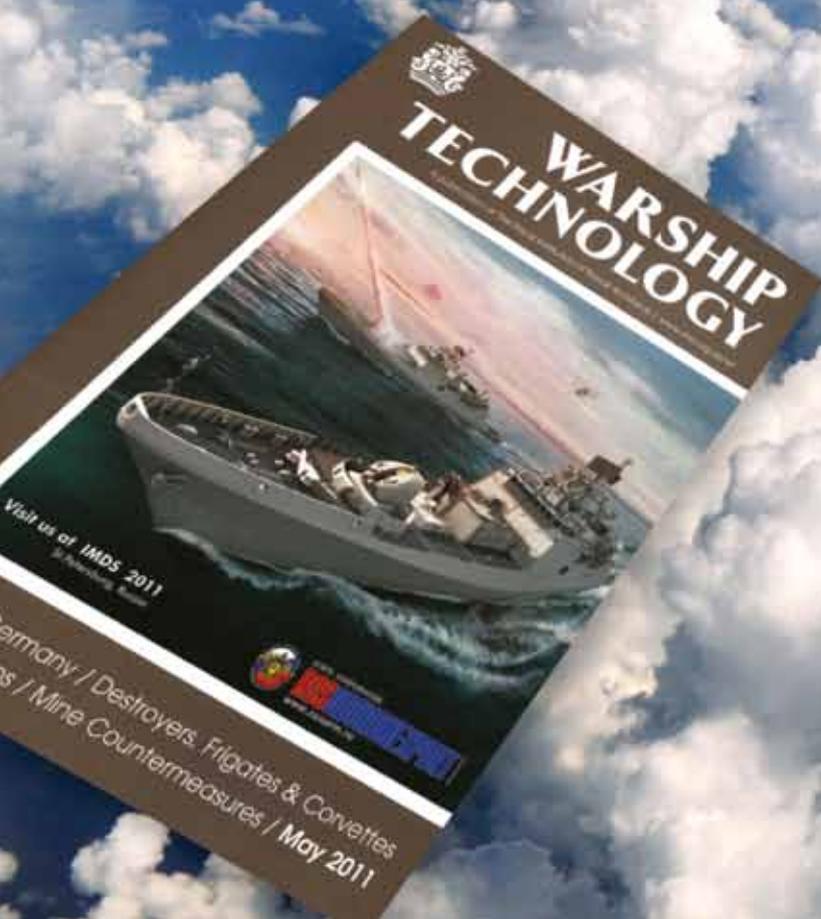
to the EMECOM) and the other four in the Be-200PS patrol version (without the fire extinguishing function). While the new planes are under construction, in June of this year the military already held joint exercises with the EMERCOM, during which the possibilities of using the Be-200 for fighting fires on drilling platforms, ships as well as in search-and-rescue and anti-terrorist operations at sea were tested.





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Fast Missile Boats from Russia



Project 12418 Molniya missile boat

On October 21, 1967, two Egyptian Soviet-built 70-ton Project 183R Komar-class missile boats (hull No. 504 commanded by Lieutenant Commander Shaker Ahmed Abd El-Wahed and No. 501 under command of Captain Lutfi Jadallah) sank the Israeli British-built 1710-ton destroyer Eilat in the Mediterranean Sea with four P-15 anti-ship missiles.

It was the first-ever successful combat use of high-speed missile boats in the history of naval battles. Since then October 21 has been celebrated as Egyptian Naval Day, while the victory over the more powerful enemy forced to change the attitude to the «mosquito fleet». There came saw a real boom in the construction and purchase of missile boats around the world. The Soviet Union, alone, built 112 Project 183R boats in various modifications, 80 units were purchased by a dozen countries in Asia, the Middle East, Africa and Latin America.

In the 21st century, Russia remains one of the world's largest shipbuilding nations. Its national shipbuilding industry can design and build warships and auxiliary vessels of all classes, as well as produce all kinds of naval weapons and equipment. The aircraft carrier INS Vikramaditya handed over recently to the Indian Navy is a dramatic proof of that.

There are currently over 150 companies in Russia specialized in designing and building warships, civilian vessels and offshore drilling platforms. Among them are not only shipyards, research institutes, and design offices, but also marine engineering, instrumentation and electronics plants that employ about 200,000 people. Russian developers are traditionally strong in the systems approach to marine equipment design. With its high level of science, design and shipbuilding technologies, strong production capacity, skilled personnel and

extensive experience of foreign trade activities, Russia holds its position as the world's leading exporter of naval equipment and armaments.

These competencies of Russian shipbuilders have long been appreciated by Rosoboronexport's foreign customers. Over the past half-century since the beginning of Russian naval equipment deliveries, more than two thousand surface combatant ships, submarines, missile and patrol boats, supply vessels and naval weapons have been exported. Last year, the Company's naval exports slightly exceeded the world average level (16 percent) and amounted to over 17 percent. In currency terms, the figure turned out to be quite impressive – more than two billion dollars.

