



NAVAL SYSTEMS

export catalogue

Rosoboronexport

Naval Systems
Export Catalogue

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GLOSSARY

| | |
|---------|--------------------------------------|
| AA | Anti-Aircraft |
| AD | Air Defence |
| ADMS | Air Defence Missile System |
| ADGMS | Air Defence Gun/Missile System |
| ASM | Anti-Ship Missile |
| ASW | Anti-Submarine Warfare |
| CIWS | Close-In Weapon System |
| CODAD | Combined Diesel And Diesel |
| CODAG | Combined Diesel And Gas Turbine |
| CODOG | Combined Diesel Or Gas Turbine |
| COGAG | Combined Gas Turbine And Gas Turbine |
| ECM | Electronic Countermeasures |
| EEZ | Exclusive Economic Zone |
| ELINT | Electronic Intelligence |
| EMC | Electromagnetic Compatibility |
| ESM | Electronic Support Measures |
| EW | Electronic Warfare |
| FCS | Fire Control System |
| GPS | Global Positioning System |
| HF | High Frequency |
| hp | Horsepower |
| IFF | Identification "Friend-or-Foe" |
| IR | Infrared |
| kW | Kilowatt |
| MANPADS | Man-Portable Air Defence System |
| MCM | Mine Countermeasures |
| MRS | Multiple Rocket System |
| RCS | Radar Cross Section |
| rpm | Revolutions Per Minute |
| SAM | Surface-to-Air Missile |
| SAR | Search And Rescue |
| TAR | Target Acquisition Radar |
| TLC | Transport-Launch Container |

FOREWORD

Rosoboronexport State Corporation presents most advanced naval systems and technologies developed by the Russian shipbuilding industry.

The present catalogue is intended to give a proper perspective on the scope of Russian-made naval equipment offered for export by Rosoboronexport State Corporation. It contains five chapters with brief descriptions of:

1. Submarines
2. Surface warships
3. Development projects
4. Shipborne weapons
5. Shipborne electronic systems
6. Stationary electronic systems
7. Coastal weapon systems
8. Auxiliary vessels.

As can be seen, Rosoboronexport State Corporation exports all types of naval equipment and associated services. Listed are major warships, such as guided missile destroyers, frigates, new generation corvettes, guided missile and landing air cushion craft, missile and patrol boats, as well as Amur- and Kilo-class diesel-electric submarines, and small-size submarines with air independent propulsion.

Baseline projects of warships and auxiliary vessels of various types elaborated by Russian design bureaus are offered for license construction at foreign customers' shipyards.

Advanced naval weapons include shipborne surface-to-surface and anti-ship/anti-submarine missile systems, air defence missile systems, various torpedoes and mines, as well as coastal missile and artillery systems.

Rosoboronexport can help customers to create integrated coast defence systems, interoperable with Air Force, Air Defence, missile/artillery and electronic warfare units. The systems feature increased target detection/classification/engagement capabilities with enhanced kill probability.

The Corporation also offers partial and comprehensive modernisation of the vintage Soviet/Russian-made ships, submarines, auxiliary vessels, shipborne weapons and equipment to increase their combat capabilities and to extend service life.

The catalogue is addressed to Navy commanders and defence procurement experts.



NAVAL SYSTEMS

SUBMARINES

PROJECT 636

Large Diesel-Electric Submarine with Club-S Missile System



Mission

Project 636 large diesel-electric submarine is designed to destroy enemy submarines, surface warships and vessels operating independently or in battle order.

Features

Project 636 submarine is a follow-on development of the well-known Project 877EKM submarine. It retains all the advantages of its predecessor but stands out owing to the parameter improvements:

- enhanced-power diesel generators;
- increased underwater full speed;
- snorkelling range increased to 7,500 n.miles;
- noise level reduced by introducing new equipment with better shock-absorbing means.

Thanks to its reduced noise the submarine is

capable of guaranteed preemptive detection of enemy surface ships at greater ranges and their engagement with 3M-54E Club-S anti-ship cruise missiles, or timely evasion.

Project 636 submarine is equipped with more efficient air ventilation and conditioning systems designed for operations in different regions of the world ocean and comfortable habitability conditions for the crew.

Armament

Combat efficiency of the submarine is increased by employing 3M-54E Club-S anti-ship cruise missile system together with a variety of advanced electronic support systems.

The deployed missile system with a launch range of 220 km features increased probability of high-speed target attacks, successful submarine/ship engagements, enhanced combat stability under enemy counterattacks (no need to penetrate enemy naval/airborne defence lines), and increased safety of littoral operations (no need to pass through mine-hazard areas).

The submarine is capable of delivering missile attacks against targets with strong point defences.

Basic specifications

| | |
|---|---------|
| Normal displacement, cu.m | 2,350 |
| Number of torpedo tubes, pcs | 6 |
| Ammunition load (missiles/torpedoes/mines), pcs | 4/18/24 |
| Ammunition calibre, mm | 533 |
| Basic dimensions, m: | |
| length | 73.8 |
| beam | 9.9 |
| Underwater full speed, kts | 19 |
| Snorkelling range (at economical speed of 7 knots with extra fuel), n.miles | 7,500 |
| Underwater range, at economical speed, n.miles | 400 |
| Max diving depth, m | 300 |
| Endurance, days | 45 |
| Complement | 52 |

PROJECT 877EKM

Large Diesel-Electric Submarine with Club-S Missile System

Mission

Project 877EKM large diesel-electric submarine is designed to destroy enemy submarines, surface warships and vessels operating independently or in battle order.

Features

Project 877EKM double-hull, single-shaft electrically-driven submarine is a state-of-the-art underwater combat platform boasting good operational record, powerful torpedo and missile weapons, extremely low noisiness, reasonable degree of control procedures automation, comfortable crew accommodation, and minimal basing requirements.

Thanks to the streamlined fusiform hull, anti-sonar coating and low-noise equipment the submarine is more quiet than its foreign analogues.

Main propulsion plant

Project 877EKM submarine is powered by two diesel generators, one main electric motor, one economic speed electric motor, two reserve electric motors and one storage battery.

Armament

Six 533mm launchers mounted in the bow section of the first compartment can fire various types of torpedoes and lay mines, two side launchers – launch remotely controlled torpedoes, and two upper ones – 3M-54E anti-ship cruise missiles.

It takes only several minutes for the crew to reload the torpedo launchers with the assistance of the quick loading system. Ammunition load comprises 18 torpedoes (including four 3M-54E missiles with a 220km operational range) or 24 mines.

To protect surfaced submarine against low-flying aircraft and helicopters six Igla-1M MANPADS are provided onboard. They are stored in a watertight fender on the retract-able masts fence.

Modernisation

Project 877EKM submarine combat efficiency is enhanced by installing 3M-54E Club-S anti-ship cruise missile system and

a variety of advanced electronic support systems. These systems include small-size inertial navigation system to provide long-time underwater operations and weapons employment without surfacing, and a new automated combat information management system to control all types of weapons systems, including missile and torpedo launchers, and facilitating commander's decision-making.

The deployed missile system with a range of 220 km features increased probability of high-speed target attacks, successful submarine/ship engagements, enhanced combat stability under enemy counterattacks (no need to penetrate enemy naval and airborne defence lines), and increased safety of littoral operations (no need to pass through mine-hazard areas).

The submarine is capable of delivering missile attacks against targets with strong point defences.

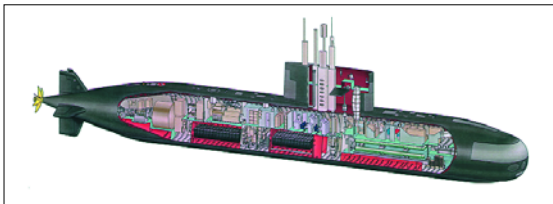


Basic specifications

| | |
|---|---------|
| Normal displacement, cu.m | 2,300 |
| Number of torpedo tubes, pcs | 6 |
| Ammunition (missiles/torpedoes/mines) load, pcs | 4/18/24 |
| Ammunition calibre, mm | 533 |
| Basic dimensions, m: | |
| length | 72.6 |
| beam | 9.9 |
| Underwater full speed, kts | 17 |
| Snorkelling range (at economical speed of 7 knots with extra fuel), n.miles | 6,000 |
| Underwater range, at economical speed, n.miles | 400 |
| Max diving depth, m | 300 |
| Endurance, days | 45 |
| Complement | 52 |

AMUR 950/AMUR 1650

Diesel-Electric Submarines



Amur 950

Mission

New-generation Russian Amur-class diesel-electric submarines are designed to destroy enemy submarines, surface combatants and vessels, as well as to conduct reconnaissance missions.

The submarines boast noise level several times lower than that of the submarines reputed to be the world's most silent to date.

Amur 950/Amur 1650 submarines are distinguished by a well-balanced weapons mix and the ability to launch salvo missile attacks against enemy combatants. Their ammunition load includes cruise missiles, standard torpedoes and mines.

Provision is also made for a follow-on installation on either submarine of an electrochemical air-independent propulsion

plant. The AIP plant with electrochemical generators and support systems is housed in a modular compartment engineered for easy incorporation into the baseline submarine.

Amur 950 and Amur 1650 submarines can operate in all regions of the world ocean in any weather, in both deep and shallow waters.

Amur 950 Submarine

Amur 950 is a single-hull single-shaft submarine with torpedo/missile weapon system comprising four 533mm torpedo launchers, quick reloading system, 12 torpedoes and missiles. Torpedo launchers are readied for fire in seconds, and between-salvos interval within several minutes.

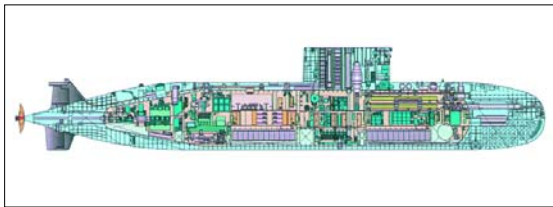
The bow section houses a highly sensitive passive antenna array whose area is several times greater than that of similar hydroacoustic arrays installed in any other diesel-electric submarine. In combination with the boat's low-level noise signature it provides guaranteed preemptive target acquisition so that the submarines can either attack enemy combatants at a great range or evade his ASW ships in time.

Submarine and its weapons are efficiently controlled by means of the boat's automated command and control system with operators' consoles in the main control room. The system provides high-speed sensor data exchange, processing, analysis, and presentation of the integrated information on operators' panels.

The onboard inertial navigation system

Basic specifications

| | Amur 950 | Amur 1650 |
|---|----------|-----------|
| Normal displacement, cu.m | 1,060 | 1,765 |
| Basic dimensions, m: | | |
| length | 60.3 | 66.8 |
| beam | 5.6 | 7.1 |
| Underwater full speed, kts | 20 | 21 |
| Underwater range, at economical speed, n.miles | 300 | 650 |
| Max diving depth, m | 300 | 300 |
| Number of torpedo tubes, pcs | 4 | 6 |
| Ammunition (missiles/torpedoes/mines) load, pcs | 12 | 18 |
| Calibre, mm | 533 | 533 |
| Endurance, days | 30 | 45 |
| Complement | 21 | 35 |



Amur 1650

ensures safety of the submarine navigation and determination of motion parameters with precision required for missile employment.

The optronic mast is fitted with TV/IR cameras and GPS receiving antenna.

Communications system employs a towed radio antenna to receive covert command and information messages at a depth of up to 100 m.

The submarine accommodates crew cabins, well-equipped galley and officers' wardroom. Efficient air ventilation and conditioning systems are designed to provide normal operations of the submarine in tropics and comfortable working and living conditions in all modes of navigation.

Amur 1650 Submarine

Amur 1650 is a single-hull, single-shaft submarine with two reserve propulsors. Its torpedo/missile weapon system comprises six 533mm torpedo launchers, 18 torpedoes and missiles, and quick reloading system providing between-salvoes interval not exceeding several minutes.

The bow section houses a highly sensitive passive antenna array whose area is several times greater than that of similar hydroacoustic arrays installed in any other diesel-electric submarine. It is supplemented by an extendable towed long-size hydroacoustic array. In combination with

the boat's low-level noise signature they provide guaranteed preemptive target acquisition so that the submarine can either attack enemy combatants at a great range or evade his ASW ships in time.

Submarine and its weapons are efficiently controlled by automated command and control system with operators' consoles in the main control room. The system provides high-speed sensor data exchange, processing, analysis, and presentation of the integrated information on operators' panels.

The onboard inertial navigation system ensures safe navigation and determination of submarine motion parameters with precision required for missile employment.

The periscope mast comprises a commander's periscope with optical and TV channels, optronic mast with IR camera and GPS receiving antenna.

