

# KARAKURT — A SUCCESSOR OF GLORIOUS TRADITIONS OF THE CORVETTE-CLASS SHIPS

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The history of creation of the first missile boats and small-sized missile warships in the world is inseparably associated with our Design Bureau. During the World War II, when new ship self-defense means were introduced, including radio location stations (radars) to detect targets and to control fire, torpedo has lost its primary role as a traditional weapon to attack warships and vessels. The guided missile weapons (GMW) have come to the fore. The first generation of missile boats had been developed since the middle of the 1950-s on the basis of Project 183 wooden-hulled boats. The first cruise missile of П-15 type was successfully launched from TKA-14 boat after a fixed target 60 years ago – on September 6, 1958.

This gave a start to major series construction of Project 183P missile boats: 112 ships of this type were built for the domestic Navy and 48 ships were exported. The next step was the creation

of Project 205 steel-hulled missile boat.

This type of warships became even more eagerly sought after: 243 ships were exported with total number of the series more than 600 ships. Further evolution of missile boats in the middle of the 1960-s resulted in creation of a totally new subclass of warships – small-sized missile warships (corvettes). What is meant here is the Project 1234 ships known as Ovod.

This corvette was armed with six anti-ship missiles (ASM) of П-120 type having considerably greater range as compared to П-15 missiles. This, in turn, required greater ranges of ship detection means. Titanit radio system was developed especially for this purpose. A total of 47 ships were built in accordance with Project 1234 and its modifications, including 37 corvettes for the domestic Navy and 10 corvettes for export.

Effectiveness of the “mosquito fleet” was repeatedly confirmed many times in

local international conflicts. In October 1967 two Egyptian Project 183P ships of Komar class attacked and sank Israeli destroyer Eilat. Three years later Egyptian Project 205 Osa missile boats sank an Israeli intelligence ship. And in 1971 Indian Project 205 boats attacked Pakistani naval base of Karachi, caused colossal damage, and in fact gave the win in Indo-Pakistani conflict to India.

In 1973 the development of Molniya (Lightning stroke) large missile boat was started. It was planned to equip this boat with Mosquito missile system, which development started in 1973 as well. This ambitious program had not been implemented as smoothly as hoped. However, it has resulted in 90 boats of different modifications.

The following fact is a measure of the success of this project. When one of German Molniya-class ship – Hiddensee missile boat – after German reunification came into hands of American military experts, it was examined by them and found to be “one of the fastest and most lethal ships of this class in the world”, that “was built to survive the worst combat conditions”, according to the article in New York Times dated May 10, 1992.

The collapse of shipbuilding industry following the breakup of the Soviet Union has resulted in a situation where new ships were not added to our Navy for a long period and the fleet was outwearing quickly in contrast to ever technically improving fleets of the world’s leading countries. The situation turned to better only in the beginning of the 2000-s, when shipbuilding programs were started again. One of them was the development of Project 20380 corvette series. However, construction of main classes of ships requires significant time and money. In the situation of limited resources



*Uragan corvette on the trial trip*



*Uragan and Typhoon corvettes*

the Naval Command Authority of Russia has found attractive the Soviet idea of «mosquito» fleet: domestic designers – Almaz Central Marine Design Bureau and Zelenodolsk Design Bureau – have been assigned a task to develop maximum effectiveness boat or ship with quite limited deadweight, which could be quickly put into production by domestic manufacturers and built in relatively large series. It was then that the first development was carried out, which later became the Karakurt corvette project. However, the Navy, based on its reasons, has decided on the Project 21631 corvette known as Buyan-M, which was created on the basis of Project 21630 Buyan gunboat. The peculiarity of these ships is that they are designed for “river-sea” operations, therefore they are equipped with water jet engines and have shallow draft allowing them run over inland water ways and in the Caspian sea. However, this hampers their seakeeping performance, and since it was assumed that these ships should not be in the offing and should be defended by land-based or coastal air defense systems, the ships have limited self-sufficiency and self-defense capabilities. The experience of Project 21631 corvettes combat employment gained during the Syria Campaign has shown their advantages and shortages. The Navy needed a ship with powerful missile, gun, and anti-aircraft weapons, having higher speed and seakeeping per-

formance. And in 2015 the Project 22800 was started.

Active works on Project 22800 started in April 2015. Abridged engineering design was prepared in a month and a half. General characteristics of the ship were obtained, main equipment was defined, schedules of purchased materials were developed, and after critical design review the customer's approval of further work was given. The engineering design was finished by the end of 2015 when the first hull drawings were submitted to Pella plant. And on December 25, 2015 keels of Uragan (the lead ship) and Typhoon corvettes were laid. In May 2018 the factory trial trip of the lead ship was started.

