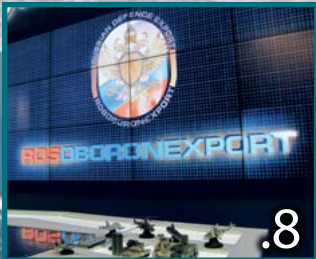


RUSSIAN NAVY & TECHNOLOGY GUIDE

Special analytical export project of Industrial Weekly

№ 01 (19), March 2018

FSMTS of Russia
Rules and successes
of defense exports



.8

The best from Russia
Navy innovations
at DIMDEX 2018



.14

'Pantsir-ME'
Absolute protection
for any ships



.20

Pride and honor
One of the main
national symbol



.36



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CONTENTS

NEWS SHORTLY

- 2 DIMDEX 2018
- 2 Cooperation agreement
- 2 Success of KamAZ
- 2 Maritime Show 2018 in Vladivostok
- 2 Light Aircraft TVS-2DTS
- 4 1500 new technologies
- 4 Russian Small Submarines
- 4 Techmash in 2017
- 6 Russia-India: Military-Technical Cooperation
- 6 Russia at Defexpo India 2018
- 6 Rosoboronexport in 2018

MAIN TOPICS

- 8 Defense Export from Russia

EXPORT REGULATION

- 14 Innovations at DIMDEX 2018

DEFENSE SENSATION

- 20 Absolute ship protection

MAIN PHOTO

- 24 PALMA. Air defence missile & gun system

SHIP AND PROJECTS

- 26 'Piranhas': Reboot
- 28 Innovations in Corvettes of Severnoye Design Bureau
- 32 An Underwater Trickster
- 34 Interceptors for interceptors

HISTORICAL DETAILS

- 36 Pride and honor of Russia

ANALYTICAL REVIEW

- 42 Russian warships in Asian service
- 48 'RN&TG' calendar

EDITORIAL



Innovations for the Navy

Political situation in the world (conflicts, sanctions, threats of war and other) makes nations once again reconsider their defense possibilities including sea lines. Threat of local conflicts to be evolved into global ones, failure of worldwide system of safety and nonending crisis – all of this leads to an unstable and dangerous situation.

One can predict raise of defense means market in times like this. But together with developing of defense technologies in order to secure people and countries safety, rivalry among sellers of weapons and defense systems increases in order to achieve such goals as increasing profits and market share. DIMDEX-2018 will present the best weapons, ships and decision that price and quality are the undisputed world leaders in their segments.

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

Taking part in DIMDEX-2018 Russia continues the policy of open partnership with other countries for national defense. Russia has a wide product line that meets all the needs of sea defense in all elements – on coast, on waves and under, over under water.

By the way, our magazine is an information partner of DIMDEX-2018.

Valeriy Stolnikov

DIMDEX 2018

Held under the patronage and vision of His Highness Sheikh Tamim bin Hamad Al-Thani, Emir of the State of Qatar, and proudly hosted and organised by Qatar Armed Forces, the Doha International Maritime Defence Exhibition & Conference, DIMDEX, has grown to become a leading event in the global maritime defence and security industry calendar. Now in its sixth edition, this prestigious event is renowned to be a dynamic gateway to industry insights, solutions and procurement opportunities, for maritime and defence leaders from around the world. DIMDEX 2018, will be held over 3 days from 12-14 March at the Qatar National Convention Centre.

DIMDEX 2018 presents a premier programme that provides the maritime and security community with access to cutting-edge military technology and the opportunity to build and strengthen relations with key stakeholders.

COOPERATION AGREEMENT

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

SUCCESS OF KAMAZ

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

Maritime Show 2018 in Vladivostok

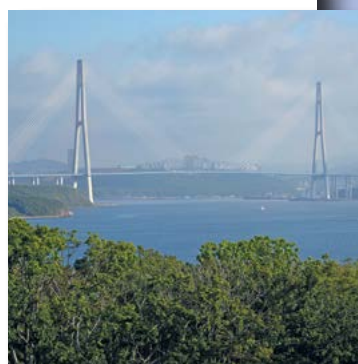
The Organizing Committee for the International Far Eastern Maritime Show 2018, which is set to take place in Vladivostok, held its first session in Moscow. Participants in the session included representatives from federal government bodies, relevant ministries and agencies, the heads of Russian regions, and representatives from the Russian Navy.

Members of the Organizing Committee examined organizational issues linked with the event and discussed preparation plans and a 'roadmap' for the show. The Roscongress Foundation was selected as official operator of the International Far Eastern Maritime Show 2018, with responsibility for both preparation and execution.

'The International Far Eastern Maritime Show is of great importance to the shipbuilding sector. All of the leading companies in this field have been invited to take part. I am certain that event will attract the attention both of industry experts and of a broader public. The venue and the infrastructure available on Russky Island will make it possible to host the show at the highest level, and we look forward to welcoming guests from regions all over Russia to Vladivostok, as well as our foreign friends and partners,' remarked Russian Presidential Adviser Anton Kobyakov.

The show will feature an extensive business programme, as well as exhibition and show programmes. The key objectives of the event are to assist the development of a shipbuilding cluster and associated industries in the Russian Far East, as well as to integrate it into wider shipbuilding industry in the Asia-Pacific region. The business programme will be built around four central themes: civil shipbuilding and repair, naval shipbuilding and repair, shipping regulation, and port infrastructure.

The event will bring together 1,500 participants from Russia and foreign countries. It is anticipated that delegations will attend from Vietnam, India, Indonesia, China, Malaysia, Singapore, South Korea, and Japan. Visitors can look forward to scientific and practical conferences on current issues facing the sector, bilateral technological symposia, and seminars from leading firms in the industry.



The International Far Eastern Maritime Show will host the First Shipbuilding Hackathon and a Young Engineers Convention. Special attention will be devoted to the jobs market in the shipbuilding sector.

The International Far Eastern Maritime Show will take place from July 25 to 28, 2018 on the eve of Russian Navy Day and the Navy Day Parade. The key events will be held on the campus of the Far Eastern Federal University on Russky Island.

Light Aircraft TVS-2DTS

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

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

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

TVS-2DTS aircraft will replace the obsolete An-2 aircraft built in USSR and abroad that are still massively used by regional airline operators.



The vehicle was first demonstrated by the Rostec State Corporation at the MAKS Air Show in 2017.

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1500 NEW TECHNOLOGIES

The Department of Shipbuilding Industry and Marine Facilities of the Ministry of Industry and Commerce of the Russian Federation based on the Krylovsky State Scientific Center FSUE in St Petersburg held a meeting on consideration of results of implementation of the Development of Civil Marine Facilities federal target program for 2009-2016.



The meeting was attended by over 120 specialists, including the heads of the Department of Shipbuilding Industry and Marine Facilities of the Ministry of Industry and Commerce of the Russian Federation, United Shipbuilding Corporation, integrated group structures of instrument engineering plants of the industry, Rosmorrechflot, heads and representatives of the leading scientific and production and engineering and development plants and scientific centers of the industry, Rosatom State Corporation, Russian Academy of Sciences, universities of the country, as well as such large customers of shipbuilding products as Gazprom, Gazprom Neft, Rosneft, Lukoil, and MorNeftGazStroy.

The resolution on a necessity to develop and implement this target federal program was adopted by the President of Russia, Vladimir Putin, in March 2017. The program implied settlement of two main objectives: creation of a forward-looking scientific reserve and technologies for development of perspective civil marine facilities, as well as reconstruction and technical re-equipping of facilities of the scientific and experimental and bench-top base for the purpose of conducting fundamental and applied research.

Over 60 billion rubles was allocated to the set of the technological directions of the Target Federal Program, and over 680 scientific and research and engineering and construction works were performed. The leading R&D contractors were represented by over 100 organizations, with consideration of co-contractors over 450. Actually, by 2016 the program brought 1,505 new technologies, over one third of which correspond or surpass the international level; about 1,040 patents were executed, 734 of which are assigned to the Russian Federation.

Russian Small Submarines

JSC Rosoboronexport, part of Rostec State Corporation, and JSC United Shipbuilding Corporation continue their efforts to promote small and midget submarines in the external market in 2018.

'Rosoboronexport notes the growing interest in small and midget submarines in South-East Asia, Africa, Latin America and the Middle East. Russia's shipbuilding industry and Navy have considerable experience in their development and operation, which gives grounds for success in promoting such boats in the world market. According to preliminary estimates, the capacity of this segment of the arms market will amount to approximately US\$4 billion for the coming five years,' said Igor Sevastyanov, Deputy Director General of Rosoboronexport.

Rosoboronexport is ready to supply its foreign partners with custom-designed small and midget submarines of up to 10 different models. These include the boats displacing 130 to 1000 tons that



meet the needs of most potential customers. The special exporter carries out after-sales service of the delivered products under a separate contract.

Small and midget submarines are designed to guard coastal maritime borders through covert patrol-

ling, destroy single surface ships and vessels, as well as submarines, or deploy or retrieve commandos. They can also be used to plant minefields, conduct reconnaissance in designated areas, evacuate people from local conflict areas and attack enemy shore facilities.

Techmash in 2017

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

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

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

Science-cum-production Concern Techmash was founded by the Rostec State Corporation in 2011.



The Techmash holding structure includes 36 enterprises of the ammunition industry. Highly effective models of military hardware manufactured by the Techmash holding are used in more than 100 countries around the world.

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



Международный военно-технический форум

№01, 21 августа 2018 года

Главный форум
Инновационный союз ОПК России
и Вооруженных сил РФ

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«С 22 по 27 августа Министерство обороны Российской Федерации проводит Международный военно-технический форум «АРМИЯ-2018». Это третье по счету масштабное мероприятие, в котором примут участие крупные отечественные и зарубежные предприятия оборонно-промышленного комплекса, ведущие конструкторские бюро и научно-исследовательские институты.

Основные мероприятия Форума пройдут в Конгрессно-выставочном центре «Патриот». Общая площадь экспозиции в павильонах и на открытых площадках превысит 300 тыс. кв. м. Динамические показы ходовых, летных и огневых возможностей вооружения, военной и специальной техники состоятся на аэродроме Кубинка, полигоне Алабино, а также в военных округах и на Северном флоте.

Научно-деловая программа пройдет в формате пленарных заседаний, конференций, круглых столов и брифингов, что позволит обсудить актуальные вопросы обороны и безопасности, дальнейшие направления совершенствования способов производства продукции военного назначения.

Тысячи посетителей смогут ознакомиться с последними достижениями в области высоких технологий и перспективными разработками, которые реализуются в военной сфере.

Сегодня Форум...

III Международный военно-технический форум (МВТФ) «Армия-2018», который открылся сегодня в Конгрессно-выставочном центре «Патриот» на полигоне Алабино и аэродроме Кубинка, на шестой день своего проведения остается самым масштабным и инновационным центром в мире. МВТФ сегодня крупнейший военно-технический форум планеты, он растет год от года, и «Армия-2018» поставит очередные рекорды по масштабам, динамическим показателям и...

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

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RUSSIA-INDIA: MILITARY-TECHNICAL COOPERATION



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

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

'The history of military-technical cooperation between Russia and India, which dates back almost six decades, is most clearly and exhaustively presented in the book. This cooperation began with a modest episode concerning a donation of two Il-14S aircraft in the de-luxe version by the head of the Soviet state to the Indian government. It has steadily evolved and today, within the framework of the strategic partnership between the two countries, shows the widest variety of the forms and types of relations: supply of military and dual-use products, joint ventures, licensed production of arms and military equipment, as well as joint R&D efforts on advanced weapons,' said Sergey Goreslavsky. The photo book was prepared under the sponsorship of Rosoboronexport and with the assistance of the Company's employees, whose professional activities have been intrinsically associated with India for dozens of years. It includes previously unpublished photos of bilateral meetings and negotiations, including summits, ceremonies for the transfer of military equipment, its operation, joint exercises, and many others. Two hundred thirty pages of a peculiar photo record encompass the entire period of Russian-Indian military-technical cooperation. The text of the book tells about the formation, development and current status of the partnership between the two countries.