Communications system employs a towed radio antenna to pick up covert command and information messages at a depth of up to 100 m.

The crew is accommodated in cabins with efficient air ventilation and conditioning systems providing normal operation of the submarine in tropics and comfortable working and living conditions in all modes of navigation.

TRITON-1/TRITON-2

Midget Submarines

Mission

Triton-1 and Triton-2 midget submarines are designed to carry out special missions such as covert transportation and planting of mines and explosive devices, as well as covert delivery and evacuation of combat swimmers and their equipment.

Features

Both submarines are fitted with all necessary navigation and electronic equipment, as well as the stationary air-regeneration system. They can be transported to the required area by any transportation means.

The submarines' hulls are made of anticorrosive materials.



Basic specifications

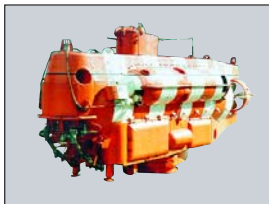
| | Triton-1 | Triton-2 |
|----------------------------|----------|----------|
| Weight ashore, t | 1.6 | 5.3 |
| Basic dimensions, m: | | |
| length | 5.0 | 9.5 |
| beam | 1.4 | 2.0 |
| draught | 1.4 | 2.2 |
| Max diving depth, m | 40 | 40 |
| Max speed, when dived, kts | 6 | 6 |
| Range, n.miles | 35 | 60 |
| Endurance, hrs | 6 | 12 |
| Complement | | |
| (with combat swimmers) | 2 | 6 |

PROJECT 18270 BESTER

Deep-Sea Manned Rescue Craft

Mission

Project 18270 Bester deep-sea manned rescue craft is designed to carry out search and rescue operations (e.g. saving crews of distressed submarines) at depths of up to 800 m. It can dock with the wrecked submarine, investigate inboard and outboard areas, accommodate up to 18 rescued persons, or lift to surface sunken objects weighing up to 1.5 tonnes.



Basic specifications

| | |
|-------------------------------------|------------|
| Normal displacement, cu.m | about 36 |
| Full load displacement, cu.m | 39 |
| Basic dimensions (length x beam), m | 10.8 x 3.2 |
| Operating depth, m | 720 |
| Underwater speed, kts | 3 |
| Range, n.miles | 10 |
| Life support endurance, hrs | 72*/10** |
| Battery capacity, A x hr | 400 |
| Complement | 3 |
| * – crew | |
| ** – crew & rescued personnel | |

Features

Project 18270 hull is made of titanium alloys. This relatively small and lightweight craft can be transported by road, air or rail. It can be launched from surface ships or submarines retrofitted for that purpose.



NAVAL SYSTEMS

SURFACE WARSHIPS

PROJECT 956E

Destroyer



Mission

Project 956E destroyer is designed to engage hostile warships, auxiliary vessels and landing craft, to provide fire support for amphibious assault forces, and air/missile defence for warships and transport vessels, as well as to perform joint patrol and other combat missions with other ships.

Features

Project 956E destroyer features good seaworthiness with minimum roll, pitch and yaw in storm sea. The ship's stability is improved thanks to stabilising fins. A telescopic helicopter hangar is provided astern.

The ship is equipped with two navigation radars, Fregat air/surface search radar, one MR-184E and two MR-123-02 fire control

radars (for 130mm and 30mm gun mounts respectively), Mineral-E target designation radar for Moskit anti-ship missile system, and MGK-335 sonar system. It is also fitted with MP-401E and MP-407E jamming stations.

The combat information management system can provide simultaneous tracking of several targets on data from active/passive sensors of the ship and organic helicopter as well as from other ships of the task force and patrol aircraft.

130mm AK-130 versatile gun mounts can engage surface, coastal and air targets with impact/proximity-fuse munitions. Targets are designated by the fire control radar in automatic mode, or optical sight in autonomous mode. They also can fire practical rounds for

training purposes.

The gun's rate of fire is 30 rds/min.

AK-630M anti-aircraft gun mount can fire blast, incendiary and tracer rounds at a max rate of 4,500 rds/min under control of either radar or optical sight.

The destroyer is also equipped with PK-2M/PK-10 passive ECM stations (200/80 rounds respectively), and anti-saboteur systems.

Main propulsion plant

Project 956E destroyer is powered by four KVG-3 high-pressure steam boilers, two 50,000hp TV-12-4 steam turbines driving two fixed pitch propellers. Electric power is supplied by two 1,000kW steam turbo-generators and four 600kW diesel generators.

Armament

- two Moskit quadruple anti-ship missile launchers (8 missiles)
- two 130mm AK-130 twin gun mounts (2,000 rounds)
- two Shtil SAM system launchers (48 missiles)
- four 30mm AK 630M anti-aircraft gun mounts (16,000 rounds)
- two 533mm twin torpedo tubes (4 torpedoes)
- two RBU-1000 six-tube ASW mortars (48 bombs)
- Kamov Ka-28 ASW helicopter

Basic specifications

| | |
|--|--|
| Displacement, full load, t | 8,350 |
| Dimensions, overall (length x beam x draught), m | 156.5 x 17.2 x 6.00 |
| Main machinery | 4 KVG-3 boilers, two 50,000hp TV-12-4 steam turbines, two 1,000kW turbo-generators, four 600kW diesel generators, two five-blade propellers |
| Armament | two Moskit-E ASM quadruple launchers (8 missiles), two Shtil ADMS launchers (48 missiles), 2x2 130mm AK-130 gun mounts (2,000 rds), 4x6 30mm AK-630M gun mounts (16,000 rds), 2x2 533mm torpedo tubes, 2x6 RBU-1000 ASW mortars |
| Radars | two navigation radars, Fregat radar, MR-184-E radar, two MR-123-02 radar |
| Sonar system | MGK-335 sonar |
| EW assets | MP-401E system, MP-407E system two PK-2M launchers (200 rounds), eight PK-10 launchers (80 rounds) |
| Max speed, kts | 32 |
| Cruising range, at 18 knots, miles | 4,500 |
| Fuel capacity, t | 1,700 |
| Helicopter fuel capacity, t | 5.5 |
| Endurance, days | 30 |
| Complement (design) | 359 |

PROJECT 11356

Frigate



Basic specifications

| | |
|-----------------------------------|------------------------------|
| Displacement, full load, t | 4,035 |
| Basic dimensions | |
| (length x beam x draught), m | 124.8 x 15.2 x 4.2 |
| Main propulsion plant: | |
| type | gas-turbine |
| total power, hp | 56,000 |
| Electric power supply: | |
| type | 4 WCM800/5 diesel generators |
| total power, kW | 3,200 |
| Number of propellers | 2 |
| Speed, kts: | |
| maximum | 30 |
| economic | 14 |
| Range, at economic speed, n.miles | 4,850 |
| Endurance, days | 30 |
| Complement | 193 |

Mission

Project 11356 frigate is designed to destroy enemy surface ships, submarines and air attack assets. It can operate autonomously, within task forces in maritime theatres of war, as an escort ship in convoys, etc.

Features

- Improved seaworthiness thanks to roll stabilisation (with UK6-1 roll stabiliser);
- Reduced secondary radar, infrared and electromagnetic signatures due to special design and layout measures;
- Low underwater noise and interference with the organic sonar system;
- Operations in a wide range of climatic conditions.

Main propulsion plant

The frigate is powered by a two-shaft gas-turbine plant developing max power of 28,000 hp on each shaft at ambient temperature of +15°C. The power plant is managed by Burya-11356 control system.

Electric power is provided by four 800kW WCM800/5-type diesel generators supplying three-phase AC/380V/50Hz under control of Angara-11356 system.

Armament & Equipment

- Club-N anti-ship missile system (one 3S-14E eight-tube underdeck launcher, eight 3M-54TE ASMs in transport-launch containers) with 3R-14N-11356 fire control system and loading facilities
- Shtil-1 medium-range multichannel air defence missile system (24 missiles)
- 100mm AK-190E versatile gun mount (500-rounds) with 5P-10E fire control system
- Kashtan close-in air defence gun/missile system comprising one 3R-86-1E command and control module and two 3R87-E combat modules (64 9M311-1E missiles, 6,000 rounds), as well as two missile storage/reloading systems
- RBU-6000 12-tube ASW mortar (48 90R mis-

- siles or RGB-60 depth bombs)
- two 533mm DTA-53-11356 twin torpedo tubes (4 SET-65E/53-65KE torpedoes)
- Ka-28/Ka-31 helicopter (provided with a hangar and a helipad)
- four KT-216 launchers of PK-10 close-range decoy dispensing station (120 decoy rounds)
- Electronic equipment
- Fregat-M2EM air/surface surveillance radar
- 3Ts-25E target acquisition radar
- MR-212/201-1 short-range navigation radar
- Sonars
- MGK-335EM-03 sonar system
- sonar with Vinyetka-EM towed array
- The above assets can be substituted with MGK-335EM-02 system
- Navigation equipment
- Ladoga-ME-11356 inertial navigation and stabilisation system
- induction log
- dead-reckoning and plotting system
- two magnetic compasses
- navigation echosounder



PROJECT 11541 KORSAR

Patrol Ship



Mission

Project 11541 Korsar patrol ship is designed to search for, to track and to engage surface, underwater and air targets, as well as to perform escort and patrol tasks. The corvette can carry out a wide class of missions, operating autonomously and within a tactical task force in sea and oceanic areas.

Features

The Korsar development programme has drawn on Russia's rich experience in patrol vessel design and operations, in international conventions on sea rescue and pollution prevention, as well as in national standards for sea systems survivability, crews' working conditions, and weapons employment.

The ship's hull is divided into 13 watertight compartments by lateral bulkheads. The hull itself is made of low-alloy steel, while external walls of the superstructure are made of carbon steel, and internal walls – of aluminium-magnesium alloy.

The ship is equipped with active and passive roll stabilisers to reduce roll amplitude in high sea.

All crew's cabins and service compartments are air-conditioned to provide comfortable conditions during long-term cruises in any season of the year.

The ship has good seaworthiness and high manoeuvrability. It is armed with diverse powerful weapon systems. Its secondary radar, electromagnetic and thermal signatures, as well as level of underwater noise and its interference with the sonar operation, are significantly reduced.

Main propulsion plant

The ship is powered by a two-shaft COGAG gas-turbine propulsion plant with fixed-pitch propellers. It comprises a cruise propulsion unit with two gas-turbine engines, two two-speed reduction gearboxes and a cruise reduction gear attachment allowing either cruise engine to rotate shafts on both sides, as well as a booster unit including two gas-turbine engines and two boost one-speed reduction gearboxes.

Electric power is supplied by two power stations comprising five diesel generators. Auxiliary power unit includes two automated boilers with a steam capacity of 1,000 kg/h and a working pressure of 5 kg/sq. cm.

Armament & Equipment

Missile weapons

- Uran-E ASM system (4x4 launchers, 16 missiles), or Yakhont ASM system (2x6 launchers, 12 missiles), or Kalibr-NKE ASM system (1x8 below-deck vertical launcher), or Moskit-E/Moskit-MVE ASM system (2x4 launchers, 8 missiles)

Anti-submarine missile, torpedo and anti-torpedo systems

- six single-tube torpedo launchers to fire missile-torpedoes or torpedoes
- RPK-8E ASW missile system, comprising one RBU-6000 12-tubed depth bomb launcher for single/salvo firings of 90RE rockets with a gravitational underwater projectile, and ammunition loader (not installed on ships armed with Moskit-E/Moskit-MVE/Kalibr-NKE ASM systems)
- KSUS Purga fire control system for missile-torpedoes, torpedoes and rockets with gravita-

tional underwater projectiles launched against surface and underwater targets

Artillery systems

- 100mm A-190E multipurpose gun mount with 5P-10E fire control system

Air defence missile systems:

- Klinok AD missile system with four eight-canister drum-type launchers
- Kashtan ADGMS comprising one command and control module and two combat modules (64 SAMs, 6,000 rounds). When mounted on ships with Moskit-E/Moskit-MVE ASM systems, Kashtan command module has no TAR and receives designation data from Sigma-E combat information management system.

Kashtan system can be replaced, at customer's request, by two Palma AA gun systems with Sosna-R SAMs and electro-optical fire control system.

ECM systems

- MP-407E ECM system (option – TK-25E)
- Spektr-F laser-emitting equipment
- PK-10 decoy launcher (option – Prosvet-M)

Air systems

- Ka-28 ASW helicopter or Ka-31 radar picket helicopter in a fixed hangar with maintenance equipment, munitions, etc.