Russia competes favorably with the world's major naval equipment and arms exporters. This is largely due to Rosoboronexport's successful activities. However, the main role in the process is played by the domestic shipbuild-



Project 14310 Mirazh patrol boat

ding enterprises, most of which are part of the United Shipbuilding Corporation (USC), one of the leading manufacturers of high-tech ships and vessels in the interests of the international market.

Currently, Russia is the largest exporter of combatant and patrol craft. Back in the 1960s-90s, our country delivered abroad approximately twice as many combatant boats as Great Britain, France, Sweden, Norway, Spain and Italy combined. Today, there is growing demand in the world for combatant and patrol boats with a displacement of 20 to 500 tons. The requirement for them is quite high in the Middle East, Southeast Asian, African and Latin American markets. Russian companies have something to offer in this sector to international buyers. Today, the combatant craft is a fast, well-armed, advanced electronic-technical system capable of successfully performing a wide range of missions in wartime and peacetime.

Russia pioneered in applying bottom devices to small ships. With lift vector control, the world's unrivalled Project 14310 Mirazh (Mirage) patrol boat can achieve speeds up to 50 knots, significantly reduce rolling and pitching motions and cut down specific fuel consumption.

The Project 12418 Molniya (Lightning) missile boat is designed to engage enemy surface combatant ships, boats and vessels on the high seas and in coastal waters, both independently and in conjunction with the fleet striking forces. It is equipped with the Uran-E anti-ship missile system capable of penetrating current shipborne air defenses and assuredly engaging any surface target. In terms of firepower, the Molniya is unrivalled among its foreign counterparts.

Throughout its history, the boat was repeatedly studied by foreign experts. Designers and military highly praised its combat and speed performance, survivability, and simplicity of design. In its issue of May 26, 1992, New York Times named the Molniya boat of the first modification one of the fastest and deadliest ships of this class in the world. New versions of the Molniya boats significantly outperform their predecessors in fighting capabilities.

Among combat missions assigned to the Molniya are engaging enemy combatant boat and ship detachments, landing detachments and convoys, providing cover for friendly ASW forces, landing detachments and convoys, conducting tactical reconnaissance, and providing surface situation awareness.

In peacetime, the boat is used to protect the state border, perform patrolling, ensure safety of navigation, fight piracy and participate in rescue operations. All these capabilities have been appreciated by the sailors of Turkmenistan's Navy, which recently purchased a batch of such boats.

The Project 12150 Mangust (Mongoose) fast planing patrol boat has great export potential. It is capable of achieving speeds up to 50 knots and is designed to intercept virtually all high-speed sea targets. Its armament mix includes a 14.5mm naval pedestal machine gun mount and the Iglas MANPADS.

The Project 12061E Murena air-cushion landing craft is unique in its combat and performance characteristics. It is designed to take on forward landing parties' military equipment and personnel from a hard beach or a beach, large landing ships and transports; provide their sealift and landing on unequipped coast and shallow water. The Murena can also be used to patrol coastal areas, naval base and seaport areas.

The Murena landing craft offers improved design features and seaworthiness through the use of corrosion-resistant alloys, extruded sections and panels, and a high-performance power plant.

The boat and its armaments remain operable at a wave height of up to 1.5 m and wind speed of up to 12 m/s. Its troop capacity is impressive: 2 infantry fighting vehicles, or 2 armored personnel carriers, or 3 armored vehicles, or 2 amphibious tanks, or 1 medium tank, or



Project 12150 Mangust fast planing patrol boat

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130 marines. Its armament corresponds to the assigned missions: two 30 mm AK-306 lightweight automatic guns controlled by an optical sighting device (ammunition load: 500 rounds per gun) and eight Igla-S MANPADS sets.

The Project 20970 Katran patrol boat is designed to counter enemy surface ships and combatant boats, patrol the maritime area in the open coastal waters of the seas and oceans and in inland waters. It can effectively engage enemy surface ships and combatant boats, landing craft and transports, provide fire support to amphibious landing parties, conduct tactical reconnaissance. In peacetime, the Katran can carry out patrol missions as part of the Coast Guard forces.

To reduce radar visibility, Katran's hull and superstructure are made using stealth technology.

The main striking weapon of the boat is the Uran-E anti-ship missile system with 3M-24E anti-ship missiles accommodated in eight transport-launch containers. Air defense is provided by an AA missile/gun system, the 3M-47 Gibka shipborne turret mount with four Igla-S SAMs, and the 30mm AK-306 lightweight automatic gun mount. The PK-10 decoy dispensing system (four KT-216 launchers, 40 rounds) is used for passive jamming.

The Katran patrol boat is capable of achieving a maximum speed of about 40 knots and covering up to 2200 miles at maximum fuel capacity. Its endurance is five days.