Russia at Defexpo India 2018

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

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

Defexpo India has been held biennially since 2000 with the support of the Ministry of Defense of India and the Federation of Indian Chambers of Commerce and Industry.

In 2018, the organizers decided to move the exhibition from Qitot in South Goa to Chennai.

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

'Today, Russia and India have good prospects for stepping up mutually beneficial cooperation in the supply of arms and military equipment for the land and naval forces, localizing their production in India and upgrading previously supplied military products. We are also carry-

ing out approximately 100 joint R&D projects. Much of this was the result to our active work at exhibitions in India. The distinctive feature of the upcoming Defexpo India 2018 for Rosoboronexport is the use of the venue to promote, inter alia, Russian security systems, equipment for counter-terror forces,' added Sergey Goreslavsky.



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Rosoboronexport in 2018

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

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

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

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

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

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



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DEFENSE EXPORT FROM RUSSIA

Dmitry Shugaev: 'Russian naval products are competitive. Meanwhile we are focused on the certain countries needs which depend on the tasks to be fulfilled, their naval concepts and financial capabilities'

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

— Mister Shugaev, what are the principles, the system of cooperation in the field of MTC is based on today?

— Today the system of military-technical cooperation of Russia is built as a vertical relationship where Rosoboronexport is the only exporter of final military purpose products. Concurrently, there is also a number of entities in the field of military-technical cooperation of Russia that are authorized to provide service of the equipment previously purchased by customers, to upgrade it and to supply spare parts for this equipment.

These, in particular, include such integrated structures of the defense industry as the United Aircraft Corporation, the United Shipbuilding Corporation, Almaz – Antey Air and Space Defense Corporation and others. They obtained this right to service their equipment supplied to foreign customers as they represent defense industry itself, they embrace the factories that manufacture spare parts, components, etc.

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

However, all decisions regarding final supplies anyway are made at the highest level in Russia. That is, either an appropriate ordinance or instruction of the President or the Russian government should be issued. That's why I call it a 'vertical type of relationship.'

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

— First of all, I'd like to note that Russia is second in the list of world top exporters of military purpose products. It is not a secret that part of our export is made up by aviation equipment; export of the equipment related to aviation varies in the range of 40-50% of the total volume. Of

Over the recent years Russia has added new and upgraded naval products, including project 636 submarines, project 11356 frigates, and Gepard type patrol frigates.

The main customers for Russian-made naval equipment are Asia-Pacific and North Africa countries. We may predict the growing interest in our naval products by Latin America. We hope for a good future and possible cooperation with the Middle East states in this field too.



course, we positively appreciate this fact, and we wish exporters of other weapon types to achieve these figures as well.

At the same time we understand, that the market of military purpose products (MPP) is a very specific market having cyclic nature. A number of factors should be taken into account, including rearmament programs of armies, financial solvency of countries depending on their general economic health. Therefore, we do not expect any abrupt jumps, we are building long-term relationships that allow us to speak with confidence about stable growth of export supplies.

It is important to participate in long-term programs, providing technical support to our clients and creating maintenance stations with an understanding that many of our

clients aspire to improve their own industry, for example.

— What can you say about naval market trend and competitive capabilities of Russian naval products?

— Over the recent years a share of maritime equipment in a total volume of defense products exported by Russia has been ranging from 7 to 10%. In terms of share in total export and stock of orders this type of equipment is inferior to aircraft, army and air defense products. However, it can be easily rationalized since naval products are expensive and have a rather lengthy production and testing cycle and require complex, multi-level cooperation.

Analyzing the current trends of the international arms market one can easily say that in the near future a portion of maritime assets is going





to be increased due to growing demand in every world region.

Russian naval products are competitive. Meanwhile we are focused on the certain countries' needs which depend on the tasks to be fulfilled, their naval concepts and financial capabilities. The main customers for Russian-made naval equipment are Asia-Pacific and North Africa countries. We may predict the growing interest in our naval products by Latin America. We hope for a good future and possible cooperation with the Middle East states in this field too.

Over the recent years Russia has added new and upgraded naval products, including project 636 submarines, project 11356 frigates, and Gepard type patrol frigates.

Taking into account a growing attention among leading world states paid to improving and increasing naval part of their armed forces, we can predict a significant growth of naval market. It especially relates to the segment of coastline and economic zone defense. Russia is designing, building and operating various displacement ships to perform every of the above mentioned tasks. Our country is ready to carry out marketing work to promote the ships and offer partners the most attractive cooperation conditions.

– Is Russia open today for new cooperation ties?

– Yes, we are open to new partnerships and we understand that this is the trend. Of course, the approach 'buy it as it is or search for it elsewhere' is becoming obsolete. Naturally, sales of the final product is our main priori-

ty, but our partners increasingly aim at building their national manufacturing facilities to develop their industries.

The relationship with partners in the 'export final products only' coordinate system are gradually replaced by cooperation in the field of creation of new high-technology products as a result of mutual efforts. And we are ready for this kind of cooperation as a country that has built its own defense industry. We are ready for cooperation and we will help our partners to create systems they need today.

– Can you give any particular examples?

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

In addition, the establishment of a chain of maintenance stations in Latin America, in particular, in Peru and in Brazil can be invoked here too. We have a lot of cooperation projects with Chinese companies etc.

Therefore, our foreign partners can be sure that we are ready for technological cooperation based on many years of experience and strong reputation of Russian weapons in the world.

– Is it really strong?

– Yes, it is. Russian weapons and military equipment have made a good showing in the world. Today experts state that our weapons are: first, highly technological; and, second, proving their 'mission survivabil-

ity'. In addition, it is relatively easy to maintain our weapons. Combination of the above mentioned factors explains why our products are so popular in the world.

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

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

– And did Soviet equipment prove its high efficiency?

– Yes, it did. And it is still doing. For example, Vietnam has been our partner in the field of military-technical cooperation for a long time for one reason only: Vietnamese army uses soviet military equipment for decades and is satisfied with it and with Russian products supplied in replacement of older soviet equipment.

– Does it ring true amid the evidently growing competition in the weapon market...

– We live in the real world and we clearly understand that competition is strong. It is absolutely normal. Russian manufacturers take into account the trends in the global market of military equipment.

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

– What types of Russian arms and military equipment are well-known in the Middle East region? In what directions cooperation is most active today?



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– The countries of the Middle East and North Africa are our time-tested partners in various fields including the military-technical one. Therefore, they have been using almost all types of Russian military purpose products. Armored machinery, aviation equipment, air-defense systems and naval equipment of Russian (Soviet) origin are in high demand in this region. And in all the above mentioned directions we cooperate closely.

– What main competitive advantages does Russian equipment have in terms of its operational capabilities in this region?

– No doubt, the main competitive advantage of the Russian equipment, from the point of view of any foreign customer, is its quality-price ratio. As for its operation in the countries of the Middle East and North Africa I will add another important factor highly assessed by our partners after many years of usage. This is high

efficiency and excellent capabilities of our weapons and equipment in extreme climatic conditions. I believe these two major advantages altogether make our military purpose products so popular with regional customers.

– How long have Russia and the countries of the Middle East and North Africa been cooperating in the military-technical field?

– We have been developing military-technical cooperation with the countries of the region from the middle of the 20th century, that is for more than 50 years. Symbolically enough, the inception of interaction in the military-technical field with the countries of the Middle East and North Africa coincided with the period when our system of military-technical cooperation was established. For our regional partners it was the time they obtained independence. Thereafter our cooperation in the

military-technical sphere has developed steadily and in a constructive manner.

– How high is the potential of modernization and renovation in the Russian military equipment intended for the countries of the Middle East and North Africa? What can the Russian Federation offer?

– At present, some operators of our military equipment in the region are facing the necessity to repair and modernize the equipment produced in the USSR and supplied earlier. I can say with full confidence that all those products, as well as the Russian origin military equipment, have considerable potential for renovation. As an example, there are several large-scale projects on repair of domestic armored materiel and air defense systems under implementation that are quite successful.

Our country is ready to offer a comprehensive service program of





We have been developing military-technical cooperation with the countries of the region from the middle of the 20th century, that is for more than 50 years. Symbolically enough, the inception of interaction in the military-technical field with the countries of the Middle East and North Africa coincided with the period when our system of military-technical cooperation was established. For our regional partners it was the time they obtained independence. Thereafter our cooperation in the military-technical sphere has developed steadily and in a constructive manner.

maintenance, repair and upgrade of our military products according to the highest quality standards.

– Is Russia ready to consider JVs in the countries of the Middle East? Is there any existing positive experience of such cooperation?

– A number of our partners from the countries of the Middle East and North Africa show interest in establishing joint ventures (JVs). The Russian Federation is ready to consider different models of cooperation, including various forms of JV. Some projects are already under implementation. We hope that they will be successfully fulfilled to further promote cooperation between the Russian Federation with the countries of the region.

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

– Sanctions is a bad notion in principle, they contradict the logic of free market per se. Suffice it to say that WTO, of which Russia is a member, upholds freedom from any restrictions. Unfortunately, many international institutions intended



to strengthen mutually beneficial cooperation are failing today. And in this particular case we are witnessing politically motivated and absolutely unjustified discrimination. However, being realists, we have to work and find solutions.

In spite of everything, the system of military-technical cooperation with foreign countries has adjusted to these changes. We have successfully implemented a program of import substitution, which has timely oriented the industry to create certain systems previously supplied by our partners from abroad. Thus, a serious impulse was given to developing the national industry, especially in the fields of engine manufacturing, radio electronics, manufacturing of special materials, including those used in military equipment. We found solutions for the contracts made with our partners before sanctions, which were exposed to serious risks.

– So we are still to see who suffered from the sanctions more, aren't we?

– Those who lost the Russian market have suffered most. So, it is our former suppliers. Especially this is related to Ukrainian suppliers. It's a pity, of course, but it is not our choice. You know, they have stopped cooperation with the Russian Federation unilaterally. But I would like to reiterate our industry has eventually gained from it. It is an important factor to our customers: when a product is manufactured completely in the country of supplier, including all components and equipment, it eliminates any issues of supplies in future.

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INNOVATIONS AT DIMDEX 2018

Rosoboronexport to present Russian naval armaments

JSC Rosoboronexport (part of the Rostec State Corporation) is organizing Russia's exhibit at the International Maritime Defence Exhibition DIMDEX 2018. The Russian delegation will be headed by Dmitry Shugaev, Director of the Federal State Service on Military and Technical Cooperation. Sergey Ladygin, Rosoboronexport's Deputy Director General, was appointed head of the company's attending team.

The market of the naval equipment and armaments in the Middle East has a steady trend of growing. At the DIMDEX show we will present more than 200 state-of-the-art models of Russia's military equipment, which provide for an adequate counteraction of present-day threats and challenges ensuring protection of national interests of the region's countries,' said Sergey Ladygin.

As part of its exhibit at DIMDEX 2018, Rosoboronexport will present 'Tigr' corvette of project 20382, 'Gepard-3.9' frigate, ocean-going patrol ship 'Gepard-5.1', project 21635 'Sarsar' missile ship, project 22160 patrol ship, 'Alexandrite-E' mine countermeasures littoral ship of

project 12701, project 21301 search and rescue vessels designed to save crews of submarines in distress, project 12322 'Zubr' large amphibious hovercraft, speedy transportation and landing cutter BK-16 of project 02510. Great attention from the part of foreign customers is expected to be paid to the 'Amur-1650' diesel-electric submarines of project 636 as well as to small submarines of littoral area based on the 'Piranya' project.

The variety of onboard weapon systems of surface ships and submarines will be represented by 'Kalibr-PLE' (Club-S) and 'Kalibr-NKE' (Club-N) integrated missile systems, 'Universal-Puma' 100mm ship artillery system, AU-220M 57mm shipboard artillery system, naval automated air defence artillery complex 'Palma' with air defence guided missile 'Sosna-R', universal electric remote-controlled target-seeking torpedo TE-2, small-size antisubmarine weapon system 'Paket- E/NK' with an anti-torpedo, sea bottom mines and MSHM sea shelf mine, self-propelled remote-controlled seeker-designator of mines 'Maevka-E', integrated system of mines search and destruction 'Alexandrite-ISPUM-E' as well as coastal missile systems 'Bal-E' and 'Bastion'.