Anti-saboteur weapons

- DP-65 anti-saboteur system (three ten-barrel grenade launchers RG-55M grenades fired at targets designated by MG-747 dipping sonar (options – Anapa-47 or Pallada)

Electronic equipment

- Fregat-MAE-3 3D automated radar with Poyma-E data processing system;
- Monument-E multifunction radar system;
- 67R IFF radar system;
- Amga self-contained submarine detection system with unified radioacoustic datalink;
- Podzagolovok-23 basic collective mutual interference avoidance system;
- Ogon-50 IR night group navigation system

Sonar equipment

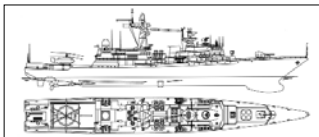
- Zarya-ME sonar system with hull-mounted and towed arrays

Combat information management system

- Sigma-E system

Navigation equipment

- MR 212/201-1 navigation radar
 - Gorizont-25E integrated navigation system
 - Topaz-5 automatic position plotter
 - LI2-1ME log
 - NEL-20K echosounder
 - KM115-07 magnetic compass
 - MS-98 weather station
 - RN naval direction finder
 - VNTs-452 surveillance and target designation sight
 - NAVTEX Morena-1 radio receiver
 - Ladoga gyroscopic stabilisation system
- Communications, relay and visual observation equipment
- Buran-6E automated communications system
 - VHF radiotelephone station
 - Musson communications system
 - intership voice transmission system
 - optical devices
 - searchlights, pyrotechnic means, code flags and figures
 - binoculars and other equipment



Basic specifications

| | |
|--|-------------|
| Displacement, full load, t | 4,400-4,500 |
| Basic dimensions, m: | |
| length, overall | 129.6 |
| beam, overall | 15.6 |
| draught, at bulb fairing | 8.4 |
| draught, at midship | 4.8 |
| Main propulsion plant power, kW | 42,000 |
| Speed, kts: | |
| full | 30 |
| cruising | 18 |
| economical | 14 |
| Range, n.miles: | |
| at cruise speed | 3,000 |
| at economical speed | 5,100 |
| Endurance, defined by food reserve, days | 30 |
| Complement | 210 |

PROJECT 11661 GEPARD-3.9

Frigate



Mission

Gepard-3.9 frigate is intended to search for, to track, and to engage surface, underwater and air targets, both independently and as part of a task force, as well as to perform escort and patrol tasks, and to guard maritime state borders and exclusive economic zones.

Armament & Equipment

Missile weapons

- 4x4 launchers of Uran-E anti-ship missile system (16 Kh-35 missiles)
- Artillery weapons
- 76.2mm AK-176M artillery gun mount
- three Palma AA artillery systems
- two 14.5mm machine guns
- ASW weapon systems
- two 533mm two-tube torpedo launchers

Basic specifications

| | |
|----------------------------------|--------------------|
| Displacement, full load, t | about 2,100 |
| Basic dimensions | |
| (length x beam x draught), m | 102.2 x 13.1 x 5.3 |
| Speed, kts: | |
| full | 28 |
| cruise | 18 |
| Operational range, at economical | |
| speed (10 knots), n.miles | about 5,000 |
| Endurance, days | 20 |
| Seaworthiness, Sea State: | |
| stay at sea | unlimited |
| weapons employment | 5 |
| Main propulsion plant | twin-shaft, CODOG |
| Main propulsion plant | 2x11,000 and |
| total power, kW | 1x5,890 |
| Complement | 103 |





- RBU-6000 12-tube rocket depth bomb launcher
- Purga ASW weapons control system
- Fire control systems
- Laska radar

- SP-521 Rakurs system
- Air systems
- Ka-28 ASW helicopter (or Ka-31 radar picket helicopter)
- hangar
- take-off and landing pad
- EW systems
- MP-407E ECM system
- PK-10 decoy system (4x10 launchers)
- Navigation equipment
- Gorizont-257 inertial navigation system comprising Gorizont-25 navigation radar
- EKNIS MK-54IS and GPS NT200D systems
- Combat information management system
- Sigma-E system
- Identification system
- 67R IFF suite
- Communications
- Buran-6VE automated communications system
- Electronic equipment
- Pozitiv-ME1 air/surface target acquisition radar
- Sonar equipment
- MGK-335EV-03 system
- Special equipment
- active roll stabilizers
- underway fuel-replenishment system

PROJECT 1239 BORA

Guided Missile Air Cushion Ship



Mission

Project 1239 Bora guided missile air cushion ship is designed to destroy enemy surface ships, fast attack craft, and transports in all water areas of closed sea theatres of operation and in short-range zone of open seas, when operating autonomously or as a flagship of uniform/mixed naval groups.

Features

Thanks to its well-balanced sensor/armament mix and high navigability, Bora is capable of

efficiently detecting and engaging surface and air targets with missiles and artillery fire at their maximum effective range without limitations in high sea (Sea States up to 5 inclusively) and adverse ECM conditions.

The onboard active and passive ECM assets efficiently protect the ship from enemy missile systems targeting.

The ship can be deployed in any battle group due to a wide range of speeds provided by transformable hydrodynamic platform and main machinery.

Missile system options

| | Missile system/Fire control system | Launchers (number x type) | Anti-ship missiles (number x type) |
|----------|------------------------------------|------------------------------|---------------------------------------|
| Option 1 | Moskit-E/3Ts-81E | 2xKT-206ME | 8x3M-80E |
| Option 2 | Uran-E/3R-60UE | 4xZS-24E | 16x3M-24E |
| Option 3 | Yakhont/3R50E | 2xSM-316 | 12xYakhont |
| Option 4 | Yakhont/3R50E, Uran-E/3R-60UE | 2xSM-316, 2xZS-24E | 12xYakhont, 8x3M-24E |

The ship's high reliability and maintainability, catamaran hull made of corrosion-resistant aluminum-magnesium alloys, skirt, and flank-speed propulsion plants have been proven in long-term operations.

Main propulsion plant

Bora air cushion ship is powered by a combined CODOG-CODAG diesel/gas turbine plant comprising two M511A reduction gear diesel units, two M10D1 flank speed gas turbines, and two M527OM3 auxiliary diesel motors to drive superchargers inflating the skirt.

The onboard electric power system incorporates four 200kW diesel generators and four 1EKPV 15/150 electric compressors.

Armament & Equipment

- attack missile systems (options are shown in the table)
- one/two modules of Kashtan-M air defence gun/missile system
- 16 Iгла MANPADS
- 100mm AK-190E single-barrel versatile gun
- two 14.5mm naval machine gun mounts
- DP-64 anti-saboteur grenade launcher
- four KT-216 launchers of PK-10 close-range decoy system

Electronic equipment

- Monolit-K/Monument-E target detection and designation radar system
- Gorizont-25 integrated navigation system
- Pozitiv-ME1 air/surface target acquisition radar

- SP-10E fire control radar

Combat information management system

- Sigma-E system

Sonar equipment

- Anapa-ME1 sonar

Navigation equipment

- Ladoga-ME inertial navigation and stabilisation system, or Pastilshchik-D gyroazimuth/horizon compass
- Gyuis GKU-5 gyroscope course detector
- Magnit (KF-1) magnetic compass, or DS-83

- and 69-M2 magnetic compasses
- satellite navigation system equipment
- NaviSailor-2400 ECDIS electronic chart display system
- LI2-1/RDL-3-AP100-E electromagnetic log
- NEL-20K, LEM2-1 navigation echosounder



Basic specifications

| | |
|--|-------------|
| Displacement, full load, t | about 1,000 |
| Length, m | 64.0 |
| Beam, midship, m | 17.2 |
| Draught, full load, m | 3.8 |
| Speed, kts: | |
| maximum | about 45 |
| economical | 12 |
| Range, n.miles: | |
| at economical speed, with full fuel load | about 2,500 |
| at flank speed, on air cushion | about 800 |
| Endurance, days | 10 |

PROJECT 1124M ALBATROS

Small ASW Ship



Mission

Project 1124M Albatros small ASW ship is designed to destroy surface, underwater and air targets, while operating autonomously or within a task force, to protect national borders and exclusive economic zones, to perform escort and patrol missions, and to plant minefields.

Armament

- 76.2mm AK-176M artillery gun mount
- 30mm AK-630M six-barrel gun mount
- OSA-MA2 air defence missile system (one launcher with two rails)
- two DTA-53 twin-tube torpedo launchers
- RBU-6000 12-tube ASW rocket launcher (controlled by Purga control system employing MGK-335ME-03 sonar data)
- PK-10 short-range decoy system (4x10 launchers)

Basic specifications

| | |
|---|--------------------|
| Displacement, full load, t | about 1,000 |
| Basic dimensions (length x beam x draught), m | 71.2 x 10.3 x 5.5 |
| Main propulsion plant: | |
| type | three-shaft, CODAG |
| total power, kW | 2x6,620, 1x13,970 |
| Electric power supply (number of diesel generators x power), kW | 2x200, 1x500 |
| Sonar equipment | yes |
| Speed, kts: | |
| full | 30 |
| economical | 14 |
| Range, at economical speed, | |
| with max fuel load, n.miles | 2,500 |
| Endurance, days | 10 |
| Complement | 80 |

PROJECT 1241PE

Small ASW Ship



Mission

Project 1241PE small ASW ship is designed to destroy enemy submarines, surface ships, and helicopters (aircraft) in the littoral zone both autonomously and in cooperation with other naval forces.

In peacetime the ship is intended to guard territorial waters, state borders and exclusive economic zones, as well as to intercept and inspect vessels in order to prevent smuggling, drug trafficking and sea piracy, as well as to detect and rescue distressed ships.

Main propulsion plant

The ship is powered by a two-shaft propulsion plant comprising two M-521-TM5 diesels.

Electric power is provided by two DGRA-200/1500 and one DGFA 100/1500 diesel generators. There are also two EKPA-2/150-4 electric compressors.

Armament & Equipment

- 76.2mm AK-176M single-barrel gun mount (152 rounds plus extra 102 rounds)
 - 30mm AK-630M automatic six-barrel cannon (2,000 rounds plus extra 1,000 rounds)
 - 12 Igla MANPADS
 - two TR-236-02 twin-tube torpedo launchers (four 53-65KE or SET-65E torpedoes)
 - two RBU-1200 ASW mortars (30 RGB-12 bombs)
 - two PK-10 close-range decoy system (40 rounds)
- Electronic equipment
- Pozitiv-E air and surface target detection and designation radar
 - Yympel-AME shipborne artillery fire control system
 - Liman navigation radar

- 67R IFF system
 - Podzagolovok-23 mutual interference avoidance system
- Navigation equipment
- Pastilshchik-D course detector/gyro stabiliser
 - LEM2-1 induction log
 - NEL-20K navigation echosounder
 - AP-5 dead-reckoning tracer
 - RN direction finder
 - Pirs-1M receiving display
 - SN3101 satellite navigation system equipment
 - KM69-M2 magnetic compass
- Communications equipment
- R-632ML HF transmitter
 - two R-680-1 HF receivers
 - R-615M HF radio
 - three R-625 VHF/UHF radios
- Sonars
- MGK-345 sonar with towed and dipping arrays

Basic specifications

| | |
|-------------------------------------|-------------------------------|
| Displacement, t: | |
| standard | 444 |
| full load | 495 |
| Length, overall, m | about 57.7 |
| Beam, midship, m | 10.2 (hull), 10.4 (crinoline) |
| Draught, midship, full load, m | about 2.35 |
| Speed, kts | min 28 |
| Range, at economical speed, n.miles | 2,400 |
| Endurance, days | 10 |
| Complement | 41 |

PROJECT 12322 ZUBR

Air Cushion Landing Craft



Mission

Zubr air cushion landing craft is designed to sealift landing assault units (personnel and materiel) from equipped/non-equipped to non-equipped shore, as well as transport and plant mines.

Features

High strength and floatability of the craft are provided by a rectangular pontoon, the main load-carrying part of the ship's hull. The superstructure built on the pontoon is divided into three compartments with two longitudinal bulkheads: combat materiel com-

partment in the midsection fitted with tank ramps, and outboard sections housing main and auxiliary propulsion units, troops compartments, living quarters, and NBC protection systems. To improve working conditions in the battle stations, troops compartments and living quarters, they are fitted with air conditioning and heating systems, sound/heat-insulating coatings, and structures made of vibrodamping materials. The ship provides normal conditions for the crew to take meals and rest.

Zubr landing craft can carry three main battle tanks (up to 131 tonnes), or ten armoured personnel carriers with 140 troops (up to 115 tonnes), or up to 500 troops (with 360 troops in the cargo compartment).

