

Navy in the new era. Role, requirements, shape

The past decade made a great contribution to the world's history. Its main result is the radical changes in the international relations, end of the mutual confrontation, refusal by the majority of the nations to use armed forces to solve conflicts, changes in the nature of threats and changes of the priorities.

The next century is going to bring at least as many changes. On the one hand it is characterized by the inevitable process of arriving to one common approach towards national security shared by different nations and the growing importance of the world ocean for the development of the mankind on the other.

The analysis of the above trends makes it possible to formulate common tasks for the navies of the leading marine powers, such as protecting state borders, participating in the international forces to trim local conflicts and hot beds of terrorism, ensuring economic activities in the seas and shelf, including transport, fishery, natural resources.

Below are the main principles of building the navy, developed in the context of the current international relations, financial restrictions of various levels and common approach of different nations to the peace and security based on the principle of collective safety. The most important requirements to the parameters, characteristics and performance of the future ships are also formulated below. It is important to keep in mind that the requirements of the future customers to their ships will be toughened. The main reasons for that are the increasing human factor, ecological restrictions and new scientific and technical developments. To meet such stricter requirements becomes more difficult in the conditions of the reduced costs of designing, manufacturing and operating the ships due to the limited funds allocated from the budget for the defense purposes. The main features of the principle types of the future ships are also provided below.

The key factors determining the nature of the maritime activities in the near future.

The main result of the development of the human civilization in the past 10-15 years is the end of the global armed tension between the main powers, which lasted for several decades, and the beginning of the new era of international cooperation. Such cooperation includes international security, military and military-technical cooperation (MTC), incredible in the past years. Although it is possible to assuredly state that there will be no more world wars in the foreseeable future, this assuredness does not reach regional conflicts, territorial claims, human rights violations and imposed regimes in some parts of the world. Such conflicts along with the recently spread international terrorism will remain the main threat to the peace and stability for many years.

Sea is the origin of the mankind. It has been and will always remain the sphere of the top interests and economic activities. However, in this century these interests will be transformed. The main reasons for that are the above mentioned changes in the international arena and the increasing economic and military-strategic importance of the world ocean.

Nature- and climate-shaping role of the ocean is impossible to overestimate. The world ocean provides for the unlimited transport opportunities. The world merchant fleet of the total deadweight of about 1 trillion tons annually carries 40\$ trillion worth cargoes. Every minute there are about 60 000 passengers on board the ships and aircraft above the oceans.

Mineral, biological and energy resources of the world ocean are of paramount importance for the world economy. Only Russia's North and Far East shelf seas of the total area of 3.9 million sq. km. have 13.7 billion tons of known oil reserves and 52.3 trillion cbm of gas. As long as the ground based mineral, biological and energy resources run out, leading to the global problems of the food and energy shortage as well as to the worsening ecology, the role of the world oceans will increase.

The world's population and the potential of the world's economy are to a great extent located near the mainland coastline: 25% in the 50 miles zone, 50% in the 100 miles zone and up to 75% in the

500 miles zone. Due to this fact it is possible to call this civilization "coastal". Naturally it contributes to the attitude the people have towards the sea.

Finally, the seas and the oceans are important from the point of view of military strategy. It is based on the fact that the bigger part of the nuclear arsenal is located in the sea zone and it is possible to apply the political pressure in any region of the planet using the world ocean.

The purpose and the main tasks of the navy.

The navy, as any other part of the armed forces is aimed at preventing the wars, military conflicts and protecting the nation's interests.

In modern conditions protecting the political and economic interests in the seas and oceans remain the main purpose of the navy. As an instrument of the foreign policy navy has a number of unique opportunities. First of all it is not limited by the nation's borders and can demonstrate the country's flag in any remote part of the world. Apart from that the newest maritime weapons make any object in any country vulnerable, irrespectively of how remote it is from the coastline. It means that the navy is the most important mean of non-contact warfare.

To our mind the main tasks of the navy for the next decade will be:

- strategic deterrence (for the countries having the deterrence weapons);
- preventing, if it is impossible to prevent - participating in the regional conflicts and liquidating the hot beds of international terrorism as part of the international coalition or UN;
- ensuring the safe economic activities in the ocean and shelf, including transport, passengers, biological and natural resources;
- protecting nation's borders together with the ships of the Border Guard Service;
- participating in the preventive and rescue operations during ecological disasters and ships' emergencies.