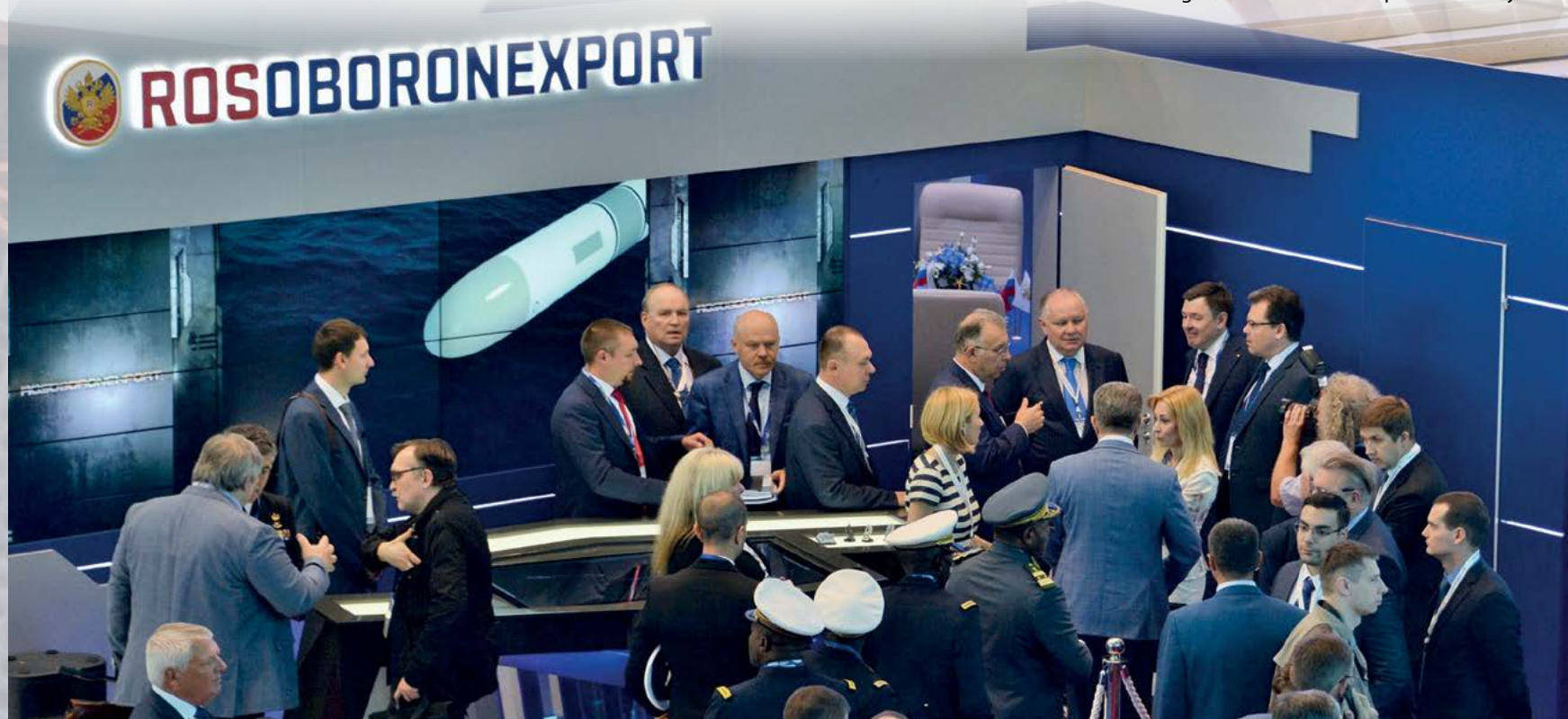
Within the exhibition Rosoboronexport's representatives will hold presentations of major models of naval armaments and equipment, which are the most interesting for

this particular region. Besides, an extensive working programme is planned, which includes negotiations with Qatar's and other regional countries' armed forces and business representatives.

'Rosoboronexport will display in Qatar the Russian materiel, which is not inferior, and in some parameters outperforms promoted models of the main world manufacturers of military equipment. Reliability, quality and high combat performance of our weapons have been proved in real time conditions during the antiterrorist operation in Syria. This



The first Soviet state intermediary agency for military-technical cooperation with foreign countries was created on 8th May 1953 after the USSR Council of Ministers had decided on forming the General Engineering Department within the then Ministry of Domestic and Foreign Trade. Other special foreign trade bodies were created later on to provide for further expansion of military-technical cooperation activities. In the late 1990s there were two federal state unitary enterprises in Russia acting as state arms exporters Rosvoorouzhenie State Corporation and Promexport. In November 2000 the two enterprises were merged into a single one – Rosoboronexport Federal State Unitary Enterprise, the sole state intermediary for export/import of defence products, by the Presidential Decree No. 1834 dated 4th November 2000 aimed at restructuring the system of military and technical cooperation of the Russian Federation with foreign states, and improving its performance. Since September the 1st, 2014 Rosoboronexport has been operating as a joint stock company.





'Rosoboronexport will display in Qatar the Russian materiel, which is not inferior, and in some parameters outperforms promoted models of the main world manufacturers of military equipment. Reliability, quality and high combat performance of our weapons have been proved in real time conditions during the antiterrorist operation in Syria. This circumstance allows our partners to objectively assess the Russian weapons and materiel, also while taking decisions of their acquisition...'

Sergey Ladygin

circumstance allows our partners to objectively assess the Russian weapons and materiel, also while taking decisions of their acquisition,' added Sergey Ladygin.

It is important to remember that only Rosoboronexport has the right to supply the world market with a full range of arms and military equipment manufactured by Russia's defense industrial complex and approved to be exported. Rosoboronexport accounts for more than 85% of Russia's arms exports. Rosoboronexport is among the major operators in the world market for arms and military equipment. This year JSC Rosoboronexport will mark its 18th anniversary.

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



agreements. Director General of Rosoboronexport – Alexander Mikheev.

The official status of the exclusive state intermediary agency gives Rosoboronexport unique opportunities to expand long-term mutually beneficial cooperation with foreign partners, provide guaranteed state support of all export-import operations, and strengthen Russia's leadership in the world arms market.

The main result of biography of Rosoboronexport, despite the difficult economic conditions and fierce, often unfair, competition in the global arms market, that company have managed not only to carry its sales, but also significantly enlarge its footprint in the traditional and new arms markets. Through integrated marketing strategies, company have ensured that order book today exceeds US\$ 46 billion.

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

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

Core areas of activities of Rosoboronexport

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

for strengthening their defense capability and national security.

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

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



As part of its exhibit at DIMDEX 2018, Rosoboronexport will present 'Tigr' corvette of project 20382, 'Gepard-3.9' frigate, ocean-going patrol ship 'Gepard-5.1', project 21635 'Sarsar' missile ship, project 22160 patrol ship, 'Alexandrite-E' mine countermeasures littoral ship of project 12701, project 21301 search and rescue vessels designed to save crews of submarines in distress, project 12322 'Zubr' large amphibious hovercraft, speedy transportation and landing cutter BK-16 of project 02510. Great attention from the part of foreign customers is expected to be paid to the 'Amur-1650' diesel-electric submarines of project 636 as well as to small submarines of littoral area based on the 'Piranya' project.

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

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

Foreign customers are offered package solutions for national systems intended to defend land, air and seaside borders, which feature the optimal trade-off between cost and performance. These solutions may include both the supply of military products and services and organization of licensed production in customer countries, the setting-up of joint ventures to manufacture and maintain equipment, as well as joint R&D efforts. Rosoboronexport widely uses the optimal offset programs. With regard to foreign customers' interests and the opportunities of the Russian defense industrial complex to increase its exports, Rosoboronexport pays much attention both to major billion-dollar contracts and small deals worth the hundreds of thousands to several millions of dollars.

/RA&MG/



HIGH-PRECISION WEAPONS IN RUSSIA AND IN THE WORLD

ВЫСОКОТОЧНОЕ ОРУЖИЕ в России и в мире

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"United Industrial Edition" preparing to publish a new quarterly international research project dedicated to the development, creation, production, delivery, maintenance and use in the armed forces of various types of precision weapons. The publication of the bilingual (Russian and English), addressed to professionals, creators and operators of high-precision weapons. Distribution is by subscription.

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[Special international analytical project]

ABSOLUTE SHIP PROTECTION

Innovative 'Pantsir-ME' is a sensational weapon

Products of the High-Precision Weapons Holding (part of Rostec Corporation) are well known all over the world. Holding has a worldwide reputation: its brands like 'Kornet-EM', 'Pantsir-S1', 'Kapustnik-B', 'Konkurs', 'Metis-M1' and others made by High-Precision Weapons Holding are determining technological and combat future of high-precision systems all over the world. This Russian holding really is the primary designer and manufacturer of Russian high precision weapons is engaged in producing the world's best types of high precision weapons, including for the navy. Last year, the presentation of the newest 'Pantsir-ME' became the main sensation of a number of the largest international military forums.

The High-Precision Weapons Holding, which is the primary designer and manufacturer of the world's best types of high precision weapons, was founded in 2009. Holding includes 19 enterprises being mostly world leaders in their production and technology segments is the world, it is largest science and technology complex engaged in developing and creating high-precision weapon systems

for combat tactical zones. This holding being a member of Rostec, the world largest engineering corporation, is among the leading designers of state-of-the-art weapons in the world, and consists of a number of largest leading defense enterprises that are well known on the world arms market.

It is sufficient only to mention such brands as Shipunov KBP Instrument Design Bureau, Tula Arms Plant, Tulatochmash, Tactical

Missiles Corporation, Nudelman Precision Engineering Design Bureau, Kovrov Electromechanical Plant, V.A. Degtyaryov Plant, All-Russian Scientific Research Institute Signal, and others. Most of them are national and international leaders in their segments.

High-Precision Weapons Holding plays an increasingly important role on the world arms market. The holding is the Russian largest developer and manufacturer of the

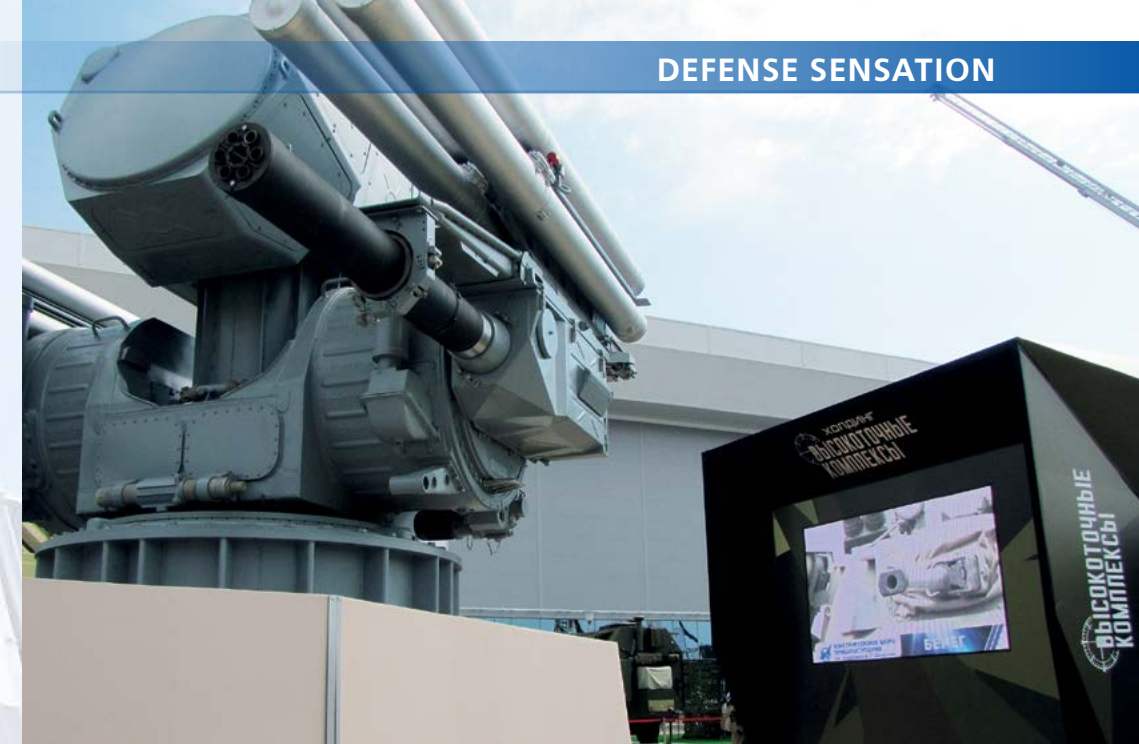
most modern and innovative high-precision weapons. The importance and potential of the Russian holding increase worldwide as well: On a scale of the top 100 weapons manufacturers in the world, the Stockholm International Peace Research Institute (SIPRI) rates the High-Precision Weapons Holding from Russia at 39.