At full displacement the ship is capable of negotiating up to 5-degree gradients on non-equipped shores and 1.6m-high vertical walls. Zubr remains seaworthy in up to 4 Sea States sailing on air cushion at 30-40 knots.

Personnel is protected against effects of weapons of mass destruction with airtight sealing of combat stations, crew and troops compartments, as well as individual gas masks and protection suits. The ship is also protected

Basic specifications

| | |
|---|------|
| Displacement, full load, t | 550 |
| Length, overall, on air cushion, m | 57.3 |
| Beam, overall, on air cushion, m | 25.6 |
| Height, overall, on air cushion, m | 21.9 |
| Flank speed, kts | 60 |
| Range, miles: | |
| at 55 knots, 131-tonne load | 300 |
| at 55 knots, 115-tonne load | 400 |
| Endurance, limited by food and fresh water stocks, days | 5 |
| Complement | 33 |



from influence mines with the horizontal winding to compensate for the ship's and the transported materiel's magnetic fields. The central command post and MS-227 device compartments are strengthened with Amg-62T alloy armour.

Main propulsion plant

The ship's main machinery includes three 10,000hp GGTA M35-1 gas turbine engines, two 10,000hp GGTA M35-2 superchargers, four NO10 axial turbochargers, and three AV-98 propellers.

Electric power is supplied by two GTG-100 100 kW gas turbogenerators.

The ship's movement and systems operation are managed by Flora-32 automated remote control system.

Armament & Equipment

- two 30mm AK-630M automatic gun mounts (with MR-1213-01 fire control radar)
- two 140mm stabilised multiple rocket systems (with MS-227 launchers, DVU-3 fire control range-finder/sight)
- four Iglá MANPADS

Navigation equipment

- GKU-2 gyro direction finder
- KM-60-M2 magnetic compass
- RDL-3-AP100 Doppler drift log
- Rumb direction finder
- RS-1 navigation radar
- Baza central gyro stabilisation system
- Communications and surveillance systems
- Buran-6 automated communications system

- R-622 UHF radio
- R-697 radio receiver
- R-85SUM
- R-159 portable radios
- VNTs-452 day and night vision device
- P-405 loud speaker system
- MSNP-205M light signal device
- Electronic equipment
- MR-123-01 fire control radar
- MR-244-3 surface surveillance radar
- Zvezdochka-12322 ECCM equipment
- MP-411E device
- 6710-01 device



MS-227 rocket launcher

PROJECT 12061E MURENA-E

Air Cushion Landing Craft



Mission

Murena-E air cushion landing craft is designed to take landing assault units and combat materiel from equipped/non-equipped shores, large-displacement landing craft and transports and land them onto non-equipped shores or in shallow littoral waters, as well as to patrol littoral and naval base/port water areas.

Features

Murena-E features improved structural and seakeeping qualities thanks to the use of advanced anticorrosive alloys, extruded profiles and panels, as well as a powerful propulsion plant.

The ship is fitted with integrated steering and equipment control system. Steering is accomplished by hydraulically-driven jet and aerodynamic rudders on commands of an aircraft-type control column in the pilot house.



Murena-E air cushion landing craft can carry either two infantry combat vehicles, or two armoured personnel carriers, or three light armoured vehicles, or two amphibious tanks, or one medium battle tank, or 130 fully equipped troops.

While sailing on cushion the ship can be operated and its weapons employed at wave height of up to 1.5 m and wind velocity of up to 12 m/s.

Main propulsion plant

The ship's main propulsion plant is composed of two power units, each comprising one MT-70M gas turbine engine, transmission to the supercharger, and variable-pitch propeller. The main gas turbine engine includes

high- and low-pressure compressors and a combined power turbine.

The main propulsion plant inflates air cushion to provide ship's high obstacle negotiability on non-equipped shores, snow-covered and marshy areas, ice fields and rugged tundra, sandstones and waterways.

Armament & Equipment

- two 30mm AK-306 light automatic gun mounts (2x500 rounds) controlled with an optical sighting device
 - eight Igla MANPADS
- Communications equipment

One HF radio, two VHF/UHF radios, magnetic tape-recording equipment.

Basic specifications

| | |
|---|-------------------------------------|
| Displacement, full load (with 24-tonne payload), t | about 150 |
| Basic dimensions, m: | |
| length, on air cushion | 31.3 |
| beam, on air cushion | 14.8 |
| height overall, empty afloat/on air cushion ashore | 10.5/15.2 |
| Main propulsion plant | two MT-70M main gas turbine engines |
| Electrical power unit | two Volvo Penta diesel generators |
| Propulsors | two AV-96 air propellers |
| Full speed, on calm sea at full load, kts | not less than 55 |
| Cruising range, with 24-tonne load at 50 knots, n.miles | not less than 200 |
| Negotiability: | |
| non-equipped shore slope, from stopped position, deg | up to 6 |
| vertical wall, m | up to 0.8 |
| Endurance, days | 1 |
| Complement | 12 |

PROJECT 12421 MOLNIYA

Guided Missile Boat



Mission

Project 12421 Molniya is designed to destroy enemy warships, transports, and landing craft in the open sea.

Main propulsion plant

The boat is powered by two M15E-1 gas turbine engines (32,000 hp).

Electric power is supplied by one DGF2A 100/1500 and two DGR2A 200/1500 diesel generators. There are also two EKPA-2/150-4 electric compressors.

Armament & Equipment

- Moskit-E anti-ship missile system (two KT-152ME launchers, four 3M-80E/3M-80E1 missiles, ZU-152ME and 3Ts-80E control systems)
- 12 Igla MANPADS
- 76.2mm AK-176M single-barrel gun mount (314 rounds)
- two 30mm AK-630M six-barrel cannons (3,000 rounds per each)
- PK-10 decoy system with two KT-216 dispensers

Electronic equipment

- 3Ts-25E1/3Ts-25E surface target acquisition radar
- MP-405-1E ECM system
- Pozitiv-E/Pozitiv-ME1 air/surface target acquisition radar
- MR-123-02/MR-123-02Ts artillery fire control system
- Navigation equipment
- NaviBridge-2400 integrated navigation system
- Pastilshchik-D gyroazimuth/horizon compass
- KM 69-M2 magnetic compass
- IEL-1 electromagnetic log
- NEL-M3B navigation echosounder
- RN direction finder

Basic specifications

| | |
|-------------------------------------|-------|
| Displacement, full load, t | 550 |
| Length, m | 56.90 |
| Beam, midship, m | 10.20 |
| Depth, midship, m | 5.31 |
| Draught, full load, m | 2.5 |
| Speed, kts: | |
| maximum at +15°C | 38 |
| maximum at +34°C | 34-35 |
| economical | 12-13 |
| Range at economical speed, n.miles: | |
| full fuel load | 1,700 |
| max fuel load | 2,400 |
| Endurance, days | 10 |
| Payload, full, t: | |
| fuel | 74.03 |
| oil | 2.01 |
| fresh water | 17.48 |

PROJECT 12418 MOLNIYA

Guided Missile Boat



Mission

Project 12418 Molniya guided missile boat is designed to destroy warships, transports, and landing craft in the open sea.

Features

- Weapon employment in Sea States up to 4 without course/speed limitations at max allowed propulsion power, and in Sea State 5 at a speed of up to 22 knots inclusive;
- Safe seagoing ability at reduced speeds in Sea States 7 and 8;
- Innovative design incorporating over 30 inventions.

Main propulsion plant

The boat is powered by a two-shaft GGTA M15E1 gas turbine propulsion plant.

Electric power is supplied by one DGF2A 100/1500 and two DGR2A 200/1500 diesel generators.

Armament & Equipment

- one Uran-E anti-ship missile system, comprising four 3S-24E quadruple launchers, 16 3M-24 anti-ship missiles in transport-launch containers, and 3R-60UE fire control system
- one 76.2mm AK-176M gun mount (314 rounds)
- two 30mm AK-630M1-2 six-barrel rapid-

- fire cannons (4,000 rounds per cannon)
 - 12 Igla MANPADS
 - four KT-216 launchers of PK-10 close-range decoy system
- Electronic equipment
- Pozitiv-E air/surface target acquisition radar
 - Monument-E surface target acquisition and designation radar
 - MP-407-E ECM system
 - Liman navigation radar
 - Podzagolovok-24E mutual interference avoidance system, etc.

Basic specifications

| | |
|--|-------------------------|
| Displacement, full load, t | 510 |
| Basic dimensions | |
| (length x beam x draught), m | 56.9 x 10.2 x 2.4 |
| Main propulsion plant | gas turbine |
| Electric power supply | three diesel generators |
| Number of propellers | 2 |
| Speed, kts: | |
| maximum at +15°C | 39-40 |
| maximum at +34°C | 35-36 |
| economical | 12-13 |
| Operational range, at economical speed, n.miles: | |
| with full fuel load | 1,450 |
| with max fuel load | 2,300 |
| Endurance, days | 10 |

PROJECT 10410, 10411 and 10412

SVETLYAK-Class Boats



Svetlyak-class boats designed to carry out a variety of missions are economical and easy-to-operate ships featuring optimal hull configuration. The automated diesel power plant provides high full speed (up to 30 knots) and long endurance (up to 2,200 miles). The boats can effectively operate both in moderate and hot climate, employ weapons in Sea States up to 5, and safely navigate in Sea States up to 7.

The ships are powered by a three-shaft diesel propulsion plant comprising three 3,530 kW (4,800 hp) diesel engines.

PROJECT 10410 Border Guards Patrol Boat

Mission

Project 10410 boat is designed to perform patrol missions in the littoral zone to protect territorial waters and exclusive economic zones.

Armament & Equipment

- 76.2mm AK-176M gun mount
- six-barrel 30mm AK-630M gun mount
- two OTA-40A single-tube torpedo launchers with SU-406 fire control system
- 16 Igla-1M MANPADS

- two sets of MRG-1/DP-64-2 anti-saboteur grenade launchers with the dedicated sonar
- MR-123-02 artillery fire control radar
- Liman navigational radar
- GKU-1M gyrocourse indicator
- Baza-10410 gyrostabilisation system
- KM-69M2 magnetic compass
- IEL-1 electromagnetic log
- NEL M3B navigational echosounder
- AP-5 dead-reckoning tracer
- PN-1 radio direction-finder
- PS-1 receiver-indicator of ground-based radio-navigation system
- SCh-1 shipborne satellite navigation equipment
- R-784B automated communications system
- Zvezdochka-10410 mutual interference avoidance system
- Izdelie 67 IFF system
- Inspectors' boarding motor boat

PROJECT 10411

Missile Boat

Mission

Project 10411 boat is designed to patrol littoral zone, and to deliver missile attacks against enemy warships and vessels.

Armament & Equipment

- Uran-E ASM system with launch range of up to 130 km (2x4 KT-184E launchers, 8 missiles)
- 76.2mm AK-176M gun mount
- 30mm AK-630M gun mount
- 16 Iglá MANPADS
- PK-10 decoy launchers
- MR-123-02 gun fire control radar
- Liman navigational radar
- GKU-1M gyrocourse indicator
- Baza-10410 gyro-stabilisation system
- KM-69M2 magnetic compass
- IEL-1 electromagnetic log
- NEL M3B navigational echosounder
- AP-5 dead-reckoning tracer
- PN-1 radio direction-finder
- PS-1 receiver-indicator of ground-based radio-navigation system
- SCh-1 shipborne satellite navigation equipment

PROJECT 10412

Patrol Boat

Mission

Project 10412 boat is intended to prevent violations of maritime state border, to protect friendly vessels and facilities from enemy surface and air attacks, to monitor exclusive economic zones, to protect natural resources areas and coastal lines of communications, etc.

Armament & Equipment

- AK-306-2 gun mount (AK-176M gun can be mounted in the bow section)
- Two 14.5mm machine gun
- 16 Iglá-type MANPADS
- FR-2150W navigational radar
- Gorizont-25 integrated navigation system
- GAGK1 Pastilshchik-D gyroazimuth/horizon compass
- KM-69M1 magnetic compass
- LEMM-2-2 electromagnetic log with echosounder functions
- AP-5 dead-reckoning tracer
- RN-1 radio range-finder
- KPI-9F receiver-indicator of ground-based radio-navigation systems
- NT-200D shipborne satellite navigation equipment
- Buran-6E automated communications system

Basic specifications

| | Project 10410 | Project 10411 | Project 10412 |
|---|------------------|------------------|------------------|
| Displacement, full load, t | about 375 | about 390 | about 375 |
| Basic dimensions (length x beam x draught), m | 49.5 x 9.2 x 2.2 | 49.5 x 9.2 x 2.2 | 49.5 x 9.2 x 2.2 |
| Speed, kts: | | | |
| full | up to 30 | up to 30 | up to 30 |
| economical | 13 | 13 | 13 |
| Range, at economical speed, n.miles | 2,200 | 2,200 | 2,200 |
| Endurance, days | 10 | 10 | 10 |
| Main propulsion plant: | | | |
| number x type of engines | 3 x diesels | 3 x diesels | 3 x diesels |
| total power, kW | 16,200 | 16,200 | 16,200 |
| Total electric power supply, kW | 400 | 400 | 400 |
| Complement | 28 | 28 | 28 |

PROJECT 14310 MIRAZH

Patrol Boat



Mission

Project 14310 Mirazh patrol boat is designed to guard territorial waters, to operate in exclusive economic zones on call, to carry out patrol missions, as well as to support maritime check points (ship inspections, police and customs operations, etc.).