Strategic nuclear arsenal has been the weapon of deterrence in the past decades. Keeping in mind that so far the existence of the deterrence weapons is the main factor preventing the large scale armed aggression (recently feared not from the large nuclear nations, but from the third countries creating the nuclear weapons), the navies of the countries with the deterrence weapons will continue to have the task of ensuring strategic deterrence for a long period.

High precision weapons with non-nuclear explosives are becoming an efficient part of the deterrence weapons. It is quite easy to forecast that in the first 10-20 years of the next century it will considerably take over, if not totally replace the nuclear weapons. It is unlikely that the mankind will overcome the syndrome of mistrust and refuse from the deterrence weapons as the main instrument of peace in the foreseeable future. Therefore it is possible to state that in the coming years more sophisticated weapons of this kind will be developed and built.

The task of localization and liquidation of the regional conflicts and the hot beds of the international terrorism by the international allies acting under the UN or other international organizations' umbrella has become more vital in the recent years. In regional conflicts the external interference will be focused on dividing the conflicting parties, providing assistance to the population, supervising the adherence of the parties to the peace deals etc. Keeping in mind high density of the population and industry in the coastal areas, it is likely that the navies will participate in such operations.

The tasks of ensuring safe economic activities in the ocean and coastal areas are different. Piracy is disappearing, but still a considerable threat to the shipping and fishery. This task will be extended by the requirements of the industries dealing with prospecting oil, gas and other natural resources.

This is not the complete list of the tasks of the navy from the point of view of economic safety. The XXI century will require the navy to participate in the sea launch programs, rescue operations, drug control and other.

The principles of building the navy.

The end of the confrontation era in the past decade of the previous century led to a considerable reduction of the ship stocks, arms arsenals, personnel and naval infrastructure in general. Design works, R&D and military manufacturing volumes have been also reduced. The purpose oriented work aimed at forming and optimizing the type structure of the future fleets adopted to the requirements of the new century is under way.

The formation of the future ship stocks is based on the following principles:

1. The cold war era characterized by the confrontation of the two large military potentials is replaced in the XXI century by orienting towards partnership and MTC aimed at ensuring stable and comprehensive peace based on the principles of democracy and collective safety.
2. The navies are not supposed to conduct large scale operations involving large groups of ships.
3. The 55 years after the WW-II demonstrated that it is unlikely that warships may be engaged in the large scale conflicts using their weapons. At present there are much more chances for the warships to be used in regional conflicts. Therefore the threat of the weapons which might be used against the ships should be viewed in the new circumstances.
3. The arms race regardless of the costs, typical for the second half of the XX century, is being transformed into the ideology of having reasonable defense opportunities at minimal costs.
4. The refusal from the straightforward confrontation provides for a growing opportunity to plan the development of the shipbuilding and arms industry in the comfortable conditions, optimizing the naval shipbuilding programs from the point of view of the long term strategies, the ratio between the strategic and conventional forces, combat and auxiliary means as well as ground infrastructure.

The above principles of building the navy are typical for many countries. They are considerably changing the old traditions.

The changed conditions of building the navy require considerably extending the range of scientific research, first of all findings on the justification of arms programs and the features of the future ships, providing a larger number of possible solutions, utilizing the cost-efficiency criteria more efficiently.

General requirements to the perspective ships. Ways of their implementing.

The new tasks of the navy and the new principles on which it should be built allow formulating the new general requirements to the perspective ships. The most important of them are as follows:

- multi role nature of a ship in general;
- universal nature of the weapons and electronic systems;
- low degree of visibility of physical fields;
- high survival rate when hit by various munitions;
- maximum compatibility with the ships of foreign navies and possibility of cooperating;
- maximum level of ecological safety;
- improved living conditions;
- highly ergonomic machinery.

The multi role nature of a ship is required because the number of the ships in the future fleets will be limited but the tasks they face will remain different. This criteria can be met first of all by making the arms systems universal, for example, using the vertical launch systems for the missiles of different types against surface, submarine (including small sized), air and ground targets. It includes the high precision missiles hitting the ground targets with minimal detriment to the nearby objects and population.