Such a success can be explained by increasing deliveries both to the Armed Forces of the Russian Federation and to the foreign market. According to an SIPRI expert, 'the Russian companies ride the groundswell of boosts in military spending and arms export. Eleven companies from the top 100 list are Russian ones. Their income has increased by a total

of 48.4%.' It also can be noted that the High-Precision Weapons Holding belongs to the top 10 world's defensive rankings by an overall production and supply increase rate.

The weight of the holding company and its products in terms of strengthening defensive power of Russian army and delivery of the newest weapons to world markets can hardly be overestimated. There is a fast growing number of high precision systems and importance of tasks performed with them in the biggest armies of the world. Thus, over the recent five years Russian Armed Forces have had increasing purchase volumes. Export volumes of the latest weapons are also increasing. According to Alexander Denisov, Director General of High-Precision Weapons Holding, 'in view of defense and industrial sector mission we are considering well-timed and full fulfillment of purchase obligations as a priority task.'

According to military experts among the calling cards of the company is first of all the above-mentioned 'Pantsir-S1' air defense gun and missile system made by Tula instrument design bureau (KBP), ship-based 'Palma' air defense artillery system armed with 'Sosna-R' missiles, 'Kapustnik-B' fire control system, 'Kornet-E', 'Konkurs', 'Metis-M1' antitank missile systems, 'Krasnopol', 'Arkan' guided missile systems and others. The majority of weapons being exported by High-Precision





Weapons Holding are second to none in the world in terms of performance and efficiency.

An average annual increase of the company's export deliveries is 25-40% that is certainly a world record in the sector of high precision weapons. Middle East, North Africa, Arabian Gulf countries and India are among the most stable importers of the company-made products. Recently there has been also increasing export activity in the markets of Southeast Asia, Latin America, Central and South Africa. Besides, according to military experts there is every reason to believe that by 2020 export delivery volume of High-Precision Weapons Holding may have been increased twice. It is clearly seen at nearly every international armament exhibition where the holding company takes part, its products (both at displays and open sites) are leading objects of regard for experts and ordinary visitors. This is also because everybody wants to take a closer look at famous 'Pantsir-S1' or 'Kornet-E' and meet the people who create the most efficient and advanced weapons in the world.

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The newest defensive sensation from High-Precision Weapons Holding was the presentation of anti-aircraft artillery weapon system 'Pantsir-ME' in Saint-Petersburg (June last year). The creation of new innovative defense complex confirms the fact that Russian High Precision

Weapons Holding is one of the world leaders in creating modern weapons.

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

mate protection against modern air threats, including low-flying and small-size unmanned aerial vehicles.

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

The creation of the new weapon system 'Pantsir-ME' provides reliable protection for ships against air threats with absolute probability virtually equal to 1, including protection against low-altitude anti-ship missiles and unmanned aerial vehicles. The key feature of the systems created by KBP is that they can first open fire on a target with missiles and then, in the dead zone of anti-aircraft missiles, use artillery armaments, if the target is not destroyed.



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

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

High engagement effectiveness is determined by the new features implemented in the 'Pantsir-ME' system. The modular design remains intact: 1 command module and up to 4 combat modules depending on ship type, which allows a flexible defence. The combined missile and artillery armaments ensure an effective engagement of all types of targets within the whole range of field conditions and counter-weapons with a potential for further development until 2020-2025.

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

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 **HIGH-PRECISION
WEAPONS**



NUDELMAN
PRECISION ENGINEERING
DESIGN BUREAU

MAIN PHOTO

PALMA

AIR DEFENSE MISSILE & GUN SYSTEM





‘PIRANHAS’: REBOOT



Malachite Design Bureau, St. Petersburg, is pushing mini-submarines ‘Piranha’ for export. The bureau views the project as shallow-water ships with well-priced production and operation. A number of 220-950-tonner ‘Piranha’ family submarines capable of carrying torpedoes, missiles and mines has been developed. CEO Malachite Design Bureau Vladimir Dorofeev tells about ‘Piranha’s evolution and other works carried out by his company.

Malachite presents a new project ‘Piranha-T’ model at the exhibitions. How does it differ from Project 865?

– ‘Piranhas’ were built at the ‘Admiralty shipyards’ in Saint Petersburg and operated by the Russian Navy. ‘Piranha-T’ has small differences in size but much better performance. With the similar size it has increased displacement (up to 500t), operational range (up to 2000 miles), propelling motor power (up to 250kW) and twice increased full speed (up to 12 knots). The submarine endurance is 20 days.

The submarine is designed to operate in inshore and shallow waters such as the Caspian Sea. We

offer our would-be customers a family of ships with standardized equipment and electronic warfare systems installed on small 250-300-tonners and big 1,000t-heavy submarines.

The priority tasks of ‘Piranha-T’ are inshore defense, discovery of underwater situation, fight against terrorist threats, offensive mining as well as landing of special force teams (up to six combat divers). ‘Piranha-T’ is armed with two torpedo tubes. It can carry two missiles or 533mm torpedoes, eight 400mm torpedoes and four mines. These weapons can be effectively used in areas where a submarine must be invisible in acoustic and electromagnetic terms. The submarine team may include from three to five persons.



‘Piranha’ is equipped with a special airlock chamber. Divers can covertly escape the chamber of a submarine moored with underwater anchor. The divers take weapons and equipment placed in external packages and start performing their tasks. The team returns to the submarine in the same way.

– Whom do you consider as would-be customers?

– ‘Piranha-T’ may be viewed as a rather cheap submarine. It can be purchased by countries which have offshore hydrocarbon fields to be protected. We see a certain interest from a number of countries.

– This year Malachite marks its 70th anniversary. Which main projects established within its work period would you like to draw attention to?

– Malachite developed the first Russian nuclear submarine, many other multi-purpose and missile submarines as well as deep-water and oceaneering equipment. Our Design Bureau has been always having both feet on the floor, looking forward and designing innovative ships. Among them were titanium nuclear submarines, the fastest nuclear Project 661 ‘Anchor’ so-called ‘Golden Fish’ which set up a world record for underwater speed of 44.7 knots (82.695km/h); also highly automated anti-submarine nuclear Project 705 ‘Lira’ submarines carrying liquid-metal-cooled reactors. The most advanced components of the design were installed into the projects of the third and fourth generation fast-attack submarines. We also made research submarines and deep-submerged vehicle called “Rus” capable of going as deep as 6km.

– How do you see the perspectives of underwater shipbuilding development?

– We should objectively consider the way of elaborating submarines not just in terms of traditional speed, depth, team strength but providing them with definitely different combat qualities such as being network centric and capability of coordinated use of submarines together with surface ships, aircraft and spacecraft. Besides, submarines must remain stealth. Making submarines network-centric without sacrificing their stealth performance is nowadays a significant research and technology task.

– What actions are being done to improve your submarines in terms of stealth operation?

– Stealthiness is a comprehensive concept which includes primary and secondary field concealment. Primary fields are about acoustic discretion which involves noise sent by a submarine itself. We apply higher requirements as to components to fit higher noise level standards. The same requirements are made in searching for new types of propulsion systems.

Not less important is secondary field concealment. Such fields are created during hydroacoustic illumination. This task can be implemented by means of individual selection of an architecture and design type and use of special hull coverings to significantly reduce echo values. The lower the illu-

mination rate is the thicker the covering should be. It involves only the wave length the covering is designed for.”

– What anti-hydroacoustic equipment is used at your submarines?

– Without comments as to such equipment available or unavailable on our ships let’s refer to foreign experience. According to public media we may clearly trace the trend of making such equipment by the USA and UK. Thus, the equipment is capable of distorting a ship’s sonic field to protect it against detection. I believe there is the same trend in progress in our country.

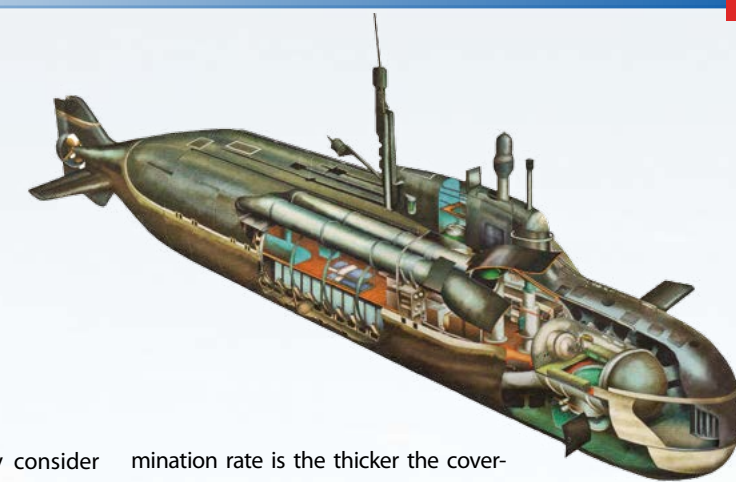
– Are robotized unmanned submarines being now designed or will be designed in the future?

– The concept of the future underwater fleet involves combination of manned and unmanned vehicles supplementing each other to increase effectiveness of operation of the whole battle system. Unmanned vehicle is definitely not a goal itself. Such vehicles’ tasks include search and undoing submarines, surface ships, as well as protection of its own water areas. They will amplify manned submarines’ capabilities in performing common tasks.

– Does Malachite design vehicles to protect oil platforms?

– Yes, we are engaged in it too among other activities.

/RA&MG/





Project 22500 multipurpose corvette

D.V. Kurochkin

INNOVATIONS IN CORVETTES OF SEVERNOE DESIGN BUREAU

Many researches of different navies and analysis of naval and shipbuilding products presented at various exhibitions show the growing demand for the corvette type ships. Due to the wide range of tasks that corvettes are able to perform, as well as to their comparably low price, many countries have undertaken development programs with corvettes in their core.

The corvettes are well armed ships capable of moving at 25 knots or faster with displacement ranging from 700 to as high as 3000 tons. Their armament and technical characteristics make them ideal for local operations. Just as most ships of the 21st century, a modern corvette is unthinkable without stealth technologies that considerably increase its efficiency in battle. Among such technologies are, first of all, reduced radar cross-section and infra-red signature due to the use of special radar absorbent materials and coating for hull and superstructure, as well as reduced noise levels. The hull and superstructure planes are inclined at various angles

to deflect radar signals in order to appear smaller on the radar screen. Severnoye DB is fully aware of the recent trends and demands of the market. Therefore, special attention is given to design of multi-purpose stealth corvettes of various displacements. Besides the hull and superstructure architecture, they can boast other features that combined help reduce the overall signature considerably, reducing detection range some 1.4-1.6 times. The corvettes of Severnoye DB are also good in terms of electronic warfare means that protect the ship from homing SSMs. The main corvettes of Severnoye DB are project 22500 (full displacement 1350 tons) and project 22160 (full displacement 1800 tons).

The main advantage of both these corvettes over potential competitors is their powerful universal armament, high speed and ability to take rotary wing craft on board. Considering the low signature, small displacement and large amount of weapons, the Severnoye DB corvettes leave competitors behind. See tables 1 and 2 for comparison. The project 22500 multi-purpose corvette can seek and destroy submarines, including midget submarines, in shallow waters, escort ships and vessels during sea passages, protect them from enemy submarines, surface ships and aerial weapons, as well as provide fire support for amphibious forces. In peace time, project 22500 corvette can patrol

water areas, 200-mile EEZ in open and closed seas, fight smuggling and piracy.