It is a high-speed boat featuring a hard chine with a transverse step and transom plate. Automatically controlled interceptors improve the boat's speed and navigability characteristics: speed is increased by 6-9 knots, roll and pitch amplitudes are reduced by 2-2.5 and 1.2-1.5 times respectively.

Features

The boat's hull and superstructure are made of aluminum-magnesium alloy. The boat's survivability, floodability, and fire/explosion safety is enhanced by a number of measures: the hull's division into watertight compartments; wide use of non-flammable or fire-resistant materials, main systems power back-

up, and surplus power available. The boat is fitted with an air conditioning system to improve crew's working conditions in hot and tropical climate.

Main propulsion plant

Mirazh boat is powered by two diesel engines with independent drive shafts and fixed-pitch propellers. It is equipped with two 50kW diesel generators. The boat can be fitted with high-speed four-stroke water-cooled M-520B diesels with drive turbochargers and reverse reduction gear.

Armament & Equipment

- 30mm AK-306 six-barrel rapid-fire light cannon to engage air, surface and ground targets (range of fire - up to 5,200 m, rate of fire - 600-1,000 rds/min, ammunition load - 500 rounds)
- eight Igla-1M MANPADS to engage air targets
- The boat can accommodate two 14.5mm naval pedestal machine gun mounts (1,000 rounds) and Shturm missile system (6 Ataka missiles).

Navigation and communications equipment

- NAVY BRIDGE 200 integrated navigation system
- gyro direction finder
- magnetic compass
- log
- echosounder
- two VHF/UHF radio sets
- INMARSAT-S ship radio set
- NAVTEX receiver
- COSPAS-SARSAT emergency radio buoy
- SART radar responder

Basic specifications

| | |
|-------------------------------------|-------------------|
| Displacement, full load, t | about 120 |
| Basic dimensions | |
| (length x beam x draught), m | 35.45 x 6.6 x 4.0 |
| Draught, midship, m | 1.31 |
| Max speed, at normal load, kts: | |
| at +15°C, moderate climate | 50 |
| at +34°C, tropical climate | 47-48 |
| Economical speed, kts | 8 |
| Range at economical speed, n.miles: | |
| full fuel load | about 1,000 |
| max fuel load | about 1,500 |
| Endurance, days: | |
| full food and fresh water stocks | up to 5 |
| max stocks | up to 8 |
| Complement | 12 |

PROJECT 12150 MANGUST

High-Speed Patrol Boat

SURFACE WARSHIPS

PATROL BOATS



Mission

Project 12150 Mangust patrol boat is designed to operate on call in territorial waters, to enforce navigation rules in outer/inner port and harbour roadsteads as well as in adjacent littoral areas.

Main propulsion plant

- two 990kW M470K diesel engines
- two Arneson drives with partially submerged propellers (or two water-jet propulsors)

Auxiliaries

- 16kW diesel generator, 3-phase 220V, 50Hz
- 12/24V storage batteries
- air conditioning system in crew's cabin and pilot house

Armament & Equipment

- 14.5mm naval pedestal machine gun mount
- Other armament options:
 - one/two Igla-1M MANPADS
 - one/two 7.62mm PKMB machine guns
 - one/two AGS-17 automatic grenade launchers
- DP-64 anti-saboteur grenade launcher
- Navigation equipment
 - gyro-compass
 - magnetic compass
 - navigation satellite system receiver-indicator
 - navigation radar
 - log
 - echosounder

Communications equipment

- NAVTEX receiver
- HF radio set
- VHF/UHF radio station
- VHF/UHF portable radio sets
- COSPAS-SARSAT emergency radio buoy

Basic specifications

| | |
|------------------------------------|-------------|
| Displacement, full load, t | 27.2 |
| Length overall, m | 19.45 |
| Beam overall, m | 4.4 |
| Draught midship, m | 2.2 |
| Extreme draught, m | 0.89 |
| Speed, kts: | |
| maximum | 50 |
| cruising | 35-40 |
| Range, at 35-40 knots, n.miles: | |
| full fuel tanks | 250 |
| max fuel storage | 410 |
| Fuel tanks capacity, litres | about 2,000 |
| Fresh water tanks capacity, litres | about 290 |
| Endurance, days | 2 |
| Complement | 6 |

PROJECT 20910 CHILIM

Air Cushion Patrol Boat



Mission

Project 20910 Chilim air cushion patrol boat is designed to guard maritime state borders in littoral zones at a range of up to 25 n.miles off its home base all year round.

The boat is capable of successfully accomplishing the following tasks:

- high-speed patrolling of littoral waters;
- detection, interception, and inspection of trespassing ships;
- landing/evacuation of border guard detachments on/from remote areas;
- search and rescue of distressed ships.

Features

Chilim amphibious boat can negotiate shallow waters and rivers with snaggy bottoms, rapids, sandy and swampy coasts, sludge and

floating ice during ice freeze-up or motion, snow-covered ice and ground.

The boat can be shipped by air and other transportation means due to its modular design.

Main propulsion plant

Chilim is powered by two Deutz BFL513 diesels and propulsive-lifting system. The latter incorporates two transmissions, six centrifugal superchargers, and two variable-pitch air propellers featuring enhanced reliability in all operational modes.

Electric power is supplied by two mounted generators and storage batteries.

Armament & Equipment

- 7.62mm Kalashnikov upgraded machine gun mounted on armoured personnel carriers
- Electronic equipment
- Gals navigation radar
- Navigation equipment
- satellite communications system receiver
- DS-83 magnetic horizon compass
- KM 69-M2 magnetic compass

Basic specifications

| | |
|---|-------------------|
| Displacement, full load, t | 9.5 |
| Max length, on air cushion, m | 12.0 |
| Max beam, on air cushion, m | 5.9 |
| Height overall, on air cushion, m | 4.34 |
| Speed, kts: | |
| maximum | 43 |
| full speed at nominal (sustained) power | 38 |
| Range, at 38 knots, full load, n.miles | 162 |
| Ferry range, n.miles | not less than 350 |
| Endurance, days | 1 |
| Complement | 2 |

PROJECT 12260 YASTREB

Fast Patrol Boat

SURFACE WARSHIPS

PATROL BOATS



Mission

Project 12260 Yastreb fast patrol boat is designed to operate on call in littoral territorial waters, navigable lakes and creeks, harbours and roadsteads. It can rapidly sealift law enforcement officers to monitor navigation, cargo shipping and fishing rules in specified sea areas. Yastreb can also be employed as a crew boat or a search-and-rescue boat.

Main propulsion plant

The boat is powered by two Volvo Penta TAMD 72 WJ diesels and two Kamewa/FF Jet FF 310S water jets.

Electric power is supplied by one Vetus GHS8SI diesel generator.

Armament & Equipment

- 7.62mm Kalashnikov upgraded machine gun intended for armoured personnel carriers (1,000 rounds)

Navigation equipment

- ST50 Plus navigation system, comprising log, echosounder, navigation radar, GPS satellite navigation system display, compass, and video plotter
- FN-201 magnetic compass
- ST60 Plus (or ECS 1000) navigation system can be installed at customer choice

Basic specifications

| | |
|-------------------------------------|-------|
| Displacement, full load, t | 9.74 |
| Length, overall, m | 12.97 |
| Max beam, m | 3.06 |
| Depth, midship, m | 2.10 |
| Draught, midship, full load, m | 0.66 |
| Speed, kts: | |
| maximum, at +25°C | 39 |
| maximum, at +50°C | 38 |
| economical | 17-18 |
| Range at economical speed, n.miles: | |
| full fuel load | 200 |
| max fuel load | 300 |
| Endurance, days | 1 |
| Full stocks, kg: | |
| fuel | 660 |
| oil | 10 |
| fresh water | 150 |

PROJECT 266ME, 1265E and 10750E

Minesweepers



Project 266ME
Ocean Minesweeper

Mission

Project 266ME ocean minesweeper is designed to provide anti-mine protection of ships and vessels in the open sea.

Basic specifications

| | |
|------------------------------------|--------------------------------------|
| Displacement, full load, t | about 800 |
| Max length, m | 61.0 |
| Max beam, m | 10.2 |
| Draught, midship, m | 3.1 |
| Max speed, kts | not less than 16 |
| Operational range, at 12 knots, nm | 3,000 |
| Main propulsion plant | two M503B-3E diesel engines |
| Electric power system | three DGR-200/1500 diesel generators |
| Total electric power supply, kW | 600 |
| Safe navigability, Sea State | up to 9* |
| Propellers, number & type | two variable-pitch propellers |
| Endurance, days | 15 |
| Complement | 67 |
| Hull material | low-magnetic steel |

* – weapons can be employed up to Sea State 4 inclusive

Armament & Equipment

Missiles and artillery

- two 30mm AK-306 gun mounts with dedicated fire control system
- 20 Igla MANPADS

Electronic equipment

- 67R IFF system
- Gorizont-25 integrated navigation system
- Ogon-M infrared collective navigation system

Navigation equipment

- GKU-2 gyrocourse indicator
- KM-145-2 magnetic compass
- Rumb or RN (ARP-85) radio direction finder
- SN-3101 shipborne satellite navigation equipment

Communications equipment

- Buran-6E or Rubin-E automated communications systems
- P-405 internal communications equipment

Anti-mine and anti-submarine equipment

- GKT-2 contact sweep
- TEM-3 influence sweep
- AT-2 acoustic sweep
- RBU-1200 ASW mortar
- Integrated anti-mine system for detection and destruction of sea mines ahead the ship's course, including MG-89/MG-89ME sonar, Mayevka-E self-propelled TV-controlled underwater vehicle, Diez automated control system, and MG-35E underwater communications sonar



Project 1265E Coastal Minesweeper

Mission

Project 1265E coastal minesweeper is designed to search for, to signal, and to destroy bottom, near-bottom, moored, and drifting mines on roadsteads, in harbours, and coast sea fairways, thus providing anti-mine protection for submarines, surface ships and vessels leaving or returning to naval bases, or sailing in littoral areas.

Armament & Equipment

Artillery and air defence weapons

- two 30mm AK-306 gun mounts with dedicated fire control system
- Igla MANPADS

Electronic equipment

- 67R IFF system
- Gorizont-25 integrated navigation radar
- Ogon-M infrared collective navigation equipment

Navigation equipment

- GKU-2 gyro course indicator
 - KMO-T magnetic compass
 - Rumb radio direction finder
- Communications equipment

- Buran-6E automated communications system
- P-400 internal communications equipment

Anti-mine equipment

- GKT-2 contact sweep
 - ST-2 influence magnetic solenoid sweep
 - AT-2 acoustic sweep
- Sonar equipment:
- MG-89 or MG-89ME sonar
 - MG-35E underwater sound communications sonar

Project 10750E

| Basic specifications | |
|------------------------------------|--|
| Displacement, full load, t | 430 |
| Max length, m | 49.0 |
| Max beam, m | 10.2 |
| Draught, midship, m | 2.75 |
| Max speed, kts | 14 |
| Operational range, at 12 knots, nm | 1,500 |
| Main propulsion plant | two DRA210-B diesel engines |
| Electric power system | three DGF2A 100/1500 diesel generators |
| Total electric power supply, kW | 300 |
| Safe navigability, Sea State | 6* |
| Propellers, number & type | two variable-pitch propellers |
| Endurance, days | 10 |
| Complement | 45 |
| Hull material | wood pasted by fibreglass |

* – weapons can be employed up to Sea State 4 inclusive



Inshore Minesweeper

Mission

Project 10750E inshore minesweeper is designed to provide anti-mine protection of water areas of naval bases and harbours, fairways, and littoral areas of the exclusive economic zone.