The radio electronic systems of detecting and targeting must be made maximum universal, which will ensure better fire control and lower costs.

Stealth architecture combined with the highly efficient radio electronic counter measures is the foundation of the surface ships' protection system. The protection of the subs is determined by the proper methods of reducing the acoustic and other fields of the subs.

The requirements to the ships' survival rate must ensure survival when the ship is once hit by any kind of munitions. The ship's design and construction, especially of its explosion-vulnerable and vital parts, fire control measures are the means of meeting the requirements of the survival rate. It is not excluded to consider the return to the method of armoring the ships on a new technological level.

The ecological requirements are ensured by the growing number of measures aimed at avoiding the pollution of the air and water during maintaining the ship at peace and repairing its different navigational and combat damages.

The living conditions on board the warships must be improved, especially in the navies which switch from the enlisted personnel to the contracted one.

In order to maximum avoid the human mistakes it is necessary to improve the ergonomics of the machinery and equipment. The volume and the quality of personnel training is improved using the electronic simulators.

Special attention should be paid to forming the requirements to ships, which may become part of the international coalition formed for peace keeping and anti terrorist operations.

The high probability of using the battle ships together with the foreign navies makes it necessary to ensure maximum compatibility in speed control, endurance, communication means, systems of loading / discharge, landing / take off, rescue means etc.

The main directions of the development and the features of the perspective ships.

The new purpose and the tasks of the navy, the general trend towards reducing the fleets and the fleets' infrastructure, mentioned above, as well as the reduced budgetary defense allocations made it necessary to develop new approach to the features of the future ships. We mean the ships which will come in 2010-2015, because due to the complicated nature of a ship it takes at least 10 - 15 years between the ship's concept and manufacturing.

The development of the strategic submarine missile carriers will continue within the frameworks of the international agreements, where an important role is given to the just ratified by Duma American-Russian agreement on limiting the strategic attack potentials, signed by the Presidents in 2002, under which each party determines itself the composition and the structure of its strategic attack arms based on the limited total number of warheads. Earlier agreements on the strategic attack arms restricted the number of the newly developed complexes, their carriers (including missile carriers), the number of the missiles and the blocks on the missiles. Keeping in mind the general tendency of reducing nuclear arms and developing the high precision cruise missiles with non-nuclear charges, in 20-25 years the nature of such submarines may be considerably changed.

Multi role nuclear submarines will develop becoming multi functional and universal. The main criteria in the development will remain reducing the noise level, improving the hydro acoustic weapons and reducing the level of other fields.

Utilizing the high precision cruise missiles with non-nuclear charges on such submarines will attribute the role of the strategic deterrence weapon to this class of subs.

Only five nations have multi role nuclear subs, whereas 43 nations have diesel-electric subs. Their total number is 380. The development of this class of subs, especially "coastal" subs of limited (as a rule 1000 tons) deadweight will go in the following directions:

- increasing the power and the suddenness of the strike due to the increased number of combat ready weapons;

- increasing the submarine speed aimed at intercepting the surface warships and transports within the vicinity of own coastline to ensure preventive strikes;
- increasing the submarine endurance;
- reducing the physical fields to the minimal level, first of all the fields of the electro magnetic group, aimed at minimal visibility when on patrol;
- complexly automating the control systems of the ships and reducing crews.

Anaerobic power stations, especially single units, will make a great impact to the development of this class of subs.

The tasks of the navy provide for a certain composition of the general purpose ships, which includes an aircraft carrier, multi role ocean ship to protect the aircraft carrier and conduct own missions (destroyer), universal ship of the sea zone (frigate), short range ship (corvette) and mine sweeper.

Aircraft carrier can ensure air superiority for the long term campaigns as well as the organization, control and sustainability of different armed groups in a conflict area. Such ships are unique and expensive; therefore they will be made by a very limited number of nations. This is the most conservative type of a ship, and it will develop in the traditional direction.

The multi role ocean ship, having the characteristics of a torpedo carrier, anti sub ship and missile-artillery ship (destroyer), will have the displacement of up to 10 000 tons, the speed of 28-30 knots and the endurance of up to 10 000 miles at 16-17 knots speed. The type of the main power station is gas turbine with fully electricity based movement.