The Project 12300 Scorpion (Scorpio) is even a more powerful missile/gun boat. It is designed to engage enemy surface combatant ships, boats and transports independently and in conjunction with fleet striking forces.

Its full displacement is about 460 tons, hull length – 57 m, beam – 10.3 m. With such dimensions, the Scorpion has a top speed of about 40 knots, cruising range at maximum fuel capacity is about 2,000 miles, and endurance is 10 days. Like on the Katran, modern radar signature reduction technologies are also effectively used here.

Upon customer request, the Uran-E anti-ship missile system may be replaced with the Yakhont anti-ship missile system consisting of two launchers (with two missiles each) and 3R50E-12300 shipborne control system. In addition to striking missile weapons, the Katran carries an AA missile/gun system; the 100mm A-190-5P-10E universal gun system (consisting of the A190 gun and the 5P-10E universal fire control radar), as well as the PK-10 decoy dispensing system (two or four KT-216 launchers) for passive jamming.

Depending on customer's requests, economic and technological possibilities, Rosoboronexport offers co-production of high-speed missile boats both at Russian production facilities and at buyers' shipyards. Licensed boat construction by partner states is also possible.

Such a policy has enabled Rosoboronexport to significantly expand its sales geography. Moreover, the Russian special exporter constantly seeks to assist customers in military expenditure optimization by tying in its recommendations for choosing Russian arms with the cost-effectiveness criterion.

«Currently, Rosoboronexport is pursuing an active marketing policy, which is based on analysis of the interests and needs of our potential customers throughout the entire life cycle of the supplied weapons, military equipment and machinery, – says Oleg Azizov, Head of the Company's Navy Equipment Export Department. – We keep on improving the quality of after-sales service, level of training, expanding the export of spare parts, and offering to establish the technical infrastructure, training and retraining centers on the territory of the importing countries. I'm sure that Russian missile boats will be in demand on all continents for use in the most challenging climatic conditions and combat situations».



Project 12061E Murena air-cushion landing craft

RUBIN IS SEEKING PERFECTION IN SUBMARINE DESIGNS



photo: Admiralty Shipyards

Project 636 submarines are being manufactured for the Black Sea operations

Since the date of its foundation on the 4th of January 1901, the major, most important, and definitely honourable task of Central Design Bureau for Marine Engineering (CDB ME) Rubin was the assurance of maritime defence capabilities of Russia. The history of Design Bureau contains many glorious pages that have brought fame to the Russian Navy. The entire world knows of Shchuka-, Malyutka- and Leninets-type submarines that fought bravely during World War II. Strategic missile submarines designed by CDB ME Rubin such as Typhoon class, Delta class and Borei class have been the most important element of nuclear deterrence force since the second half of the 20th century. All non-nuclear

submarines (among them are Whiskey class (Project 613), Foxtrot class (Project 641), Kilo class (Projects 877EKM and 636) including those that have been successfully exported for over 50 years were also born at the Rubin Design Bureau.

The policy of the Russian state in recent years directed for comprehensive modernisation of armed forces, without doubt, cannot but reflect positively the work of our Design Bureau.

Since 2012 Borei-class submarines have been accepted by the Navy. Shipbuilding yards have been constructing new submarines of the same class modernised to satisfy more stringent requirements of the Navy. It can be stated confidently that the Borei

class SSBN submarines armed with Bulava ballistic missiles with intercontinental range fully proved their value. These submarines will be the basis of Russia's nuclear shield in the first half of the 21st century.

Maintaining the non-nuclear fleet in combat readiness and its development is taken very seriously. Diesel-electric submarines of Project 877 are being refurbished at ship repair yards of Russian Far East and North. And construction programme for new submarines of Project 636 is rather extensive. Modernised submarines of this Project, fitted with state-of-the-art missile-torpedo complexes and combat systems, arouse continuous interest of both Russian Navy and foreign customers. Total number of Kilo class



Lada is to complete trial operation programme this year

submarines constructed (Projects 877 and 636 and their modifications) has exceeded 60 units this year.

Kilo-class submarines are still in stable demand with foreign customers. At present, contracts are being implemented for navies of two partner countries.

Export of submarines was always one of business priorities of CDB ME Rubin.

In the short term, this priority will also remain very important and claim a special attention due to the market expansion and increasing competition.

Growing interests of Southeast Asian countries spur the demand for submarines in the region. The Persian Gulf area shows a similar situation. In this respect, the market demonstrates the obvious regularity that the augmentation of navy in one country of a region results in growing demand for ships with the neighbouring countries. In the years to come, market growth in Latin America will be determined by the necessity to replace the submarines purchased in the 1970s. Making sure even once in the capabilities of submarines, very unlikely that a country will be willing to reject them from the Navy.

Russia is one of the key players in the international market of non-nuclear submarines and significantly affects it as a whole with the technical component of this influence being within the competence of CDB ME Rubin.