Basic specifications

| | |
|------------------------------------|--|
| Displacement, full load, t | 139 |
| Max length, m | 31.5 |
| Max beam, m | 6.5 |
| Draught, midship, m | 1.56 |
| Max speed, kts | 11 |
| Operational range, at 12 knots, nm | 650 |
| Main propulsion plant | two 6ChNSP diesel engines |
| Electric power system | one DG50/1500 diesel generator, two DG100/1500 diesel generators |
| Total electric power supply, kW | 250 |
| Safe navigability, Sea State | up to 3 |
| Propeller, number & type | three fixed-pitch propellers |
| Endurance, days | 5 |
| Complement | 14 |
| Hull material | fibreglass |

Armament & Equipment

Artillery and air defence weapons

- two 30mm AK-306 gun mounts with dedicated fire control system
- four Igla MANPADS

Electronic equipment

- 67R IFF system
- Gorizont-25 integrated navigation radar
- Ogon-M infrared collective navigation system

Navigation equipment

- GKU-2 gyro course indicator
- KM100-M6 magnetic compass
- Rumb or RN (ARP-85) radio direction finder
- SN-3101 shipborne satellite navigation system

Communication equipment

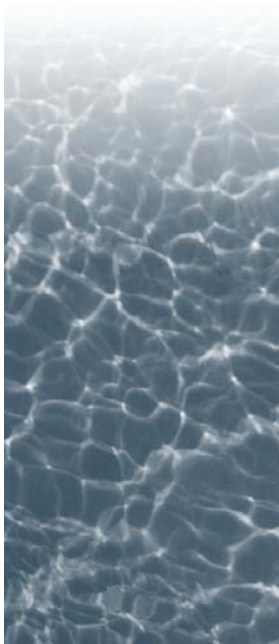
- Buran-6E or Rubin-E automated communications system
- P-408 and P-407 intercom systems

Anti-mine equipment

- GKT-2 contact sweep
- ST-2/PEMT-1 influence magnetic sweep
- AT-2/AT-3 acoustic sweep

Sonar equipment

- MG-991/Livadia-E mine-hunting sonar
- Mayevka-GAE self-propelled remotely controlled variable-depth sonar
- Mayevka-E self-propelled TV-controlled underwater vehicle



NAVAL SYSTEMS

DEVELOPMENT PROJECTS

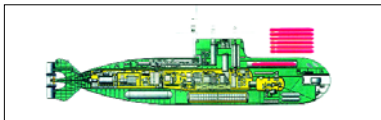
SMALL-SIZE SUBMARINES



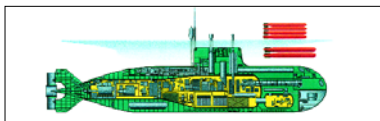
Mission

Small-displacement submarines are intended to defend seacoast, sea borders and lines of communications, as well as to carry out stealthy patrol missions in shallow waters. They are capable of:

- destroying enemy surface combatants, vessels and submarines of different types and classes;
- landing special forces ashore, providing comprehensive support to their operations, and taking them back on board;
- providing target designation data for friendly forces;
- carrying out minelaying and electronic reconnaissance missions;
- causing damage to enemy stationary sea-based and coastal installations;
- evacuating personnel and equipment from potentially hazardous areas;
- monitoring sea borders and exclusive economic zones to counter violations, such as piracy, smuggling, poaching, drug trafficking, etc.



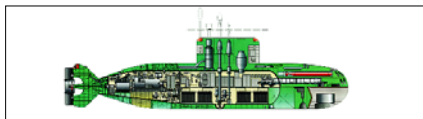
P-130



P-170



Project 865 Piranya



Piranya-T



Piranya-2

| Basic specifications (1) | | | | | |
|--|-------|-------|---------------------|-----------|-----------|
| | P-130 | P-170 | Project 865 Piranya | Piranya-T | Piranya-2 |
| Normal displacement, cu.m | 130 | 170 | 218 | 250 | 400 |
| Basic dimensions, m: | | | | | |
| length | 31.0 | 30.0 | 28.3 | 33.4 | 31.0 |
| beam | 3.0 | 4.0 | 4.8 | 5.1 | 5.8 |
| draught | 5.2 | 5.1 | 5.1 | 5.1 | 5.4 |
| Main propulsion plant | DG+SB | DG+SB | DG+SB | DG+SB | DG+ECG |
| Max diving depth, m | 200 | 200 | 200 | 200 | 200 |
| Max underwater speed, kts | 12 | 12 | 6,65 | 12 | 12 |
| Max range, n.miles | 2,000 | 2,000 | 250 | 2,000 | 1,200 |
| Endurance, days | 20 | 20 | 10 | 20 | 20 |
| Complement | 4 | 4 | 9 | 4 | 4 |
| Combat swimmers | 6 | 6 | 6 | 6 | 6 |
| Armament: | | | | | |
| cruise missiles in standard launchers | * | * | – | – | – |
| 533mm torpedoes (missiles) in torpedo tubes | * | 2 | – | 2 | – |
| 400mm torpedoes | 6 | 4 | 2 | 5 | 2-8 |
| mines in mine dispensers | * | * | – | 4 | 6 |
| Igla MANPADS | – | – | – | – | – |
| Sirena-UM swimmer delivery vehicle | 2** | 2** | 2 | – | 2 |

DG – diesel generator

CCDG – closed cycle diesel generator

ECG – air-independent propulsion plant with electro-chemical oxygen-hydrogen generators

SB – storage battery

* – additional munitions can be accommodated in special clip-on containers

** – in special clip-on containers

Small submarines are capable of carrying out missions in shallow and confined water areas both independently and within naval groupings comprising submarines, combatants and naval aircraft, in cooperation with stationary surveillance systems.

Features

Modern small-size submarines are characterised by fairly high (for the given class) speed and manoeuvrability, reduced displacement, operational stealth, and great underwater range owing to introduction of new air independent power units based on oxygen-hydrogen electrochemical generators or closed-cycle diesel-generators. These submarines have various offensive, defensive

and land-attack weapon systems, state-of-the-art radars and sonars, automated command and control system, and corrosion-resistant hull and equipment.

Small subs feature improved survivability owing to titanium alloys and glass-reinforced plastic used in the hull structure, and reduced acoustic, magnetic and electromagnetic fields as a result of special design solutions.

These submarines embody cutting-edge underwater technologies, high-level automation and integration allowing fewer crew to control submarine movement and weapons/equipment employment.

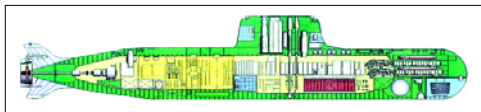
Small subs can be built within shorter time at a reduced cost.



P-550



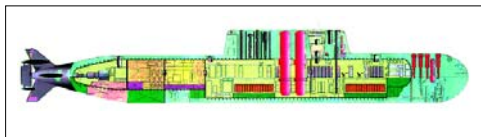
P-650B



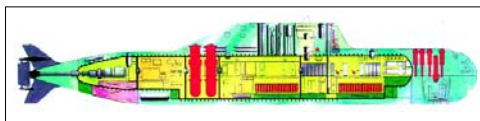
P-650E



P-750



P-750B



P-750E

Basic specifications (2)

| | P-550 | P-650B | P-650E | P-750 | P-750B | P-750E |
|------------------------------------|-------|----------------|---------------|-------|----------------|---------------|
| Normal displacement, cu.m | 650 | 760 | 760 | 860 | 920 | 920 |
| Basic dimensions, m: | | | | | | |
| length | 51.0 | 57.0 | 57.0 | 62.0 | 68.0 | 69.5 |
| beam | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 |
| draught | 6.3 | 6.3 | 6.3 | 7.3 | 7.3 | 7.3 |
| Main propulsion plant | DG+SB | DG+ CCDG+SB | DG+ ECG+SB | DG+SB | DG+ CCDG+SB | DG+ ECG+SB |
| Max diving depth, m | 300 | 300 | 300 | 300 | 300 | 300 |
| Max underwater speed, kts | 16 | 16 | 16 | 17 | 17 | 17 |
| Max range, n.miles | 2,500 | 2,500 | 2,500 | 4,500 | 4,500 | 4,500 |
| Endurance, days | 20 | 20 | 20 | 30 | 30 | 30 |
| Complement | 9 | 9 | 9 | 9 | 9 | 9 |
| Combat swimmers | 6 | 6 | 6 | 6 | 6 | 6 |
| Armament: | | | | | | |
| cruise missiles | | | | | | |
| in standard launchers | – | – | – | 4 | 4 | 4 |
| 533mm torpedoes (missiles) | | | | | | |
| in torpedo tubes | 4 | 4 | 4 | 4 | 4 | 4 |
| 400mm torpedoes | 8 | 8 | 8 | 8 | 8 | 8 |
| mines in mine dispensers | 12 | 12 | 12 | 12-24 | 12-24 | 12-24 |
| Igla MANPADS | 4 | 4 | 4 | 4 | 4 | 4 |
| Sirena-UM diver propulsion vehicle | – | – | – | – | – | – |

DG – diesel generator power plant

CCDG – closed cycle diesel power plants

ECG – air-independent propulsion plant with electrochemical oxygen-hydrogen generators

SB – storage battery

* – additional weapons can be accommodated in special clip-on containers

** – in special clip-on containers

PROJECT 20382

Small Patrol Ship/Corvette



Mission

Project 20382 small patrol ship (corvette) is intended to destroy enemy submarines, surface ships, and air attack assets, autonomously or in cooperation with other naval forces, as well as to guard state border and exclusive economic zone.

Features

- Hull and superstructure made of shipbuilding steel with extensive use of stealth technologies, advanced design materials and innovative manufacturing techniques;
- Diverse powerful weapon systems housed in relatively small displacement ship;
- Options for replacing certain weapon systems with their analogues.

Basic specifications

| | |
|--|-------------------------|
| Displacement, full load, t | 1,700 |
| Basic dimensions (length x beam x draught), m | 94.0 x 13.0 x 3.5 |
| Propulsion plant | CODAG two-shaft |
| Gas turbines total output at +15°C, kW | 2x10,000 |
| Diesels total output at +20°C, kW | 2x3,750 |
| Electric power sources | three diesel generators |
| Total electric power, kW | 3x600 |
| Number of propellers | 2 |
| Speed, kts: | |
| maximum | 27 |
| economical | 14 |
| Range, at economical speed with max fuel, n.miles | 4,000 |
| Endurance, days | 15 |
| Complement | 85 |

Main propulsion plant

The ship is powered by a CODAG two-shaft plant comprising two diesel gas turbines.

Armament & Equipment

- Yakhont anti-ship missile system (2x4 launchers, fire control system, 8 missiles in TLCs), or Uran-E anti-ship missile system (4x4 launchers, 3R60UM fire control system, 16 missiles in TLCs)
 - 100mm A-190E artillery system with Puma-E 5P-10E fire control radar (80 rounds); or 76.2 mm AK-176M gun mount with the MR-123-02Ts fire control radar (152 rounds)
 - Kashtan air defence gun/missile system comprising one command and control module and one combat module (8 SAMs, 1,500 rounds)
 - 32 Igla MANPADS
 - two 14.5mm naval pedestal machine gun mounts (2,000 rounds)
 - two 533mm twin-tube torpedo launchers (four torpedoes)
 - anti-saboteur system including DP-64 grenade launcher (240 grenades) and Pallada sonar
 - one helicopter can be carried onboard
- The ship is fitted with various electronic and sonar equipment to support efficient accomplishment of a wide range of tasks assigned.

KORVET-Class

2,000-tonne Displacement Ship



Mission

Korvet-class 2,000-tonne displacement ship is designed to destroy enemy surface ships and submarines in oceanic and sea theatres-of-war, and to counter raids of enemy air attack assets, both independently and as an escort ship assigned to a naval task force to escort, protect and support with fire landing assault units, as well as to perform patrol and border guard missions in territorial waters and exclusive economic zone.

Armament & Equipment

Missile weapons

- Kalibr-NKE missile system comprising unified launcher, missile/torpedo fire control system, eight anti-ship or anti-submarine missiles in TLCs

Air defence weapons

- Shtil ADM system (24 SAMs)
- 12 Igla-1E MANPADS

Artillery weapons

- 100mm A-190E artillery system (80 rounds)
- two 30mm Palash gun mounts (6,000 rounds)

Torpedo weapons:

- two 533mm twin-tube torpedo launchers (4 SET-65KE/53-65KE torpedoes)

Anti-saboteur weapons

- two DP-64 anti-saboteur grenade launchers

Aviation weapons

- Ka-28/Ka-31 helicopter

Electronic equipment

- Fregat-MAE radar system
- Garpun-Bal-E target detection and designation radar system
- MR-212/201-1 navigation radar
- Irbis-K ESM equipment
- Podzagolovok-24E mutual interference avoidance system
- MGK-335EM-03 sonar system
- combat information management system

Communications means

- Buran-E automated communications system
- Global maritime communications system for disaster relief operations
- P-405 intercom system

Navigation equipment:

- Ladoga inertial navigation and stabilization system
- GKU-5 gyrocourse indicator
- LI2-1ME electromagnetic log
- KM 115 magnetic compass
- NEL-20K navigational echosounder
- ECS 1000 electronic mapping unit
- Briz-K and KPI-9F Baltika radionavigation receiver-indicators

EW systems

- TK-25 multifunctional ECM system
- PK-10 close-range decoy system (four KT-216 launching units, 60 rounds)

Main propulsion plant

The ship is powered by a two-shaft CODAG power plant comprising two M504-type cruising diesels and one main M90-type gas-turbine unit. Maximum shaft power of the geared-diesel is 4,700 hp, and of the main gas-turbine unit – 20,400 hp.