The destroyer will have a complex of missiles with universal vertical launching systems to use high precision missiles against ground targets, missiles against surface and submarine targets, air defense missiles of far, medium and small range targets as well as a universal artillery unit with high precision controlled shells against ground and surface targets. The ship will have one or two helicopters.

The radio electronic means of a destroyer will consist of the universal unit of detecting and targeting, a complex of radio electronic counter measures, a hydro acoustic complex for detecting subs, anchor and bottom mines, anti diversion means.

The universal ship of the sea zone (frigate) will have the displacement of about 5000 tons. Even now there are prerequisites to provide absolutely the same complex of weapons to the destroyer and the frigate with the only difference in the number of spare charges. At the same time such ship, having smaller displacement than the destroyer will be much cheaper. For most nations frigates will be the main battle ship.

The last ship in the surface list is corvette with the displacement of up to 2000 tons. It is supposed to conduct short range and coastal operations as well as the functions of the border guard.

A large role is given to the anti mine ship, which will have self propelled complex for detecting and destroying the mines ahead of the ship.

Military shipbuilding has been always based on the new technologies. During the past years the development of the ships has been based on the implementation of the new solutions of the traditional shipbuilding subjects - hydromechanics, strength of materials, (electric) energy. A bit later the main priority was given to the reduction of physical fields (acoustic, electromagnetic, radiolocation, heat, radiation etc.). Considerable results have been reached in all the above sectors.

The development of the shipbuilding in the past 20 years has been characterized by the degree of using electronic systems. During a historically short period the shipbuilders have passed the way from automated ships' rudders and some automated weapons to complicated automatic systems of combat control (ASBU), automatic control of the ships' power stations, equipment and movement. A fully integrated system of combat control of a sub is being developed. The works aimed at

automating the surface ships are under way. The modern automated ship controls have high degree of reliability, high survival rate, big volume and high rate of signal processing.

The multi role nature of the large and middle warships as well as the complicated nature of the marine operations excludes the suggestion to make the ships automatic even in the remote future. Therefore the development of the automation of such ships should be based on further integrating separate functional systems, extending their intellectual level and the number of the instruments that can be used. The most perspective direction of automating the ship and introducing robots is ensuring the viability during combat or operational damages, as well as servicing potentially dangerous units and systems.

Today the tendency of transferring the achievements of the civil shipbuilding to the military sphere is the most important in the world's military shipbuilding. The civil tonnage is 140-150 times bigger than the military one, civil fleet is operated much more intensively, it has much higher safety standards and tough competition between civil ships in the market All this led to the reconsideration of the standards of the military shipbuilding by the main maritime powers from the point of view of benefiting from the civil experience. The leading foreign classification institutions that provide the design rules for the civil ships, started developing the design rules for battle ships. For example, the English Lloyd has issued the first version of such rules. Own rules to some ships' classes have been developed by the Italian Register, Norwegian Veritas and the American Bureau of Shipping.

Russian Shipbuilding Agency Rossudostroyenie

The Shipbuilding Agency comprised 180 enterprises of which more than 80 were state-owned. The remaining enterprises consisted of joint stock companies with different shares of government capital or with "golden" shares. In the 1990s, for a number of objective and subjective reasons there occurred a dramatic slump in the shipbuilding industry and in all other areas of the economy.

On 09 December 1999 the Russian Government passed the provision on the Russian Shipbuilding Agency. Under that provision, Russian Shipbuilding Agency (Rossudostroyenie) became a federal body of the executive power branch that implemented control, permissive, and regulation. In addition, it held responsibilities in other fields within the shipbuilding industry such as research, development, manufacturing, and updating and utilization of products of military and civic shipbuilding. The Agency's main task was formation and fulfillment, together with Russian Ministry of Science and Technology and Defense Ministry, of research and industrial policy directed to the manufacture of competitive products and the introduction of advanced technologies in the field of the shipbuilding. Some of the enterprises that earlier been subordinated to the former Ministry of Shipbuilding, which include the agencies on conventional arms of the former Defense Industry Ministry, agencies on control systems, enterprises of the former Ministries of Electronics, Radio Industry, and Industry of Communication Facilities, were transferred to the authority of the Agency of Shipbuilding.