The project 22160 corvette has a bigger displacement. The experience gained from development and operation of similar ships both in the Russian and foreign navies was taken into consideration when creating this ship. A ship of project 22160 is to be inexpensive in construction and operation, it should possess high efficiency and seaworthiness and be capable of patrol, antipiracy and environmental tasks. The ship is intended to operate in the EEZ, open seas and oceans, conduct search and rescue operations, relieve the consequences of disasters and shipwrecks, as well as perform environmental monitoring. The special feature of this corvette are two slots for standard 40-foot containers that can house virtually any kind of modular equipment, from missile systems to a medical with all connections and interfaces to the ship's systems.

Both corvettes designed by Severnoye DB can be armed with the universal missile system Kalibr-NKE with tactical, anti-ship and anti-submarine missiles. This complex proved very well during the assignment in Syria on the 11356 project frigates also designed by Severnoye DB.

For engagement of aerial targets, Pantsyr or Palma anti-aircraft artillery systems or Shtil-1 missile systems can be installed. To engage surface, coastal and air targets depending on customer's request, 57 to 100-mm calibre gun mounts of Russian or foreign design can be installed. 324 mm torpedo tubes Paket-E/NK and/or RBU-6000 anti-submarine rocket launcher can be used to fight underwater targets. The ships also may feature a dipped sonar and automatic grenade launcher, two 12.7 mm machine guns, 3D radar to detect surface and aerial targets, retractable sonar to detect small targets like midget submarines, swimmer delivery vehicles, bottom mines, also for shallow waters, integrated bridge system, automatic communication system, etc.

The Severnoye DB corvettes feature a low-signature "deep V" shape hull with a single-island superstructure and a closed moor-

Table 1

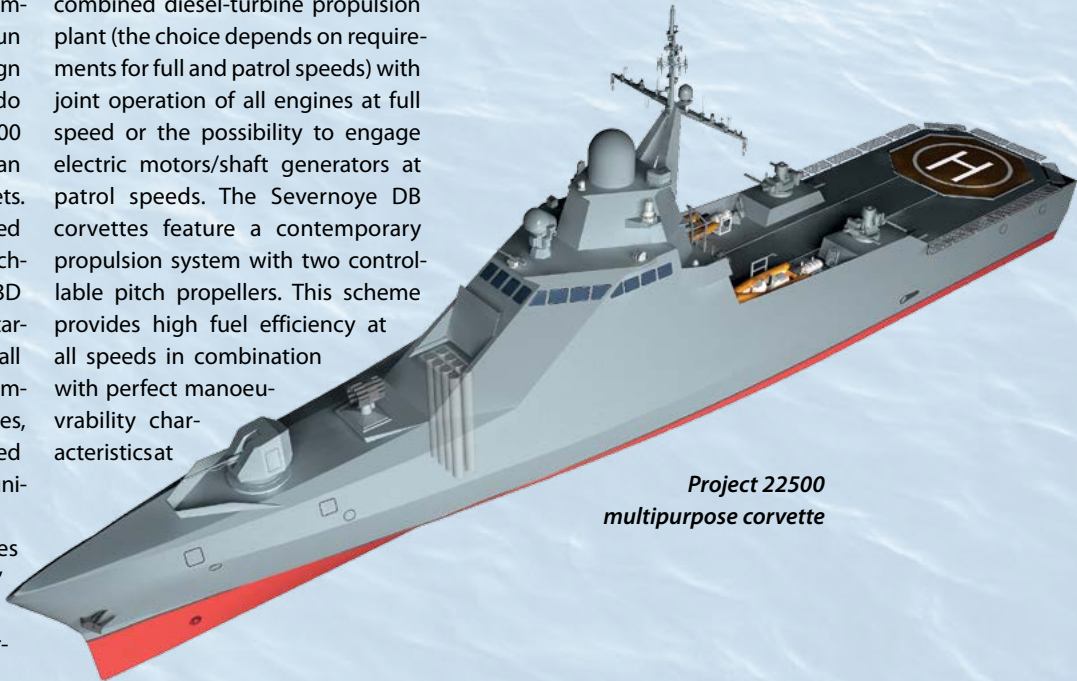
Comparison of 22500 corvette and foreign analogues

Country	Russia	China	Netherlands	Italy
Builder/designer	Severnoye DB	CSSC	Damen	Fincantieri
Project	22500	Type 056	Sigma 9813	Abu Dhabi
Full Displacement, t	1350	1440	1700	1620
LxBxT, m	84.0x13.7x3.2	90.0x11.1x4.0	97.9x13.0x3.75	88.4 x 12.2
Full Speed, knots	33	25	28	25
Missiles	Kalibr-NKE universal missile complex	YJ-83 SSM	SSM, SAM	2 x 2 SSM
ASW	2 x 3 TT	FL-3000N SAM 2 x 3 TT	2 x 3 TT	2 x 3 TT
Artillery	1 x 100-mm gun 2 x Palma AA system	1 x 76-mm gun 2 x 30-mm gun	1 x 76-mm gun 2 x CIWS	1 x 76-mm gun 2 x 30-mm gun
Aviation	helipad and telescopic hangar	helipad	helipad and hangar	helipad and extendable hangar

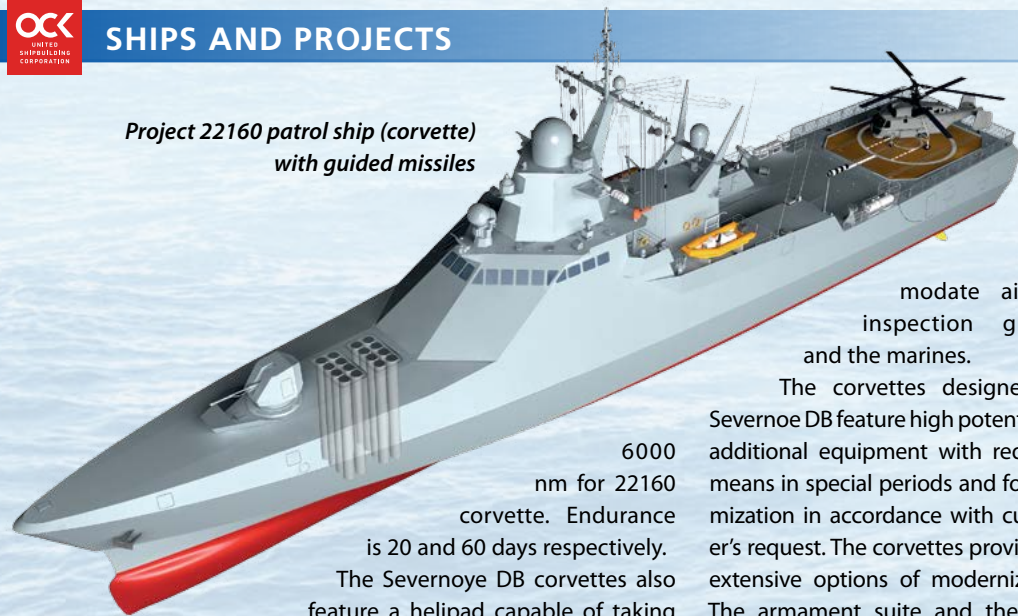
ing arrangement optimised for sustaining high speed navigation in rough seas. The ship's hull and superstructure are made of steel without light alloys. The hull is made up of structural elements which are remarkably inexpensive and easy to manufacture and repair. The bridge and some of the ship's stations are protected against bullets and splinters.

The corvettes can have different variants of the main propulsion plant, depending on the customer's requirements. The ship is suggested to be powered by a diesel or a combined diesel-turbine propulsion plant (the choice depends on requirements for full and patrol speeds) with joint operation of all engines at full speed or the possibility to engage electric motors/shaft generators at patrol speeds. The Severnoye DB corvettes feature a contemporary propulsion system with two controllable pitch propellers. This scheme provides high fuel efficiency at all speeds in combination with perfect manoeuvrability characteristicsat

low reverse time (less than 60 seconds). Reliable modern diesel engines provide high speed and low fuel consumption for cruising and electric motors will help prolong extend life for prolonged operations on low and super low speeds. With GT engines the full speed may be as high as 30 knots. The main machinery is configured to provide alternate or joint operation of any combination of engines transferring power to any of the two propellers, which enhances both survivability and efficiency of the main propulsion plant. The range is 4000 nm for 22500 corvette and



Project 22500 multipurpose corvette



Project 22160 patrol ship (corvette)
with guided missiles

modate aircrew, inspection groups and the marines.

The corvettes designed by Severnoye DB feature high potential for additional equipment with required means in special periods and for optimization in accordance with customer's request. The corvettes provide for extensive options of modernization. The armament suite and the function of the corvettes may be altered in the course of serial construction

6000 nm for 22160 corvette. Endurance is 20 and 60 days respectively.

The Severnoye DB corvettes also feature a helipad capable of taking helicopters and drones of up to 12 tons. The project 22500 corvette features a shelter hangar and 8 tons of fuel reserve. The project 22160 corvette features a stationary hangar, a helicopter transportation system and a reserve of about 20 tons of fuel. The corvettes' aviation facilities are able to handle landing and take-off at sea state 4–5.

The ships designed by Severnoye DB traditionally feature good habitability of the crew. The crew is accommodated according to the highest modern standards in one, two, and three-berth cabins with bathrooms for officers and messes with double bunks for sailors. The number of crew members is optimized due to modern means of automation and can be from 34 up to 42 men, depending on the design. Also there can be up to 40 additional seats to accom-

thanks to the unified universal platform depending on the operational requirements and market situation. It is also worth mentioning that the Severnoye DB corvettes can accommodate both Russian and foreign made weapons and equipment.

The Severnoye Design Bureau has a rich experience of cooperation with foreign companies in the field of shipbuilding, which enables it to create competitive high-tech products, quickly consider customer requests and render technical assistance in modern corvettes construction performed at both domestic and foreign shipyards.

Translated by Sergey Berezovikov

/RA&MG/

Table 2

Comparison of 22160 corvette and foreign analogues

Country	Russia	Germany	France	Spain
Builder/designer	Severnoye DB	Lürssen	DCNS	Navantia
Project	22160	K130	Gowind 2500	Avante 2200
Full Displacement, t	1800	1840	2500	2500
LxBxT, m	94.0x14.0x3.4	89.1x13.3x3.4	length 102 m	97.5x13.6
Full Speed, knots	30	26	25	25+
Missiles	Kalibr-NKE universal missile complex	SSM, SAM	SAM, SSM	SAM, SSM
ASW		2 x 3 TT	2 x 3 TT	1 x 3 TT
Artillery	1 x 57-mm gun 2 x 14.5-mm gun	1 x 76-mm gun 2 x 27-mm gun	1 x 76-mm gun 2 x 20-mm gun	1 x gun 1 x CIWS
Aviation	helipad and telescopic hangar	helipad and hangar for drone	helipad and hangar	helipad and hangar



Project 22160 patrol ship (corvette)

ОПК РФ

СПЕЦИАЛЬНЫЙ ИНФОРМАЦИОННО-АНАЛИТИЧЕСКИЙ ПРОЕКТ

ОБОРОННО-ПРОМЫШЛЕННЫЙ КОМПЛЕКС РФ



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AN UNDERWATER TRICKSTER

The scope of unmanned vehicles application has expanded year by year. Robotic systems enable less expensive, more qualitative and less risky conduct of hazardous and monotonous works. Robots are playing more and more important role under water. Unmanned underwater vehicles (UUV) more and more frequently accomplish mine detection and destruction, survey of large areas of sea bottom, research at large depth and other tasks that are dangerous for a human. One more comparatively new trend of military use of UUV is simulation of enemy submarine during naval exercises and firing.

Carrying out exercises with participation of submarines has always been risky. Complicated manoeuvring near surface ships and other

submarines, erroneous actions of the crew, technical failures (of torpedo dummies in the first place) turn such exercises into a source of danger for the submarines as well as for the other participants. Surface ships ram attacks and "errors" of torpedo dummies hitting the submarines instead of evasion are vivid examples of the danger. It is evident that each such case is fraught with major damage or even loss of the submarine.