In this connection, irrespective of successful development of Kilo class series, special consideration is given to the active promotion in the market

of the Amur Project that is based on the fourth-generation non-nuclear submarine Lada.

Completion of the trial operation programme of the Lada lead unit (St.Petersburg submarine) is scheduled for this year; thereafter it will join the war strength of the Navy. Now, according to the schedule approved by the Naval Command, additional works are being effected in northern seas with the systems that cannot be fully trialled in the shallow Baltic Sea. Construction of the second boat of the Lada Project is under way at the Admiralty Shipyards, a contract for the

construction of the third one is being prepared for signing. The second Lada differs considerably from the lead unit. Main tactical-and-technical characteristics have been improved, all problems, revealed during the trial and initial operation, have been eliminated. In the context of non-nuclear submarines further evolution related to an air-independent propulsion plant, CDB ME Rubin continues activities for development and testing of the plant in accordance with agreed upon time frames and on the basis of proven engineering solutions.

Thus, it can be noted that an advanced submarine of Amur type will be a combat ship where all innovations of Russian industry will be embodied. In addition, the Project will be tailored to specific technical requirements and naval operating conditions of a country-customer.

As a whole, there is sustainable development tendency in the Russian industry and in shipbuilding, in particular. Main suppliers are continuously working on equipment performance enhancement. R&D activities are being carried out, advanced systems and equipments are being developed. At present, CDB ME Rubin closely interacts with the Russian Navy for the development of fifth-generation submarines.

CDB ME Rubin works successfully in all the areas of its activity and our task is to achieve perfection in submarine designs.



photo: Admiralty Shipyards

Kilo class submarines have been exported for over 50 years



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A NEW ERA OF BRAHMOS AEROSPACE



Mr. Sudhir Kumar Mishra, CEO & MD of BrahMos Aerospace

Mr. Sudhir Kumar Mishra Outstanding Scientist & Chief Controller (Research & Development), DRDO, Ministry of Defence, India who has taken over as CEO & MD of BrahMos Aerospace from 1st August 2014 has a very rich background of interacting with Russia and other countries for International co-operation for around four decades.

A Post Graduate in Mechanical Engineering from IIT Madras and Doctorate aspirant from NIT Warangal, India Mr. Mishra has been the Director of Missile Program and Head Program office since 2007 in DRDO. He has been closely associated with all missile development related works of DRDO and its cooperation with other partner countries specially Russia.

His Hand on experience as Programme Manager at DRDL Hyderabad for BrahMos in the initial days of the JV resulted in realization of flight hardware and other support systems as per schedules. It was his merit performance which resulted in his selection as Technical Advisor at Embassy of India in Russia in 2003.

He during his tenure of four years as Technical Advisor (Defence Technologies) in Moscow played a pivotal role in ensuring that the relationship between India and Russia in Defence grew to a new level of partnership. It was his endeavor which resulted in the then Director General & Designer General of NPOM, the Joint Venture partner of DRDO and Share Holder from Russia in BrahMos Aerospace Dr. G. A. Yefremov being awarded the highest Civilian Honour from the Indian Government to any foreigner The «Padma Bhushan».

His interaction with major industries of Russia in particular in Defence Sector has enabled leap frog in technology for many projects under DRDO as well as the three services of the Armed Forces. JV BrahMos has benefitted manifold during his tenure in Russia. The visits of Defense Minister & President of India to NPOM the JV partner were coordinated by him.

A high profile Missile Scientist with specialization in missile project management he has been awarded with numerous awards which in-

cludes the DRDO Scientist of the Year Award in 2009 by the then Prime Minister of India.

Mr. Mishra is a fellow member of numerous Professional bodies including the Institution of Engineers and the Aeronautical Society of India to name a few.

On assuming office as CEO & MD BrahMos Mr. Mishra has set very crisp agenda for the near future which includes several targets.

First and Foremost meeting of all schedules of deliveries to the armed forces through optimization of deliveries from various industries of India & Russia

The Indian Prime Minister Narendra Modi had stated that India should now move towards self-reliance in producing military weapons and systems and also look for exporting them to the friendly nations. In these regards, Mr. Mishra said it will be indigenizing missile development in India, capacity building for larger produc-



Mr. Mishra welcomes Russian Vice Prime Minister Dmitry Rogozin at BranMos exposition

tion, meeting the production orders ahead of schedule to ensure delivery of missiles on time and ensuring different versions of BRAHMOS missiles to meet the aspirations and requirements of the defense force including Army, Navy and Air Force. Mishra said the Indian contribution has so far been only for the inertial navigation guidance system and fire control system. «We have to focus on indigenously realizing the engine and seeker for the BRAHMOS missile,» he added.

Realization and start of the flight trial program of the Air-Launched version by early 2015 for deliveries to the Air force from 2016.