The shipbuilding industry was traditionally one of the leading defense industries in Russia. Since the beginning of the defense conversion process, state military orders had been reduced from 60 percent of total production to 5-10 percent, and Russian shipbuilders sought new markets and expanded existing product lines. Faced by tough western and eastern competition, Russia was pressured to introduce new technology and construction practices in order to maintain its competitiveness.

Russia possesses 40 shipyards; however only seventeen among them has the capacity to build vessels greater than 122 meters in length and only five among them has the capacity to build large ocean ships. St. Petersburg is the most important center of shipbuilding in Russia since three of the country's main shipyards are located there, as well as many supporting industries (machine building, compressor manufacturing industry, ship design bureaus etc.).

Russian shipyards are not able to compete with the shipyards of South Korea, China, Germany and other European countries, where during recent years modern robotic shipbuilding technologies were

implemented. Russia fell behind these countries in terms of level of production management, technology, construction period and prime costs. Due to this, Russia was threatened with the possibility that it could lose its competitiveness unless the shipyards were modernized. Modernization of each shipyard during the time period required no less than \$500-600 million. According to experts, robotics and new technologies would not have made the shipyards highly profitable if they were installed in old yards. Thus, in the mid-1990s the Council of the Ministry of Economy of Russia decided to create a modern shipbuilding complex. The investment project was included in the State program for the conversion and restructuring of the defense industry of the Russian Federation. This program, which is a Russian analogue to the US "Moritex" program, was called "Russian Shipyards" and received presidential status. The program envisioned the merging of the three St. Petersburg shipyards (Baltiysky Zavod, Severnaya Verf and Admiralty Verf), and the subsequent creation a joint ship-assembly complex in the form of a joint-stock industrial corporation. The project of unifying the yard would cost approximately \$650 million. Of this amount, 30% would go for the transfer of a number of machine building workshops to other enterprises in St. Petersburg and to the redevelopment of 150 Ha of freed property in the center of the city. It remained unclear at the time how the project would be financed.

Shipbuilding in Russia is very different from other sectors of industry: very long terms of project completion (sometimes more than 30 months); very high project costs (\$30-50 mln.); and a need for high capital investments. According to some estimates, Russia needs annual fleet renewal of 150-200 ships, requiring an investment of \$2.5-3.5 billion. However, Russian ship-owners do not have money to finance the construction of new vessels.

Following the termination of the Mikhail Kasyanov government on 24 February 2004, President Putin restructured the country's defense agencies. The Conventional Weapons Agency, Shipbuilding Agency (Rossudostroyenie), and Control Systems Agency were all disbanded. Their functions and responsibilities were transferred to the Ministry of Industry and Energy under the authority of the Federal Industry Agency (FAP).

The Russian shipbuilding suffers from the shortage of orders. By 2006 a total of 95% of the total tonnage of civil vessels built for the previous decade by the orders of Russian ship-owners, had been built abroad. Only 5% were built in Russia. At that, civil goods' production was decreasing. For the period January–October 2006 the reduction constituted 3,2%. The peculiarity of the situation is that production for export had increased by 19,7% and for the domestic customer it has decreased by 15,1%. During the first 10 months of the 2006 a total of 20 vessels of different purpose had been constructed, with 141 vessels are under construction.

Bank's interest rates for credits are too high in Russia, and foreign banks do not finance construction of vessels in Russia. Therefore, it is more favourable to build tankers and dry-cargo ships abroad. Besides, in Russia taxes and duties are high, which increases the cost of a vessel by 20-25%, and the conditions for the investments inflow are absent, too. Hence, one may not expect development of the branch at the expense of civil orders.

The Russian shipyards have traditionally specialized on warship construction, and civil ships have been built abroad. As the result, in Russia production costs are high, the production cycle is long, mechanization is low, labor intensity is high. As the result, 44% of vessels are built against the state defense order, and 33% more are accounted for by the military ships' export.

By 2006 there were many new ships under construction at shipyards. And the volume of financing required for their construction was much more than the state defense order can provide. Nevertheless, it did not prevent the development of state strategies and of the programs of development of the Navy, development of the shelf sea, construction of high-speed vessels, etc. At that, the state-of-the-art ships equipped with effective arms are built for foreign customers, and the Russian Navy, because of long period of construction, got, as a rule, the ships which are 15-20 years old.