Electric power is supplied by four 450kW 12V183TE52-type diesel generators.

Basic specifications

| | |
|--|------------------------|
| Displacement, full load, t | 1,760 |
| Basic dimensions (length x beam x draught), m | 89.8 x 12.3 x 3.0 |
| Main propulsion plant | two-shaft, CODAG |
| Main propulsion plant overall power, hp | 29,800 |
| Electric power supply units | four diesel-generators |
| Power, electric power supply units, kW | 4x450 |
| Number of propellers | 2 |
| Speed, kts: | |
| maximum | 27 |
| economical | 14 |
| Cruising range at economical speed, with full fuel tanks, n.miles | 3,500 |
| Endurance, days | 15 |
| Complement | 100 |

KORVET XXI-1, 2, 3, 4 Class

2,000-tonne Displacement Ships

Mission

Ships of the Korvet XXI-1, 2, 3, 4 class are designed to engage surface, underwater and air targets in sea and oceanic areas autonomously or making part of a naval task force.

Features

Multirole ships of the class are armed with powerful weapon systems, highly protected, stealthy and survivable. They feature good seaworthiness.

Korvet XXI-1 and Korvet XXI-2 ships are powered by two-shaft CODAG, and Korvet XXI-3 and Korvet XXI-4 – by two-shaft diesel power plants. The ships are fitted with two stand-by 250hp VDRK-185 engines providing speeds of up to 8-9 knots.

Armament & Equipment

Attack missile systems

- Kalibr-NKE (Club-N)/Yakhont/Uran-E anti-ship missile system

AD missile systems

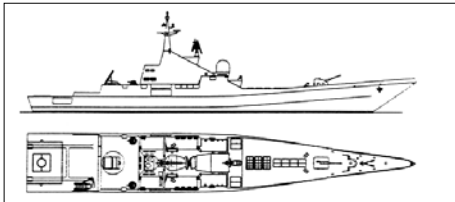
- Rif-M/Klinok air defence missile system
 - Kashtan air defence gun/missile system
- ASW weapons
- 91RE ASW missiles of Kalibr-NKE missile system
 - UMG-1ME torpedoes

Artillery systems

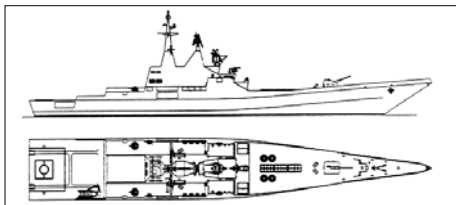
- 100mm A-190-5P-10 Universal-Puma-Palma versatile artillery system
- 30mm AK-630M rapid-fire gun mounts

Electronic equipment

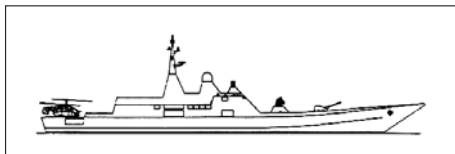
- Fregat-MAE radar
 - Fregat-M2 EM radar
 - MR-212/201-1 navigation radar
- Sonar equipment
- Zarya-ME sonar system
 - sonar station with Vinyetka long-size flexible towed antenna
- Combat information management system
- Sigma-E system



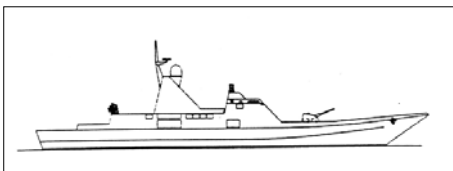
Korvet XXI-2



Korvet XXI-1



Korvet XXI-3



Korvet XXI-4

| Basic specifications | | | | |
|--|--------------------|--------------------|--------------------|-------------------|
| | Korvet-XXI-1 | Korvet-XXI-2 | Korvet-XXI-3 | Korvet-XXI-4 |
| Displacement, normal, t | 1,930 | 1,980 | 1,500 | 1,000 |
| Basic dimensions (length x beam x draught), m | 115.0 x 15.0 x 5.6 | 115.0 x 15.0 x 5.7 | 112.0 x 13.6 x 7.3 | 98.0 x 11.8 x 5.7 |
| Speed, kts: | | | | |
| full | 30 | 30 | 29 | 31.5 |
| economical | 14 | 14 | 14 | 14 |
| Range, at economical speed, n.miles | 4,000 | 4,000 | 4,000 | 4,000 |
| Main propulsion plant type | CODAG | CODAG | diesel | diesel |
| Main propulsion plant power, hp | 31,600 | 31,600 | 10,000 | 10,000 |
| Endurance, days | 15 | 15 | 15 | 15 |
| Armament: | | | | |
| Attack missile systems, number of launchers | 24 | 24 | 8 | 8 |
| Long-range AD missile systems, number of launchers | 32 | 16 | - | - |
| Short-range AD missile systems, number of launchers | 32 | 32 | 8 | 8 |
| 324mm torpedo systems, number of torpedo tubes | 8 | 8 | 8 | 8 |
| 100mm gun mounts, pcs | 1x1 | 1x1 | 1x1 | 1x1 |
| 30mm six-barrel gun mounts | 2x6 | 2x6 | 2x6 | 2x6 |
| Helicopters | 1 | 1 | 1 | - |
| Complement | 90 | 90 | 90 | 70 |

1,000-1,500-TONNE DISPLACEMENT ESCORT SHIP

Mission

The ship is designed to detect and destroy enemy submarines, to escort and guard friendly ships and communications and to counter air attacks, both independently and within naval groups, as well as to protect and support with fire landing assault units, to carry out border guard patrol missions.

Main propulsion plant

The ship is powered by a two-shaft CODAG-type propulsion plant comprising two 10D49-type geared cruising diesels and one main M90FR-type gas-turbine unit.

Electric power is supplied by four BMD87-type 315kW diesel generators (three-phase AC, 380V, 50Hz).

Armament & Equipment

Missile weapons

- Kalibr-NKE missile system comprising unified underdeck launcher, missile and anti-submarine weapons control system, four anti-ship or ASW missiles in TLCs

AD weapons

- Kashtan air defence gun/missile system with one control and two combat modules (48 missiles and 4,000 rounds)
- eight Igla MANPADS

Artillery systems

- 100mm A-190E gun mount (80 rounds) with 5P-10E/MR-123-02 fire control radar system



ASW systems

- MPT-34E small-size ASW torpedoes in TLCs
- Paket-E/NK anti-torpedo protection system comprising four small-size anti-torpedoes in TLCs, target designation sonar and automatic fire control system

Anti-saboteur weapons

- two DP-65 anti-saboteur grenade launchers Rotary-wing craft
- Ka-28 ASW helicopter with 72 RGB-16 radio/sonobuoys

Electronic equipment

- Pozitiv-ME/Monument-E air/surface target acquisition/designation radar
- Pal-N navigation radar
- Podzagolovok-24E mutual interference avoidance system
- MGK-33SEM-03 sonar system
- Vinyetka-E sonar system with long-size flexible towed antenna

Combat information management system

- Sigma-E system

Navigation equipment

- Ladoga inertial navigation and stabilisation system

- GKU-5 Gyuis gyrocompass

- LI2-1 electromagnetic log
- ECS 1000 electronic chart display system
- KM115-04 magnetic compass
- NEL-20K navigation echosounder
- Briz K GPS receiver-indicator
- MT 150/140 tyfon

ECM systems

- TK-25 ECM system
- PK-10 close-range decoy system (four KT-216 launchers, 80 rounds)

Communications equipment

- Buran 6E automated communication system
- SM001-03 radio communication system
- P-405 intercom equipment

Basic specifications

| | |
|--|------------------------|
| Displacement, full load, t | 1,250 |
| Basic dimensions | |
| (length x beam x draught), m | 84.5 x 13.0 x 2.5 |
| Main propulsion plant | two-shaft, CODAG |
| Main propulsion plant total power, hp | 30,000 |
| Electric power supply units | four diesel generators |
| Power, electric power supply units, kW | 4x315 |
| Number of propellers | 2 |
| Speed, kts: | |
| maximum | 30 |
| economical | 14 |
| Cruising range at economical speed, with max fuel stock, n.miles | 4,000 |
| Endurance, days | 15 |
| Complement | 84 |

PROJECT 12300 SCORPION

Missile Boat



Mission

Project 12300 Scorpion missile boat is designed to engage enemy surface ships, boats, and transports both autonomously and in cooperation with naval attack forces.

Features

The boat's hull and superstructure are slanted (seven to ten degrees and more), and other stealth technologies are also employed to reduce its radar signature.

Main propulsion plant

The boat can be powered by two MTU 16V1163TB93 diesels, or one GTU-12 gas turbine and two M530/MTU 16V 4000 M90 diesels.

Electric power is supplied by one DGF2A 100/1500 and two DGR2A 200/1500 diesel generators. It also has two 1EKPV 15/150 electric compressors.

Armament & Equipment

Attack missile systems

- Yakhont anti-ship missile system with two twin launchers and 3R50E-12300 fire control system (four missiles in TLCs), or Uran-E anti-ship missile system (eight 3M-24E missiles in TLCs) with two quadruple 3S-24E launchers and 3R-60UE fire control system)
- Kashtan-1 air defence gun/missile system (four SAMs, 2,000 rounds plus option of surplus 1,000 rounds)
- 100mm A-190-5P-10E versatile artillery system, comprising A-190 gun mount (80 rounds) and 5P-10E fire control radar
- two DP-64 anti-saboteur grenade launchers
- PK-10 decoy system with two/four KT-216 launchers

Electronic equipment

- Monument-E/Pozitiv-ME target detection/designation radar
- TK-25E-1 ECM system
- IFF system
- Podzagolovok-24E mutual interference avoidance system
- Combat information management system
- Sigma-E Sonar equipment
- Pallada combat swimmer detection sonar
- Navigation equipment
- Ladoga-ME navigation system
- Gyuis gyrocompass
- LEM2-1 log
- NEL-20K navigation echosounder
- SN-3103 satellite navigation equipment
- KM115-07 magnetic compass

Basic specifications

| | |
|---------------------------------------|-------------|
| Displacement, full load, t | about 460 |
| Max length, m | about 57 |
| Max beam, m | about 10.3 |
| Depth, midship, m | about 5.3 |
| Draught, midship, full load, m | about 2.5 |
| Speed, kts: | |
| maximum, with diesels | about 33 |
| maximum, with diesels and gas turbine | about 40 |
| economical | 12-13 |
| Range at economical speed, n.miles: | |
| full fuel | about 1,500 |
| max fuel | about 2,000 |
| Endurance, days | 10 |

PROJECT 12200 SOBOL

Patrol Boat



Mission

Project 12200 Sobol patrol boat is designed to operate on call, to patrol territorial waters and enforce navigation regulations in inland channels, open roadsteads near harbours and ports, as well as in adjacent littoral areas.

Features

Sobol patrol boat is distinguished by high speed, excellent navigability and manoeuvrability, as well as weapons mix sufficient to perform the above tasks.

Basic specifications

| | |
|-------------------------------------|------------|
| Displacement, full load, t | about 57 |
| Length, overall, m | about 30.0 |
| Beam, overall, m | about 5.82 |
| Depth, midship, m | about 3.25 |
| Draught, midship, full load, m | about 1.34 |
| Speed, kts: | |
| maximum | about 47 |
| economical | about 40 |
| Range at economical speed, n.miles: | |
| full fuel | about 500 |
| max fuel | about 700 |
| Endurance, days | 3 |

Main propulsion plant

The boat is powered by two Deutz TVD 616V16 diesels.