These problems resulted in induction of specially built submarine-targets into US Navy and USSR Navy. However, the use of the latter did not solve the major problems, i.e. these submarines also had crew exposed to danger and their operation was rather expensive. Furthermore, due to different circumstances, these sub-

marines were not able to provide adequate simulation of enemy submarines. Thus, US Navy having no combat diesel-electric submarines, has to involve diesel-electric submarines of its allies into the exercises or even lease them, as it was done to Gotland submarine of the Swedish Navy.

Emergence of sonar counter-measures (SCM), i.e. self-propelled and drifting submarine simulators, allowed to have a new look at the task of submarine simulation during the exercises. By the beginning of 1990s many navies had self-propelled submarine simulators (both heavy with dimensions of a torpedo and light single-mission with weight of several kilograms) specially designed for naval exercises. These simulators are able to simulate primary and

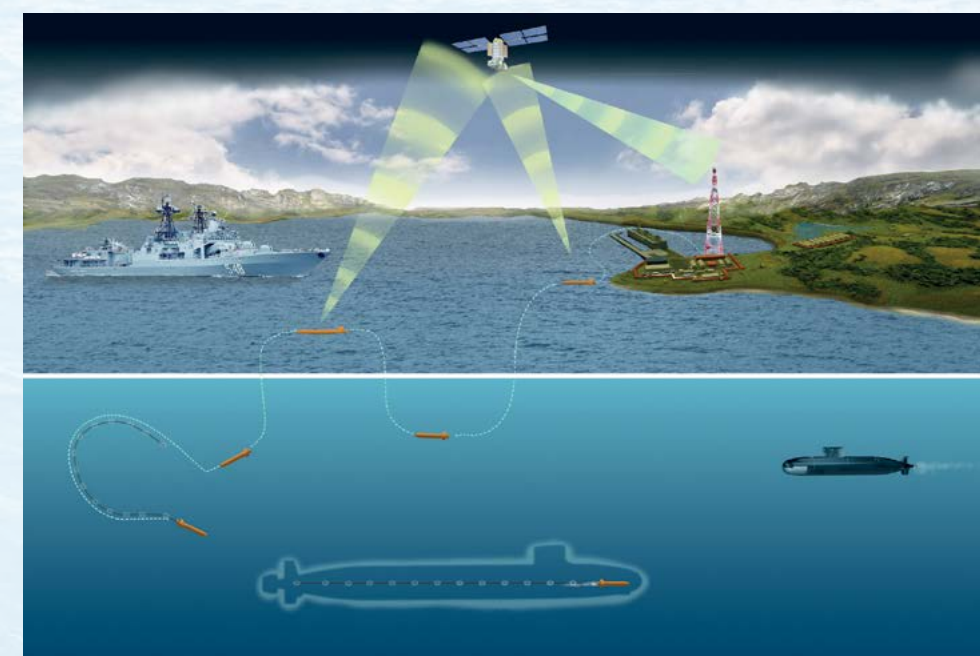
secondary acoustic fields as well as magnetic field of submarines. Enemy submarine search as well as attack of the same with practice torpedoes can be simulated using such simulators. Some of the simulators may also be fitted with SCM. It enables to additionally increase realism of the exercises. Nowadays many companies including American, Sweden, Italian and French offer such simulators. They are manufactured in sufficiently large series and widely used during exercises.

However, as submarine noise level decreases, search and identification of the same become more extended and require stage-wise use of various aids, from stationary and mobile underwater facilities to airborne ones which use



different physical fields to detect enemy submarine. Therefore, while creating simulators it is essential to impart to them more autonomy and capability to realistically simulate a number of physical fields and in extreme case to use SCM and self-defence means. However, presently even heavy simulators have comparatively little energy reserve and use of the same does not allow performing realistic simulation of tactical episodes with duration of more than several hours.

All the above-mentioned results in necessity to develop larger simulators having big energy reserve. First example of such ultra-large simulator is MASTT (Mobile Anti-Submarine Training Target) of MSUBs production. Basically, it is an unmanned submarine. Its displacement is about 60 t., submerged cruising range is up to 500 miles at speed of 7.5 kn. Diesel-generator installed in the vehicle allows to charge the battery and, hence, increase total endurance of this target. Big dimensions of payload compartment allow to accom-



modate wide range of simulation means and SCM.

Thus, submarine simulators available at the market fall into three segments. The first one comprises single-mission vehicles which are simple and cheap but have limited functionality. The second contains more complex and expensive but more realistic torpedo-sized vehicles. The third segment developing before our eyes consists of ultra-large vehicles capable of simulating not only enemy submarine fields but also "behaviour" of the same, and for a long time.

Since long time Rubin Design Bureau has been working on engineering of a number of various UUVs, both light like Yunona (Juno) and heavy like Klavesin (Clavecin). Development of simulators based on the above mentioned vehicles will allow to use proven technical solutions and series-produced components, and this in its turn will allow to reduce the cost of such simulators.

Rubin has made a number of studies on design of a much larger

unmanned submarine designed for naval exercises. Marine robotic system Surrogat (Surrogate) is equipped with Li-Ion battery. It has displacement of about 40 tonnes, cruising range of about 600 miles at the speed of 5 knots, maximum speed is more than 24 knots. All this allows to conduct exercises with duration up to 15-16 hours simulating manoeuvring of enemy submarine including manoeuvres at high speed. Relatively large sizes (length of about 17 m) and provision to carry towed antennas of various purpose ensure realistic simulation of physical fields of enemy submarine (acoustic and electromagnetic). Because of its modular construction, Surrogat simulator will be capable of simulating non-nuclear as well as nuclear submarines and perform mapping and reconnaissance.

Such a simulator may be used not only in anti-submarine exercises but also for trying-out and testing of new sonar systems, torpedoes and other samples of weapons and submarine detection facilities. Use of unmanned simulator reduces risks and decreases costs of trials maintaining their realism. Ease of operation and low cost of maintenance and upgradation will be distinctive features of this vehicle. In addition, the vehicle will make planning of naval forces' activities easier as it will not be required to engage combat submarines in the trials distracting them from accomplishment of main tasks. /RA&MG/



INTERCEPTORS FOR INTERCEPTORS

A modern world military and political situation makes leaders of many countries reconsider capabilities, goals and tasks of their coast guards. Nowadays, in order to be efficient coast guard should accomplish not only their primarily tasks but a number of other related ones acting in close cooperation with other agencies such as police, navy, customs service and environmental monitoring bodies who also perform their missions along coastlines. To this end, coast guard should have necessary equipment.

In a modern world more attention is paid to monitoring along coastlines, not only for military, defence or security reasons. In addition to military and antiterrorist security there is a great necessity in monitoring and prohibition of possible illegal migration as well as drugs and arms trafficking. Another task is enforcing rules of navigation and fishing as well as use of other biological resources and customs rules. In case of emergency some special measures must be taken including fast delivery of specialists to disaster relief areas, medical evacuation etc. According to the actual global situation threats' number is increasing and diversifying on a permanent basis.

To properly meet modern challenges national and international agencies in charge of coastline security, primarily coast guards, should

have corresponding equipment and armament. In particular, coast guard vessels should significantly outperform those of potential intruders. Necessity of accomplishing a great number of various tasks puts a focus on such properties as flexibility and versatility. In the context of a general global trend to reforming national navies in terms of reduction their numbers in favor of improving their quality, reliable operation and economic efficiency are of utmost importance.

In the related area of the world market Russian manufacturers of maritime assets may proudly introduce products being not only equal but sometimes outperforming their available foreign counterparts.

Let us take a look at a Project 14310 'Mirazh' high-speed patrol boat. A 120-ton 38 m long boat designed by the Almaz Central Marine Design Bureau is designed to support maritime con-

trol points (search, police and customs operations etc.). Due to her speed performance the boat is capable of on-call operating in economic zones and of intercepting potential intruders especially those using high-speed craft. The boat can be used to rescue crews and passengers of aircraft or vessels in distress. Due to a system of automatically-controlled interceptors, a unique Almaz development, the boat can move at a speed up to 50 knots and keep up to 45 knots run at sea state 4. By the way, this has been a world record for 120-ton boats. The system also ensures increase in stability and maneuverability.

The vessel is equipped with a diesel propulsion unit. The range with full fuel capacity is 1,000 miles, endurance is 5 days. The boat can carry out patrol duties both in motion and at anchor. It is armed with an AK-306 gun, an 'Uprava-Kord' multi-purpose remote-controlled weapon station or a 14.5mm pedestal machine-gun as well as eight 'Igla-type' man-portable air defence systems. The boat's striking power can be increased with a 'Shturm-V' missile system comprising 6 missiles with an effective range up to 6 km. Being highly respected by naval officers, 'Mirazh' boats are operated by the Russian Coast Guard in the Caspian Sea.



The automatically-controlled bottom interceptor system is also mounted on project 12200 'Sobol' patrol boats, also designed by the Almaz CMDB. A 57-ton 30.3 m long boat is employed in patrolling the state border, coastline lanes as well as monitoring economic zones and protection of natural resources. Due to interceptors and 'Arneson' drive the boat can move at a speed up to 50 knots, navigate at sea state 5 and use weapons at sea state 3. Her cruising range at 36 knots with full fuel capacity is 500 miles, which can be increased up to 700 miles with extra

fuel. Endurance with regard to fresh water and food supply is 3 days. The boat can be armed with an AK-306 light automatic gun, a 14.5mm pedestal machine-gun and two Igla-type man-portable air defence systems.

High speed performance is a distinctive feature of all patrol boats designed by the Almaz CMDB. A project 12150 'Mangust' high-speed patrol boat, which is now being built in a large series (over 70 units), is no exception. She is designed to patrol coastlines, perform customs tasks, protect fish resources and perform search and rescue operations. A 32.2 ton 19.8 m long boat can reach the speed over 50 knots due to her two Arneson drives or water jets. Operational range at 30 knots may reach 400 miles. The boat has proved her efficiency during operation with the Russian Coast Guard units. Due to versatility the designers of the Almaz CMDB are focused on, they managed to create EMERCOM-dedicated search and rescue and fire-fighting versions of the boat. Besides, 'Mangust' boats have been built for the Federal Customs Service, Interior Ministry and Defense Ministry. Yet another boat 'Sviataia Ksenia' – research modification – was delivered to St. Petersburg Water Supply Company.

Due to wide experience of the Almaz CMDB in developing patrol vessels it can design versatile multi-purpose platforms of a displacement ranging from 10 t up to 3,000+ t of outstanding speed and navigation performance.

/RA&MG/



PRIDE AND HONOR OF RUSSIA

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

The Navy is one of the main components of national pride in Russia. This is especially evident in the main holiday of naval Russia – Navy Day, which always takes place with the participation of the country's leader, Vladimir Putin. On Navy Day of Russian fleet last year In St. Petersburg there was the Main Naval Parade of Russia. Parade was held in the Neva and inner harbour of Kronstadt. The parade featured the passing of ships and a marine air force unit overflight. Sailors from the Baltic, Black Sea, Northern and Pacific fleets and the Caspian Flotilla participated in the parade.

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

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

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

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

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

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

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

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



'Russia's history is inseparable from the victories of its courageous and fearless Navy. Our country's status as a strong marine power has been achieved through the brave acts of sailors and officers, the inventive talent of our shipbuilders and the daring exploits of sea explorers.'

Vladimir Putin



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

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





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

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



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

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

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

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



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

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

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





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

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



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

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



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

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

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

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



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

Vladimir Putin

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

/RA&MG/





Vladimir Karnozov

RUSSIAN WARSHIPS IN ASIAN SERVICE

Russian-origin naval assets are found in India, China, Vietnam, Indonesia and North Korea. Surface combatants are represented by aircraft carriers, destroyers, frigates, corvettes, anti-submarine ships, minesweepers as well as missile, torpedo and patrol boats. Indonesia used to have a cruiser. There are also some landing ships, fleet oilers and various auxiliary vessels. Collectively, China, India and Vietnam operate 27 Kilo-class diesel-electric submarines. Besides, India has taken a nuclear-powered submarine in operating lease for ten years, and is likely to get one more. So, the list of classes is rather impressive.