BrahMos Aerospace will begin delivery of the air-launched version of BRAHMOS supersonic cruise missile system to the Indian Air Force (IAF) by 2016, the JV Company's new Chief Sudhir Kumar Mishra has said. He said the air-launched version of the BRAHMOS missile was under progress and the first test-firing is expected to take place by either the end of this year or the beginning of next year. «We have already modified our missile system in terms of its weight and size. The Su-30MKI is undergoing modification so as to carry the strike weapon in its belly in partnership with the HAL,» he said.

The air version of BRAHMOS will be lighter than its other variants and will weigh 2.5 ton, though it would be equally potent in firepower and devastating capability as its range and maximum speed of 290-km and 2.8 Mach respectively will remain unchanged. Carrying a warhead of up to 300 kg, the missile would be able to intercept surface targets as low as 10m in altitude. India has placed orders for a total of 272 Su-30MKI fighters with Russia, deliveries of which are expected to be completed by 2018-2019. While Russia has delivered 50 of the fighters, India's Hindustan Aeronautics Limited (HAL) is license-producing the remaining warplanes domestically.

Expedite the Cooperation on BRAHMOS Mini – between DRDO, NPOM & BrahMos.

Supersonic cruise missile manufacturer BrahMos Aerospace has said it is hopeful that a pact to develop a sleeker and faster «Mini» version of the missile will be signed soon.

According to Mr. Mishra the mini version of the BRAHMOS missile will have a speed of 3.5 Mach and carry a payload of 300 km up to a range of 290 km. In size, it will be almost half of the present missile, which is around 10 metres long. Mishra said once developed,

the missile could be integrated with different platforms including submarines and the Fifth Generation Fighter Aircraft (FGFA) being developed jointly by the two countries.

The new BrahMos CEO said he was expecting that the missile would be ready for induction into the services by 2017 and there would be a huge market for the new missile in India, Russia and friendly foreign countries.

Parallel R & D efforts to remain a market leader in Cruise missile Family.

In line with Prime Minister Narendra Modi's vision to export defense hardware, supersonic cruise missile manufacturer BrahMos Aerospace has said that South-East Asian and Latin American countries have shown interest in acquiring the 290-km range weapon system and it is possible to export the missile to certain friendly nations. «Several South-East-Asian and Latin American countries want the BRAHMOS, expressed interest in it, particularly for the naval and coastal defence versions. A definite list of such countries already exists. We are progressing with our marketing strategy for exporting BRAHMOS to certain nations, subject to clearance from both Indian and Russian governments,» BrahMos Aerospace CEO Sudhir Kumar Mishra said. The inter-governmental agreement between India and Russia for development of BRAHMOS missile also stipulates use of this advanced system to be inducted in the Indian and Russian armed forces as well as export to friendly countries.

Collaboration between Institutions like MAI from Russia & IISc in India for futuristic versions main being the BRAHMOS- II hypersonic project

BrahMos Aerospace officials stress that the current mission of BrahMos is not just further missile technology development but to become a locomotive of high-tech for our both nations for many more ventures. The result of this new mission will be India and Russia leading position in the knowledge world order.

A thorough professional and a person full of Zeal and enthusiasm Mr. Sudhir Kumar Mishra seems all set to take the role model of cooperation in Defence Field «BrahMos Aerospace» in the near Future to greater heights. A new Era is all set to begin in this fruitful partnership.

DESIGNING OF RADAR COMPLEX SYSTEMS FOR ALL TYPES OF SUBMARINES AT JSC «CONCERN «GRANIT-ELECTRON»



One of the main fields of JSC «Concern «Granit-Electron» is development of radio technical systems and complexes of various purpose for submarines. The specific feature of our radio equipment is the multichannel design, application of basic multifunctional devices with AI elements and expert systems which ensure high efficiency of the electronic warfare systems, minimal weight-and-dimensional characteristics, and high ergonomics of the equipment. The building block concept and application of various interfaces provide high level of upgradeability for the electronic warfare systems of JSC «Concern «Granit-Electron».

All the primary technical solutions implemented in the radar complex systems are patented.

MRKP-59E radar system

Modern radar systems for submarines is designed in the form of radar complex systems which integrate active and passive radio-location channels with the application of the joint integrated antenna post mounted at one radio mast.

The MRKP-59E radar system is installed at submarines and performs the following missions when the submarine surfaces or at periscope depth:

- surface surveillance in order to warn the submarine about possible detection by anti-submarines forces;
- short range surface surveillance



MRKP-59E radar system

with enhanced security by active channel for provision of submarine's navigation safety.

- long range surface surveillance in active and passive modes;
- transfer of coordinates data into the combat management system for target designation data generation for torpedo and missile weapons;
- displaying and documenting of received information.

The MRKP-59E consists of:

- active radar channel for surface surveillance (ARC);
- passive radar channel for surface and air surveillance (PRC);
- integrated antenna of ARC and PRC and IFF equipment.