Thus, the period from the date of decision on the start of construction of these ships to the start of trial was as short as three years. This is a kind of record for the modern domestic military shipbuilding, on account that Pella shipyard was never involved in building warships before.

Conceptually Karakurt ships continued the traditions started with Ovod corvettes. These ships are comparable in terms of main dimensions, deadweight, speed, and main purpose corrected for the modern reality of weapon evolution and tactics of weapon use.

The distinctive feature of this project was that no supporting research and development (R&D) activities were carried out in the process of creation of

the lead ship. In order to speed up the process of corvette creation, the following task was set by the Customer: only commercially available products should be used, that are mastered by the industry. The development used only products with lettered design phases or products created on the basis of completed R&D works of the Ministry of Industry and Trade of Russia. Thanks to this the construction of new ships was started and mastered by the industry in a very short period.

In order to accelerate the design process to the maximum possible extent, many engineering solutions in the field of main power plant (MPP) were taken from Project 1234, i.e. three M507 diesel engines were used, which were derated in order to extend their service life. At the same time the use of another hull geometry helped in improvement of seakeeping performance, habitability, in resolving problems of vibration and additional resistance to movement related to large shaft angles typical for traditional planning hulls.

Karakurt ships are equipped with versatile launchers of YKCK 3C14 type. These launchers can be used to launch Kalibr, Onix family of cruise missiles and their equivalents (Yakhont, Brahmos), as well as Zircon hypersonic missiles, as soon as they will be passed into service. In addition, the ship is equipped with improved gun mount (GM) of AK-176MA

type with higher shooting accuracy due to the use of electric actuators.

The first pair of Karakurt-class corvettes – Uragan and Typhoon – is armed with AK-630M rapid firing GM. Starting from the second serial-produced corvette Shkval, the ships are equipped with Pantsir-M air defense missile systems – a seaborne version of land-based Pantsir-S1 air defense system proven effective in the course of the Syria Campaign.

The development was not only focused on the enhancement of combat capabilities of the new ship as compared to missile boats and ships of older projects, but also on the improvement of habitability, ergonomics, reliability, lowering of the work load on the crew through higher degree of automation of the technical means.

This ship features comfortable environment for the crew. Thus, seamen and sergeants are accommodated in compartments for six persons, warrant officers are accommodated in compartments for four persons, officers are accommodated in compartments for two persons, and captain is accommodated in a single-berth cabin, with separated lavatories and showers.

All main systems and equipment packages of the ship are supplied by Russian manufacturers. The negative experience of cooperation with European suppliers of shipborne equipment who have stopped their supplies because of sanctions against Russia, initiated the program of import phaseout.

The system of consumer fresh water with Russian distilling plant provides the crew with uninterrupted cold and hot water supply in independent sailing, while the system of air conditioning and ventilation, also based on Russian equipment, provides comfortable conditions in compartments, cabins, and combat stations in any climatic zones of operation. Imported parts are limited to appliances intended to ensure comfortable environment for the crew and to other devices, which are non-critical for warship and commercially available on the market.

Currently, the lead ship Uragan is completing government testing in Baltic Sea after successful tests of Kalibr system in the White Sea. Upon completion of government testing the ship will be handed over to the Navy, which is expected at the end of this year. Even now it can be stated that this ship lives up completely to our expectations as designers: in terms of its speed, maneuverability, seakeeping performance, and habitability.

Up to now four ships are heaved off: Uragan, Typhoon, Shkval, and Burya. Other 8 ships are in the process of construction in Zelenodolsk, Feodosia, and Kerch. In addition, on August 22 contracts were signed for construction of six more corvettes on shipyards of the Far East.

Unexpectedly, the engine manufacturing appeared to be the most difficult issue in the program: currently Zvezda

plant in fact cannot ensure the required timeframe of diesel engines production. To avoid schedule overrun various options are prepared with changes related to MPP. The option with diesel-gas turbine plant based on M70ФРУ-Р Russian turbine seems to be the most promising one. However, the final decision on this issue will be made by the customer of these ships.

In addition to its primary goal, i.e., National Navy fleet replacement, this ship is considered as a type of naval weaponry that may be exported. Export version of the ship – Project 22800Э – already has attracted attention of foreign customers at international naval shows: The International Maritime Defense Show (IMDS) in Saint-Petersburg and the International Military-Technical Forum “Army” in Moscow Region in 2017 and 2018. Our naval weaponry is traditionally of interest for such partners, as India and Vietnam. Also, some other countries from Southeast Asia, Africa, and Middle East demonstrate interest to the ship.

The selected strategy for creation of the new Project 22800 corvette has been proven by time. Equipment of the ship with well-designed and proven weaponry, involvement of our design bureau with wide experience in creation of small-sized striking warships, as well as dynamically developing private Pella JSC shipyard made it possible to achieve the result to satisfy the Customer at short notice.



*Burya corvette*