The Soviet Union began exporting naval assets to Asia-Pacific shortly after WW2. By 1960 the People's Republic of China received a Project 629 ballistic-missile submarine, fourteen WW2-vintage submarines, ten Project 613 and 633 diesel-electric submarines (including hulls for completion locally), eight Project 122B patrol ships, six Project 254 minesweepers, 22 missile and torpedo boats of Project 183 along with 90 older ones and other equipment. PRC also received design and manufacturing documentation

on Project 633 submarines, Project 50 escort ships and Project 254 minesweepers. Even though relations between Moscow and Beijing deteriorated in the early sixties, the Chinese industry was able to carry one with production of these ships and their local derivatives.

In the early sixties the Soviet Union supported Indonesia in her struggle against the colonial powers by supplying advanced equipment such as a Project 68bis cruiser and twelve Project 613 diesel-electric submarines. The military assistance terminated after the nationalists

came to power in 1965. That same year New Delhi awarded Moscow first contracts for naval equipment and since then has remained the world's largest customer for Russian warships.

Submarines

Apart from a handful of outdated Soviet submarines and their Chinese clones in North Korea, there are 27 relatively modern Kilo-class submarines in service with three Asia-Pacific nations. China received a couple of Project 877EK boats built at Sormovo in Nizhny Novgorod in 1994-1995 and

a pair of more advanced Project 636s assembled at Admiralty Shipyards in St. Petersburg in 1996-1998. Then it procured eight Project 636M submarines in 2004-2006 of which one was built in Nizhny Novgorod, five in St. Petersburg and two at Sevmash in Severodvinsk. The latter version features the Club-S tube-launched missile system employing 3M54 anti-ship weapons. China has paid about U.S.\$ 3 billion for these submarines, missiles and torpedoes to them.

In 2009 Vietnam placed order worth U.S.\$ 4 billion for six Project 636.1 boats complete with shore infrastructure and support package. The first submarine arrived at Cam Ranh in December 2013. Today, all six are operational: HQ-182 Hà Nội (Hanoi), HQ-183 Hồ Chí Minh (Ho Chi Minh city), HQ-184 Hải Phòng (Haiphong), HQ-185 Khánh Hòa (Khanghoa), HQ-186 «Đà Nẵng» (Danang) and HQ-187 Bà Rịa-Vũng Tàu (Vangtau).

The Indian navy acquired its first submarines from the Soviet Union after attempts to buy Porpoise or Oberon boats from United Kingdom proved futile. In September 1965 the customer signed for four I641 boats (NATO codename: Foxtrot), and, six years later, filed a follow-on order for four improved Project I641Ks. The first Indian Foxtrot was inducted fifty years ago and was later replaced by the Kilo.

In 1984 India placed order for six Project 877EKM submarines. Sindhuraj and S59 Sindhuratna were built at Sormovo. The Admiralty Shipyards added S55 Sindhugosh, S56 Sindhudhvaj, S58 Sinduvir and S60 Sindhukesari. The latter company accepted a follow-on contract to assemble S61 Sindhukirti and S62 Sindhuvijay in 1990-1991. Second follow-on order also went to St. Petersburg: S63 Sindhurakshak and S65 Sindhushastra were inducted in 1997 and 2000. The latter was first to be armed with the Club-S missile system. Earlier-built submarines were outfitted with that weaponry during a major overhaul. Today, a couple of Indian Kilos is undergoing heavy maintenance and life-time extension work at Zvezdochka in Severodvinsk.

The Indian navy was the only one in the world to have leased nuclear-powered submarines. A Project 670 boat raised the Indian flag in January 1988 and served for three years under local designation of Chakra. During that time, her crews were receiving assistance from 38 Soviet technicians via four translators. Today, the Indian navy operates a Project 971 boat on ten years operating lease terms. Hiring Russian equipment shall help local specialists with their own nuclear program which commenced back in 1978.

India is considering lease of an additional nuclear submarine from Russia and a replacement to INS Sindurakshak lost to internal explosion in August 2013. Besides, New Delhi has recently re-activated the Project 75i tender for six conventional boats with Project 677 Lada – or, better, her export version Amur 1650i – among the bids. According to the Pentagon annual reports to U.S. Congress, China is working with Russia on a customized version of the Amur 1650 with an air-independent propulsion system. Later this year Indonesia is expected to make a decision whether to procure Kilo class submarines.

Aircraft carriers

The aircraft carrier of the Russian type was developed during the eighties by the Nevskoye design bureau in St. Petersburg. It represents a conventionally powered ship providing basing for fighter jets built to "short take-off but arrested recovery" (STOBAAR) concept. Today, there are three such carriers in service: Kuznetsov in Russia, Liaoning in China and Vikramaditya in India. These have many things in common, including the fact that their hulls were built at the dockyard in Nikolaev, Ukraine.

Kuznetsov became operational in December 1990. This Project 1143.5 ship displaces 61,400 tons. Her hangar measures about four thousand square meters (dimensions 153x26x7.2 meters) and flight deck 14,800 square meters (305x70 meters). There are an angled deck (at 7 degree) with the landing strip 205 meters long and 26 meters wide

and a 14.3-degree ski jump on the bow. Kuznetsov was to be followed by Varyag, but the latter was not complete due to the breakup of the Soviet Union. At a readiness of 67%, she was sold to China and, in March 2001, arrived at Dalian. Completed in 2012 under the new name of Liaoning, she now serves the flag-ship of the People's Liberation Army Navy (PLAN).

INS Vikramaditya was made through refit and modernization of ex-Russian navy Admiral Gorshkov. This Project 1143.4 heavy aircraft carrying cruiser went into commission in December 1987 and remained operational for five years. India bought her on condition that the cruiser will be transformed into a through-deck aircraft carrier under Project 11430 at Sevmash in Severodvinsk. In the new shape the ship was handed over to the Indian navy in November 2013. Because of the smaller hangar (130x23 meters), the customer preferred the smaller MiG-29K/KUB to the larger Sukhoi-33. According to specification, Vikramaditya's air wing is made up of 24 MiGs, four Ka-31 and two Chetak helicopters. This compares to 26 Su-27K and 24 Kamov helicopters for Kuznetsov. India bought 45 MiG-29K/KUBs from Russia, while China reverse-engineered the Su-33 to produce the J-15.

Using Russian designs as points of reference, India and China are constructing new STOBAAR carriers locally. INS Vikrant was laid down in 2008 at Cochin. Compared to Virkamaditya, her full displacement is reduced from 45,000 down to 40,000 tons. Completion is expected in 2018. China is building a larger carrier, Shandong.

Destroyers

Today, China is the only foreign operator of guided missile destroyers imported from Russia. The four Project 956E/EM ships acquired at the turn of the century remain the only surface combatants of foreign make in PLAN inventory. PRC paid U.S.\$ 0.8 billion for the first pair and \$1.4 billion for the second. This was a big money for the time when Russian weapons were selling cheaply. Reportedly, since 2014 these destroy-



ers have been undergoing a major refit and modernization program to help them stay in service for many more years.

The primary weapon system of these ships is the Moskit (Mosquito) employing 3M80 anti-ship missiles. Air cover is provided by the Uragan (Shtil) system employing 9M317E anti-aircraft missiles and two sets of six-barrel Gatling-type AK630 30-mm rapid-fire guns. Accepted into service in 1984, the four-ton Moskit weapon accelerates to Mach 2.8 and has a firing range of 120km. Improved 3M80MBE and 3M82 (Moskit-M) versions can strike at longer distances. In 2000-2006 PRC procured one hundred Moskit missiles at a cost of US\$ 1.5 million each.

Hangzhou (DDG136) and Fuzhou (DDG137) of Project 956E became operational in December 1999 and November 2000, respectively. They were broadly similar to the Soviet/Russian navy sister-ships (seventeen destroyers went into commission in 1982-1994) except having radio-electronic equipment and weapons systems of export versions. Inducted in 2005-2006, Taizhou (DDG138) and Ningbo (DDG139) are bigger (full displacement 8,500 tons) and come with a proper helicopter hangar at the expense of the stern 130-mm cannon mount. They feature KVG-3D boilers consuming diesel fuel in lieu

of KVG-3s running on the furnace oil found in all other sister ships.

The Severnoye Design House (SDB) in St. Petersburg (since "Severnoye" in Russian means Northern, this organization is also referred to as NDB) came up with an improved Project 21956 but failed to sell it to the Chinese. Consequently, the Zhdanov shipbuilding plant in St. Petersburg – now known as the Northern Dockyard – converted to other ship classes.

India also has destroyers, but these are built locally, at Mazagon Dock Limited (MDL) in Mumbai. NDB provided assistance on their development. A starting point was Project 11000, a design that did not go into production. Its drawings were used in 1978 as a first iteration to what became Project 15. Lead ship, D61 Delhi, was started in 1992 and completed five years later. She has a full displacement of 6200 tons, Ukrainian gas turbines and a complete set of Russian weapons: Uran-E anti-ship system (employing Kh-35/3M24E anti-ship missiles), Shtil SAM, 100-mm AK-100 cannon mount, AK630 rapid fire guns, RBU-6000 rocket launchers, 21-in torpedo tubes as well as Fregat-MAE radar.

The lead ship of the class was followed by D60 Mysore and D62 Mumbai going into commission in 1999-2001. These were followed

by three Project 15A Kolkata class destroyers, laid down in 2003-2006 and commissioned in 2014-2016. Next step in the evolution shall be four Project 15B Visakhapatnam class destroyers due for entry into service after 2018. Displacing 7400 tons, these have a reduced radar signature and carry a mix of weapons and systems from Russian, Israeli and European OEMs. The whole series relies on the same 163-meter-long hull and Ukrainian gas-turbines.

Less Russian content is found in the three Project 17 Shivalik surface combatants built in Mumbai in 2000-2012. Classified as frigates, they displace the same amount of water as the Delhi, while carrying Shtil anti-ship and Club-N strike missiles. Ukrainian turbines gave way to a CODOG propulsion employing LM2500 turbines whose production have mastered locally under license from General Electric.

Frigates

First sales of Russian guided missile frigates occurred in 1975, when India placed order for three Project 61ME ships. Six years later the customer requested two more. Their design was based on the Project 61 to which twenty "large antisubmarine ships" had been built for the Soviet navy. Nicknamed "the singing frigates" for a characteristic noise coming from COGAG propulsion, these were first Soviet – and Indian – navy ships to employ gas turbines for both cruise

and chase. At 4025/4905 tons (standard/full), the Indian frigates were larger than their Soviet sister ships and carried additional weaponry: four launchers for P-20 anti-ship missiles and a battery of 30-mm rapid-fire guns. The stern 76-mm cannon mount was removed to empty place for a hangar housing a Ka-25PL ASW helicopter. The first ship was laid at Nikolaev in September 1976 and handed over to the customer in May 1980 as D51 Rajput. She was followed by D52 Rana (1982), D53 Ranjit (1983), D54 Ranvir (1986) and D55 Ranjivey (1988). This series made the first case in history when the Soviet industry obliged a foreign client with warships of not a factory-standard, but a special export version developed to the customer's specific requirements. All five remain in service, including three re-armed with Indo-Russian BrahMos PJ-10 missiles.

New Delhi went for Russian frigates again in 1997. It signed an initial contract worth U.S.\$ 1billion for three Project 11356 ships. F40 Talwar, F43 Trishul and F44 Tabar were delivered in 2002-2003. They represented a tailor made design based on the Project 11351 border patrol vessel and were the first to have a brand-new A190 cannon mount of 100-mm caliber. In 2006 the customer placed a follow-on order worth U.S.\$ 1.56 billion for three more ships. Instead of the Baltic Plant in St. Petersburg these were built at the Yantar dockyard in Kaliningrad. F45 Teg, F50

Tarkash and F51 Triand went into commission in 2012-2013. Instead of the Club-N system, these came with vertical launch silos for BrahMos missiles. The Kashtan artillery-missile system for close-in air defense was replaced by AK630 30-mm rapid-fire guns. Other design changes were to replace Russian MG-345 bow sonar and a towed array to it with newer systems of Indian origin developed for operations in the specific hydrological environment of the Indian Ocean.