KRM-66E small dimension radar complex system

The KRM-66E radar system of non-penetrating type is installed at submarines and performs the same missions as the MRKP-59E when the submarine surfaces or at periscope depth.

In case of a specific request of a customer a channel of information and logical interaction with the aviation outside-mounted look-out station may be included in the radar system.

The KRM-66E consists of the following channels, equipment and documents:

- active radar channel equipment (ARC);
- passive radar channel equipment (PRC);
- integrated antenna post for ARC and PRC and IFF equipment mounted on a telescopic mast of non-penetration type.

The radar system provides automated complex performance monitoring and malfunction diagnostics. The equipment of the radar system provides possibility to design various configurations of radar complex systems for particular projects of submarines on its basis.

The new design of the radar system for the conventional submarines is a unique example of integration of the active and passive channels equipment

State Decorations to Outstanding Russians

On August 1, 2014 President of Russia Vladimir Putin presented state decorations and title conferment certificates to outstanding Russians from various parts of the country in a ceremony at the Kremlin.

President Putin stressed in his speech, in particular:

«Here at the Kremlin today are people from all around Russia who have achieved high recognition. Our country needs the results of your constructive and creative work. What's more, your work plays a huge part in shaping our country's successful development. With your direct involvement, modern Russia acquires ever greater strength, pride and confidence in its own ability and carries on with dignity the traditions of our more than 1,000-year-old country, building on its rich scientific, cultural and spiritual heritage, and making full use of the truly endless opportunities for growth».

General director of Joint Stock Company «Concern «Granit-Electron»

Georgiy Anatolyevitch Korzhavin was awarded with order for «Marine merits».

Georgiy Korzhavin is doctor of technical science (2009), professor (2010), doctor of electro technique of Academy of electrical science (2002), member of Academy of electrical science (2005) and Saint-Petersburg engineering Academy (2002), Academician of International Engineering Academy (2005). He has been working in Central Research Institute «Granit» since 1972 beginning his career as engineer. Since May of 2006 – General director of JSC «Concern «Granit-Electron».

Georgiy Korzhavin has 167 publications, including 101 inventions and utility models.



President Putin presented order for Marine merits to General director of Granit-Electron Georgiy Korzhavin

He is decorated with state awards and medals, as well as different industrial awards.



into the joint system with the common multifunctional antenna post mounted on the telescopic radio mast of non-penetration type.

The active radio-location channel of the radar system is the further development of the concern's achievements in the field of designing of so-called LPI radars with the single antenna for mission and receiving. These radars are a kind of trademark products of the concern. The emitting devices of the radio-location system are fitted with X-range solid-state power amplifiers with controlled output depending on the design. The passive channel is fitted with the generation and processing device producing a wide range of radio signals with various parameters of intrapulse, adapted for natural and artificial jamming situation. The emitted signals with a wide range of frequency hopping and alternation of parameters of the emitted signals allow broadening of the functionality of the radar systems in general if necessary and ensure electromagnetic compatibility with other radio means.

The electronic signal monitoring system which is a part of the radar system satisfies all the requirements to the submarine equipment:

-high-sensitivity detection of various types of signals simultaneously in the whole antenna bandwidth with further

analysis, classification and assessment of the potential threat of the detected object; - the antenna system of ESM ensures instant direction finding of signals using ring arrays, the precise direction finding is carried out through the specific antenna system integrated with the antenna of the active radio channel.



KRM-66E small dimension radar complex system

The main specifications of the radar system meet the requirements to modern and perspective submarine-based electronic warfare systems. The performance of the radio hardware, the calculation system and the software of the radar system allow application of the equipment as part of the surveillance subsystem in the integrated combat management system.

The experience of the concern in the field of designing radio-location complex systems proves that the upgradeability of parts of the equipment should be taken into account even at designing stage. This, for example, will allow improvement of the radar system's performance (e.g. maintainability) by the results of testing and make necessary adjustments by the assignments of bureaus designing submarines. The equipment of the system provides possibility to design various configurations of radar complex systems for particular projects of submarines on its basis.

Advertorial is based on the article of I.A. Ledovoi, director general, RawenstvoJSC, V.P. Ivanov, director, NPK-3 of R&D and OEM JSC «Concern «Granit-Electron».

For more information please visit www.granit-electron.ru



«VOSTOK» 2D AND 3D RADAR FAMILY BY «KB RADAR»



«Vostok-D/E» radar

2D, i.e. measuring the azimuth and slant range of aerial platforms, surveillance radars provide the user with general information about the aerial situation in the country or region. Modern solid-state VHF-band radars protected from antiradiation missiles (ARM) and capable of reliably detecting stealthy targets, feed authentic and accurate radar information into integrated Air Defense control systems. In peacetime, such information is sufficient for the purposes of air traffic control and air defense.



2D radars can be combined with radar height finders into 3D radar suites. Such suites ensure high accuracy of coordinate measurements, however they do not provide sufficient throughput and are bulky.

For a country to possess a fleet of less expensive, as compared to 3D

systems, 2D radars working round the clock, is still a topical issue.

3D radars are used for the air defense, providing targeting and guidance for SAM systems and aviation (interceptor aircraft). They are devoid of the above-mentioned shortcomings but, as a rule, possess less spectacular accuracy characteristics and provide inferior authenticity of radar information (false targets).

Taking into account the above advantages and deficiencies, one should, in every particular case, select an optimal variant of kitting up the radar reconnaissance system.

The JSC KB Radar, the leading developer and manufacturer of radar, EW and radio control equipment and systems in the Republic of Belarus,

has developed and offers for delivery a unique family of «Vostok» 2D and 3D radars:

- Vostok-D/E - mobile digital 2D VHF radar featuring unprecedented mobility, high reliability and jamming immunity;

- Vostok 3D – mobile digital 3D radar – a «classical» system possessing performance characteristics at the level of the world's best radars;

- Vostok 3D VHF – a compromise version of radar combining the advantages of 2D, 3D radars and 3D radar suites.

The radars designed by KB Radar display a high accuracy of coordinate measurements, reliable detection of small-RCS and low-visibility targets, enhanced jamming protection. They are effective against stealthy aerial platforms and immune to ARMs.

All the Vostoks can work with friend-or-foe recognition systems of different standards and will be integrated into a control system using the relevant control and information exchange protocols.

The Vostoks are based on common engineering and manufacturing solutions, which ensures a high degree of unitization of the components they are built from, economy in operation and maintenance, and reduces the time for the operating personnel to master the systems.

For more information you are welcome to visit www.kbradar.by



EUROSATORY REMAINS THE LARGEST AND THE BEST!

Eurosatory 2014, the Land and Air-land Defense and Security Exhibition, was held in Paris from June 16th to 20th 2014.

Eurosatory remains the first global meeting for land and Air-Land defense. During this edition, the exhibition also confirmed it's now-established implication in the areas of homeland security, civil security and safety of companies with the presence of many visitors and delegations involved in those sectors, of several Interior Ministry entities and over 50% of exhibitors offering various security solutions.

Presenting, as usual, a wide selection of materials and systems on show, an unrivalled number of exhibitors and the widest exhibition area, Eurosatory maintained its position as the international leader and appeared as the major event for new products and innovations. From year to year Eurosatory improves its already complete cover of the Land and Air-land Defense and Security industries, imposing itself ever more as the event of reference.

Eurosatory was organized on the total area of 175,523 square meters with 1,504 exhibitors in 36 pavilions this year, a 5 per cent rise on the 1,432 exhibiting

in 2012 and a 35 per cent jump on the 978 exhibiting a decade ago! The number of exhibiting nations has also risen to 58 from the 53 present in 2012. There were also 172 official delegations from 88 countries and 3 International Organizations, 55 770 visitors and 707 journalists representing 330 media.

Under the international pillar, Eurosatory aims to attract every country in the world with a defense and/or security industry. Thus 69 per cent of exhibitors were not French and at least one country from each of the six inhabited continents is represented. This year, Eurosatory was welcoming six new countries: Argentina, Colombia, Hong Kong, Iraq, Japan and Panama. New countries usually take part for the first time through the participation of a single company. But Japan was departing from that trend and arriving in force for its very first participation with 14 industrial firms exhibiting new at Eurosatory 2014 on 153 m² of space. Companies such as Fujitsu Ltd, Kawasaki Heavy Industries, Mitsubishi Heavy Industries and Toshiba Corporation were there. More than a mere participation in the exhibition, true state co-operation with France is being developed. At the instigation of GICAT, the DGA arranged meetings between

French industry representatives and Japanese participants.

The French Army Air Corps chose Eurosatory to celebrate its 60th anniversary, thus reinforcing the air-land dimension of the event. International army aviation delegations from numerous countries were invited for the occasion and will spend several days at the event.

The French Ministry of Defense presented the operational functions of a force deployed in operation. The main stand covering 2,100 m² was organized around the SCORPION program. It displayed major equipment (CAÏMAN TTH, VBCI, SAMP/T, and so on) and intelligence, contact, support and protection functions that have proved their worth in operation.

The French Ministry of the Interior was at Eurosatory for the first time ever, with a 200 m² stand located near the «Civil security and emergency response» and «Infrastructure and critical facilities protection» clusters.

At Eurosatory visitors got a chance see more than 600 pieces of real equipment, including 450 new items being revealed here. Live hour-long demonstrations at the outdoor field were organized twice a day.