During President Putin's visit to New Delhi in October 2016, an inter-government agreement was signed on four additional frigates. Two of them would be built in Russia and the remaining pair in India under license. Like the first trio, these would come with the vertical launch system (VLS) for the Club-N system employing three different types of missiles – 3M54 for antishipping, 3M14 for land strikes and 91R for submarine warfare. Older Shtil (Uragan) anti-aircraft defense system will be replaced by the more advanced Shtil-1. While the Uragan can simultaneously engage four to six aerial targets, the Shtil-1 – thanks to its multi-channel firing capability – can handle up to twelve targets at a time and has a larger ammunition stock (two 3S90E.1 subsystems employing three modules each loaded with twelve 9M317M missiles against a total of 48 9M38M1 previously). The Shtil-1 is advertised as able to defeat a group of enemy

aircraft committing a coordinated attack from different directions.

It is rumored that the new Indian ships will be using hulls laid down in 2013-2014 at the Yantar as Butakov, Istomin and Kornilov frigates of Project 11356R for the Russian navy. Their construction was halted in 2015 due to Ukraine refusing to sell propulsion systems on political reasons. At the same time, Zorya-Mashproekt DT59 boost and DS71 cruise gas-turbines are available for India, provided it buys them directly from the manufacturer.

Corvettes

The most important of the recent programs on acquisition of surface combatant for the Vietnamese navy is do with the Project 11661E "Gepard 3.9" corvettes with a full displacement of 2200 tons. Two hulls were laid down in 2007, and commissioned four years later as HQ-011 Đinh Tiên Hoàng and HQ-012 Lý Thái Tổ. Today, they are the most modern and capable surface warships in the Vietnamese inventory. Apart from guns and torpedoes, they come with the Uran guided missile system (employing Kh-35E weapons), Sosna-R anti-aircraft missiles, and a pad for Kamov Ka-28 helicopter.

Keels of the second pair were laid down in September 2013. Because of the recent disagreements with Ukraine, Russian shipbuilders had to search for alternatives to Zorya-Mashproekt turbines elsewhere. Late



last year, the second pair of the frigates commenced trials in the Black Sea. Vietnam is negotiating a follow-on order for two more ships.

India has never bought missiles corvettes from Russia, but cooperated on their designs in a view of producing them locally. Shipwrights from St. Petersburg assisted in development of the Project 25 Kukri class with full load of 1350 tons and P-20 missiles. Four of them were built at Mazagon Dock Limited (MDL) and Garden Reach Shipbuilders and Engineers (GRSE) in 1989-1991. Larger (1500 ton) Project 25A Kora followed with completion of four ships at GRSE in 1998-2004 and a fifth for Mauritius in 2013. Many of their combat systems are of Russian origin including the Uran-E anti-ship missile set.

Russian shipwrights rendered assistance to the Indian navy in the late 1970s on refit and modernization of old British frigates that involved outfitting them with anti-ship missiles. Besides, as MDL continued license production of the Leander class frigates, the baseline design was reworked to employ P-20 anti-ship and Osa anti-aircraft missiles, AK-725 and AK-630 artillery pieces as well as Angara-U radar of the Russian origin. Known as Project 16 Godavari class, these were followed by Project 16A Brahmaputra, with three more ships completed at GRSE in Kolkata in 2000-2005.

Patrol vessels

The Indian started to receive Russian warships in the late sixties. The first were Project 368 patrol boats displacing about 100 tons: P246 Panvel, P247 Pamban, P248 Puri, P249 Panaji and P250 Policat were delivered in February – March 1967. Their sister ships also served with the Vietnamese navy.

Coming next were five Project 159E antisubmarine ships (NATO codename: Petya III) built in Khararovsk, the capital city of Russia's Far East. P77 Kamorta, P78 Kadmatt, P79 Kitan, P80 Kavaratti and P81 Katchall went into commission in 1968-1969. Shortly after New Delhi place a follow-on order for five more. They came from the Soviet

navy stocks with subsequent refit into export version. P68 Arnala, P69 Androth and P73 Anjadip were built at the Yantar in 1968-1969 and handed over to the customer in 1972. The remaining two – P74 Andaman and P75 Amini – were built in Khabarovsk in 1973-74.

Hanoi also acquired five Project 159E vessels. Despite the age, they are still operational. As in case with India, these were first Vietnamese navy ships with gas turbines for boost, enabling the 1120-tonne vessel to accelerate up to 32 knots. Designed primarily for antisubmarine patrols, they are now employed on coastal patrol duties since their outdated sonar set is no longer able to handle modern underwater threats.

With the rise of the domestic production, India switched to making patrol boats locally. Hanoi also wanted to master production of small displacement vessels. First, it applied to NDB, which offered the 'Patrol Ship of 500 ton displacement' (PS-500 or Project 12412). The developer advertised it as "first-ever successful application of deep V shaping in hulls of such displacement". Under contract signed in 1996, one such vessel was built in Ho Chi Minh city with Russian support. Even though the Vietnamese navy commissioned the HQ-381 in 2001, the respective industrial program has been put on hold.

Instead, the customer went for the TT400TP, a derivative of the Ukrainian 'Lan' missile boat. The 480-tonne HQ-272 was commissioned in January 2012. Reportedly, local makers are constructing more of these for the navy and for the coastal guard, in the last case with 2*2 25mm rapid-fire cannons instead of a 76-mm AK-176 and a six-barrel 30-mm AK-630. Besides, in 2002-2012 Vietnam acquired six smaller patrol boats displacing 375 tons from Russia, built to Project 10412 Svetlyak.

Indonesia operates about forty Cold War era warships built to Russian designs, including minesweepers and patrol boats. Most of them were acquired in Germany in 1993 following the reunion of the Western and Eastern parts of the country. The most numerous in the Indonesian

inventory are 900-tonne antisubmarine ships (operated as coast guard vessels) built by the Peene-Werft plant in East Germany to Russian project 1331M. All of these have been re-equipped with MTU diesels, but still keeps many of Russian-origin systems. Moscow is offering a life-time extension and modernization program involving installation of new weapons systems. Along with modern missiles (the 3M55 Yakhont anti-ship weapon is already on board of the Indonesian navy frigate KRI 354 Oswald Siahaan), torpedoes, mines and artillery, Indonesia is also offered radars and other systems for use on these and other warships.

Torpedo and missile boats

Torpedo boats were made in the Soviet Union almost to its demise. The most popular with domestic and overseas customers was the Project 206. The most recent of those were completed in 1978-1985 to Project 206ME design, including five for Vietnam. Displacing about 250 tons, they carry four 21-in torpedo tubes, 57-mm and 25-mm artillery pieces. These boats operate alongside with few older Project 206 vessels on coastal patrol duties.

The Project 205 missile boat based on the same hull was built in several hundred copies in Russia and China (Type 021 Huangfen). Most of them have gone for scrap; few remaining examples are still operational. India received sixteen such boats. The first contact, awarded in 1969 to the plant in Rybinsk was for eight hulls with P-15 missiles. K82 Veer, K83 Vidjut, K84 Vijeta, K85 Vinash, K86 Nipat, K87 Nashak, K88 Nirbhik and K89 Nirghat were delivered on the eve of the 1971 Indo-Pakistan War. They won much acclaim during the hostilities by sinking enemy ships and destroying infrastructure in port and naval base of Karachi. The follow-on order came in 1973 for eight boats armed with evolved P-20 missiles: K90 Prachand, K91 Pralaya, K92 Pratap, K93 Prabal, K94 Chapal, K95 Chamak, K96 Chatak and K97 Charag went into commission in 1976-1977.

The 60-m-long boats built to Project 1234 are officially classified

as small (light) missile ships, for they carried not only anti-ship, but also Osa-AK anti-aircraft missiles for self-protection. Production run in 1967-1992 accounted for 67 hulls, some of which are still operational. India ordered three, and these were built in 1976-1977 at Almaz in Leningrad (now St. Petersburg) as K71 Vijaydurg, K72 Sindhudurg and K73 Hosdurg.

In parallel to the Project 1234 program, Russia built dozens of Molniya series boats in various versions since 1979. As part of that effort, in 1981-1992 twenty boats were completed to Project 1241RE design, including one for the Soviet navy to serve as training tool for foreign crews. Compared to the Project 1234, they were smaller, with a 50-meter-long hull, but carried a similar weapons set. In 1981-1983 Moscow and New Delhi signed documents under which the Indian navy should receive twenty copies with P20 anti-ship missiles (further evolution of the P-15) and gas-turbine propulsion. Five were built at the shipyard in Rybinsk, and attained operational status in 1987-1989.

Collapse of the Soviet Union caused difficulties in setting up license production for what called the Veer class. Mazagon Docks Limited (MDL) completed two and Goa Shipyard Limited (GSL) four ships in 1991-1997. Later on, under a separate contract, the local dockyards built two more boats in 2002 – Prabal and Pralaya – with Uran-E missile system. It is interesting to notice that officially the system was accepted into service in June 2003, following completion of fire trials.

Under a separate contract signed in 1984, India bough four antisubmarine ships of Project 1241PE based on the same hull. They were commissioned in 1989-1991 as P33 Abhay, P34 Ajay, P35 Akshay and P36 Agray. Instead of missiles, these ships carried sonar set with keel-mounted and towed antennae. Besides, a single boat was built to Project 12421 with the 3M80 Moskit missiles. Although she successfully underwent testing, the intended customer refused to buy it.

Vietnam started negotiating on the Molniya in the late 1980s. First

off, it acquired two boats – HQ-371 and HQ-372 – built in 1990-1991 but not accepted by the Russian navy. Besides, Hanoi acquired rights for license production of the improved Project 1241.8 design displacing 500 tons and carrying 16 Kh-35 (3M24) missiles. After a pause that followed, in 2003 the Russian industry won a comprehensive deal, to make six of such vessels and assist in setting up a license production line at the Ba Son dockyard in Hanoi. Today, the Vietnamese navy operates twelve Molniya vessels, including four made locally. Ba Son delivered first pair in 2014, second in 2015, and is looking to produce up to ten eventually.



Other classes

In 1967, India ordered six mine-sweepers of Project 266ME. These were built at Sredne-Nevisky plant in Leningrad and commissioned in 1978-1980: M61 Pondicherry, M62 Porbander, M63 Bedi, M64 Bhavnagar, M65 Alleppey and M66 Ratnagiri. In 1982 the customer placed a follow-on order for six more. They became operational in 1986-1989 as M67 Karwar, M68 Cannanore, M69 Cuddalore, M70 Kakinada, M71 Kozhikode and M72 Konkan. Besides, India bought six smaller minesweepers of Project 1258E, commissioned in 1983-1984 as M83 Mahe, M84 Malvan, M85 Mangrol, M86 Malpe, M87 Mulki and M88 Magdala. Vietnam has also acquired a number of Russian mine-sweepers, including 460-ton vessels of Project 1265E.

The Indian navy operates A58 Jyoti fleet oiler manufactured at the Admiralty Shipyard in 1993-1996. Other auxiliary ships include submarine tenders A14 Amba (A54), a Project 1886E ship which is a former Soviet PB-7 built at Nikolaev. There is also A15 Nistar submariners rescue vessel of Project 532 acquired in 1971, which is ex-Soviet-navy SS-53 completed in 1962. There are a few amphibious/landing ships built to Russian designs in service with the Pacific nations. With Russian assistance, Vietnam built the HQ-571 Truong Sa landing ship in 2012.

Apart from ships, Asia-Pacific nations have acquired about seventy Kamov

Ka-28 ASW (India, China, Vietnam) and Ka-31 radar-picket helicopters (India and China). India operated Tupolev-142MK and continues using Ilyushin-38SD ASW aircraft. Besides, Vietnam has procured Bastion (NATO: SSC-5) coastal defense system employing the Yakhont supersonic cruise missile, and, along with few other nations, continues using the older Rubezh (SSC-1) and Redut (SSC-3). The respective contract was signed in 2006, shipments commenced in 2010. India and China buy Russian naval weapons, radars, electronics, various onboard systems and their components for installation on the ships of indigenous designs.

Russia believes that the long and eventful history of weapons sales in the region will help raise new orders, and, hopefully, extend their geography.

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