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Eurosatory in Action





Photos of Yuri Laskin

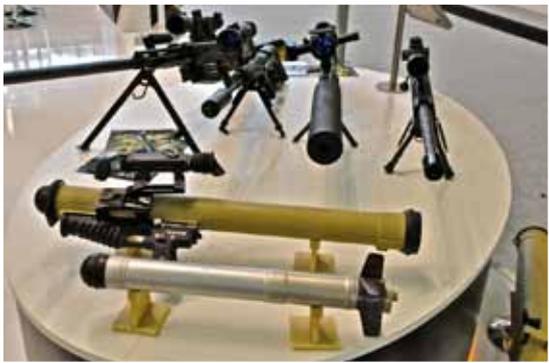
Eurosatory Stationary





Photos of Yuri Laskin

Russian Companies at Eurosatory 2014



FRENCH LEADER EXPANDS GLOBAL

At the Eurosatory 2014 international defense show Sagem (Safran) was showcasing a range of systems and equipment designed to meet the most demanding needs of today's armed forces: intelligence, long-range precision strikes, surveillance, border protection, high-intensity combat and guerrilla warfare. The Sagem products on display at Eurosatory 2014 included:

Patroller™ long-endurance tactical drone. The Patroller drone features a new-generation very-high-resolution imaging system. The first versions of this new payload, derived from the Sagem Euroflir 410 gyrostabilized pod, were successfully tested in April and June 2014. Patroller is a multi-sensor drone, capable of integrating a communications intelligence (Comint) package. The Patroller mission system handles intelligence missions up to 20 hours.

SATIS thermal imagers. Sagem is expanding its range of vehicle-mounted thermal imagers, based on the SATIS family. By combining high-res sensors with advanced image processing, these systems offer very long-range capability in all environments. SATIS is available in both cooled and uncooled versions, and the former features an optical zoom function.

PASEO, a new generation of combat vehicle sights. The innovative PASEO sight offers unrivaled performance in the detection, identification and designation of air-land threats, based on the integration of very-high-resolution digital optronic sensors, including the SATIS line of thermal imagers, and line-of-sight stabilization.

Soldier modernization systems. Sagem produces the FELIN integrated equipment suite for the French army, which has already taken delivery of these systems for 15 regiments. Based on this experience, Sagem is developing a new, more integrated and flexible solution for infantry soldiers. Its C4I component features a latest-generation radio and intuitive C2. Furthermore, its open architecture facilitates the integration of other equipment, such as binoculars, scopes, C2 applications, etc.

JIM LR II multifunction infrared binoculars. Sagem is extending its range of applications based on the JIM LR II infrared binoculars, by using

optronic sensors and their networking ability. The combat-proven JIM LR integrates a number of functions in a single compact tactical package: thermal imager, GPS, rangefinder and North seeker. JIM LR II also includes a day/night image fusion function, panoramic display and automatic threat detection.

AASM Hammer SBU-54 Laser missile. This version of the AASM modular air-to-ground weapon features a laser seeker in addition to the standard inertial/GPS guidance. Offering a range exceeding 60 km, the AASM Hammer is an agile weapon that can be fired highly off-axis, day or night, in any weather, including at low altitude.

During Eurosatory South African Denel Land Systems has awarded a contract to Sagem to deliver infrared imagers for the South African National Defence Force's (SANDF) Badger infantry fighting vehicles (IFVs). The contract covers the installation of three types of the medium wavelength advanced thermal imaging system (MATIS) on different versions of the Badger vehicles.

Designed to address demanding operational requirements of combat platforms for global armies, navies and air forces, MATIS allows users to carry out observation, reconnaissance, identification and engagement missions in challenging environments. Capable of being integrated in turret-mounted weapon systems, the hand-held, fully autonomous imager integrates bi-ocular display, controls and a battery pack, and has already proven its performance

during field testing. To date, more than 6,000 MATIS thermal imagers have been manufactured for major weapon systems in France and international markets.

Production will be carried out at Sagem's facility in Poitiers, France, while the delivery schedule remains undisclosed. As part of the industrial participation programme in South Africa, Sagem has collaborated with local company Afrimeasure, which will handle part of the final imager integration, along with testing and through-life maintenance.

Around 238 Badger IFVs are being manufactured by Denel under a contract awarded by the Armaments Corporation of South Africa (Armcor) in October 2013. A new generation 8x8 IFV, Badger is designed to provide soldiers with effective protection and offensive firepower in high-intensity warfare, while enabling them to dismount from the vehicle and freely interact with civilians during peace-enforcement operations. It is expected to replace the existing armoured protected combat vehicle fleet, including the Ratel 6x6.



MATIS thermal imager will be installed on DENEL's Badger IFV



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- Ability to detect and identify air targets at stops and during movement, short reaction time, maximum automated combat operation process.
- High jamming immunity.
- Combat vehicle is capable of completion of assigned combat missions independently, within a group of two CVs in «Squad» mode and as a part of SAM battery consisting of four CVs under command of a battery command post.

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