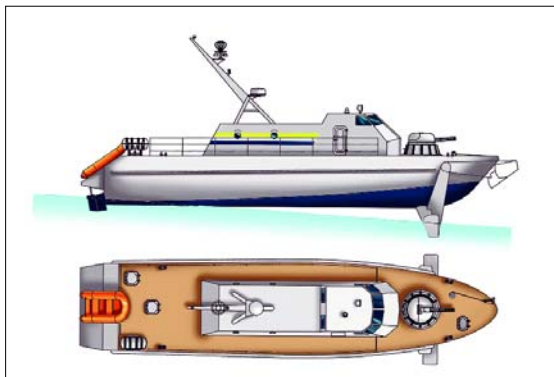
Electric power is supplied by two Deutz BW 1537 diesel generators.

Armament & Equipment

- Vikhr-K missile/gun system comprising AK-306V missile/gun unit (four Vikhr missiles in TLC and 500 rounds) and automatic surveillance/targeting sight, or one 30mm AK-306 light automatic gun mount (500 rounds)
- two Iglá MANPADS
- 14.5mm MTPU naval pedestal machine gun mount (500 rounds)
- Navigation equipment
- ST 60 Plus integrated navigation system
- Gyuis gyrocompass
- KM69-M2 magnetic compass

RYS-2

Police Patrol Boat



Rys-2 Police Patrol Boat

Mission

Rys-2 police patrol boat is designed to carry out patrol and customs missions, to hunt down and intercept trespassers.

Rys-2 is a speed-boat glider with a lifting nose hydrofoil, hard-chine sides, and transom stern. With the lifted hydrofoil the boat can approach the shore.

Features

- High speed and manoeuvrability;
- Sufficient floatability (the hull is divided lengthwise into four watertight compartments, so that the boat stays afloat even if any one is flooded).

Main propulsion plant

The boat is powered by a two-shaft diesel plant comprising two 1,100kW/1500hp diesels.

Electric power is supplied by one 8kW diesel/generator/compressor and two DC generators mounted on the propulsion plant.

Armament

- one 30mm AK-306 six-barrel gun mount (500 rounds) with Kolonka-219-1 fire control system
- two Iгла MANPADS

Basic specifications

| | |
|---|------------------|
| Displacement, full load, t | 30 |
| Basic dimensions (length x beam x draught), m | 20.5 x 4.6 x 1.1 |
| Propulsion plant | |
| type | two-shaft diesel |
| total power, hp | 2x1,100 |
| Total electric power, kW | 8 |
| Number and type of propulsors | two water jets |
| Speed, kts: | |
| maximum | 60 |
| economical | 50 |
| Range, at economical speed with full fuel, n.miles | 400 |
| Endurance, days | 3 |
| Complement | 7 |

SDK 1400/SDK 1700

Medium Landing Ships

Mission

SDK 1400/SDK 1700 landing ships are designed to sealift marines and their materiel to equipped/non-equipped shores, as well as to engage enemy ground forces prior to assault.

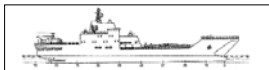
Features

- Integrated powerful missile systems;
- Embarkation/disembarkation of conventional materiel on/from non-equipped sand/gravel shores, and of amphibious materiel on/from water surface in Sea States 2 (SDK 1400) and 3 (SDK 1700);
- Capability to operate naval helicopters.

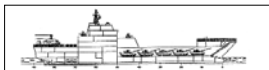
Main propulsion plant

Both ships feature a two-shaft propulsion plant comprising two reduction gear diesels rated at max shaft power of 2,300 kW (SDK 1400), and 2,600 kW (SDK 1700).

Electric power is supplied by three 300kW diesel generators (SDK 1400) and four 300kW diesel generators (SDK 1700). SDK 1400 also mounts one auxiliary 100kW ADFG 100/1500 diesel generator.



SDK 1400



SDK 1700

Armament & Equipment

Missile and artillery weapons

- Ogon A-22 shipborne flame-thrower comprising two MS-227P launchers and DVU-3-BS rangefinder/sight (176 rocket-assisted projectiles – SDK 1400, and 220 – SDK 1700)
 - 30mm Palma automated AA artillery system comprising two firing modules (6,000 rounds)
 - eight Igla MANPADS
- ECM equipment
- TK-25E ECM system
 - PK-10 close-range decoy system comprising four KT-216 launchers (120 cartridges)

Electronic equipment

- MR-212/201-1 close-range surface surveillance radar
- Pozitiv-ME1.2 3D active TAR
- 6730R IFF system
- Blokirowka joint safe navigation system
- Podzagolovok-24E mutual interference avoidance system

Navigation equipment

- Ladoga-ME inertial navigation and stabilisation system
- LI2-1ME electromagnetic log
- AP-5 dead-reckoning tracer
- KM 115 magnetic compass
- NEL-20K navigation sonar/depth-finder
- GKU-5 gyro direction finder
- SN-3101 satellite navigation equipment

Communications equipment

- Buran-6E automated communications system
- Standart-S INMARSAT-type shipborne radio set
- UHF radio set
- NAVTEX radio receiver

Aviation support assets

- helipad
- 20,000-kg helicopter fuel stock
- lighting equipment

Basic specifications

| | SDK 1400 | SDK 1700 |
|--|---------------------|---------------------|
| Displacement, full load, t | 1,460 | 1,740 |
| Basic dimensions | | |
| (length x beam x draught), m | 90.5 x 10.0 x 2.5 | 97.0 x 11.0 x 2.4 |
| Main propulsion plant | two-shaft diesel | |
| Total propulsion power, kW | 4,600 | 5,200 |
| Electric power source | 3 diesel generators | 4 diesel generators |
| Total electric power, kW | 3x300 | 4x300 |
| Number of propellers | 2 | 2 |
| Speed, kts: | | |
| maximum (at 85% of max sustained power) | 16 | 16 |
| economical | 14 | 14 |
| Range at economical speed with max fuel, n.miles | 2,000 | 2,500 |
| Payload capacity: | | |
| total military cargo, t | 275 | 300 |
| tanks, t | 5x50 | 5x55 |
| troops and tank crews, persons | 180 | 200 |
| Endurance, days | 30 | 30 |
| Complement | 43 | 47 |



NAVAL SYSTEMS

SHIPBORNE WEAPONS

RIF-M

Air Defence Missile System

Mission

Rif-M air defence missile system is intended to protect naval order from massed air raids of aircraft, air-launched cruise missiles, anti-ship and anti-radar missiles (including low flying and manoeuvring ones), and to engage missile-carrying and jammer aircraft beyond their stand-off distances (to move away jamming and weapons delivery lines).

Composition

- underdeck launcher
- 48N6E surface-to-air missiles in TLCs
- radar control system
- ground support equipment

Features

Within its phased array antenna working sector the fire control radar system can track six targets and guide 12 missiles onto them simultaneously. It contains built-in test equipment, crew training assets and combat data recording system. The control system provides data processing, presentation and exchange with external supporting systems.

48N6E single-stage solid-propellant missile can effectively engage a wide range of air targets thanks to its high speed, allowable overloads and powerful fragmentation warhead. SAMs are supplied, stored, transported and loaded for launch in TLCs. Missiles in TLCs do not require testing and adjustment during ten years.

Vertically-launched missiles are tilted towards the target in the beginning of their trajectory according to a programme fed at their launch sequence, to exclude laying.

A drum-type launcher is installed below



deck. It includes a loader taking TLCs from the ship's deck to the missile magazine and into the drums' launch guides.

The Rif-M ADMS can be installed on board surface ships displacing 5,000-plus tonnes. Its engagement zone covering 360 degrees in azimuth is limited only by the ship's architecture.

Basic specifications

| | |
|---------------------------------------|-----------|
| Target engagement envelope: | |
| range, min-max, km | 8-120 |
| altitude, min-max, m | 10-25,000 |
| Min speed of aerodynamic targets, m/s | 950 |
| Number of targets | |
| tracked simultaneously | 6 |
| Missile launch interval, sec | 4 |
| Number of missiles | |
| guided simultaneously | 12 |

KLINOK

Air Defence Missile System

Mission

Klinok multichannel self-contained air defence missile system is designed to protect warships from massive air attacks of sea-skimming anti-ship missiles and manned/unmanned aircraft, as well as to engage enemy ships, including wing-in-the-ground-effect craft.

Composition

- underdeck launchers with missile loaders
- 9M330E-2 surface-to-air missiles in transport-launch containers
- shipborne multichannel fire control system
- ground support equipment



Basic specifications

| | |
|--|--|
| Target engagement envelope: | |
| in range, km | 1.5-12 |
| in altitude, m | 10-6,000 |
| Target flight speed, m/s | up to 700 |
| Number of simultaneously engaged targets | up to 4 |
| Guidance mode | radiocommand |
| Target detection range (at 3.5km altitude), km | 45 |
| Working frequency band (NATO) | J, I |
| Operational mode (main) | automatic |
| Reaction time, sec | 8-24 |
| | (depending on the target acquisition radar working mode) |
| One-missile launch time, sec | 3 |
| Into-action time: | |
| cold started, min | not more than 3 |
| on duty, sec | 15 |
| Missile allowance: | |
| in one launcher module | 8 |
| total | up to 64 |
| Weight, kg: | |
| missile at launch | 167 |
| warhead | 15 |
| Crew | 13 |

Features

Klinok ADMS can autonomously detect and engage up to four air/surface targets simultaneously with vertically-launched surface-to-air missiles stored in underdeck TLCs. Each launcher comprises 3-4 launch modules with eight missile TLCs in each.

Medium- and large-displacement ships can mount 2-4 Klinok ADMS with one fire control system per four launchers. Klinok ADMS can get target designation data from other shipborne systems, and provide such data for 30mm gun mounts to build up the ship's close-in defence starting from 200 m and further off.

Klinok SAM system is mounted on ships displacing 800-plus tonnes.

SHTIL-1

Air Defence Missile System



Mission

Shtil-1 multi-channel medium-range air defence missile system, a follow-on modification of Shtil ADMS, is intended for all-round protection of single surface ships and naval groupings from massed strikes of sea-skimming anti-ship missiles, fixed- and rotary-wing aircraft, ships and boats in heavy ECM environment.

Composition

- single-beam modular elevated launchers with missile storage, loading and reloading systems
- 9M317E SAMs
- KMSUO multi-channel fire control system
- automated modular launch equipment
- unified recording system
- ADMS software
- ground support equipment

Features

- Variable composition with number of target channels depending on ship displacement and customer requirements to simultaneous target engagement (2-12 targets);
- Modular design ensuring high combat survivability and ease of maintenance;
- 3D omnidirectional target acquisition and tracking radar;
- Optional integration of TV/optical sights with customer-defined number of target channels.

Shtil-1 ADMS can be mounted on ships displacing 1,500-plus tonnes with 3D all-round surveillance radars on board, or used in a shore-based version.



Basic specifications

| | |
|--|--|
| Engagement envelope: | |
| range, km | 3.5-32 |
| altitude, min-max, m | 5-15,000 |
| Max target speed, m/s | 830 |
| Operational mode (main) | automated |
| Number of targets | |
| simultaneously tracked | 12 |
| Number of targets simultaneously engaged | depends on the number of radio beacons |
| Deployment time: | |
| cold started, min | 3 |
| standby mode, sec | 10-19 |
| SAMs per launcher | 24 |
| Weight, t: | |
| one launcher, w/o missiles | 30 |
| whole system, w/o missiles | 13-28 |
| Combat crew | |
| 8-18 | |
| SAM specifications: | |
| length, m | 5.55 |
| diameter, m | 0.4 |
| wing span, m | 0.86 |
| launch weight, kg | 715 |
| max flight speed, Mach number | 3 |
| homing head | Doppler, semi-active |
| warhead type | HE/fragmentation |
| warhead weight, kg | 70 |
| fuse | pulse |
| Launcher specifications: | |
| azimuth sector, deg | -330... +330 |
| azimuth turning speed, deg/sec | 84 |
| elevation sector, deg | +10... +80 |
| elevation turning speed, deg/sec | 46 |

KASHTAN

Air Defence Gun/Missile System



Mission

Kashtan air defence gun/missile system is designed to provide self-defence of surface ships and ground-based facilities from air-launched precision-guided weapons, including sea-skimming anti-ship missiles, fixed- and rotary-wing aircraft, as well as to engage small-size sea targets.

Composition

- combat module
- surface-to-air missiles
- command and control module
- ground support equipment

Features

The command and control module serves to detect and classify aerial (including low-flying) and stationary targets, to track, to distribute and to designate them to combat modules.

The combat module consists of a gun/missile unit, radar and optical fire control systems, computer system and power supply unit. It

automatically receives target designation data, tracks and engages targets with missile and artillery fire.

Normally, the ship can be armed with one to six combat modules depending on its displacement and self-defence capability required. On large-displacement ships each combat module can be completed with a storage/loading system with a 32 SAM capacity.

9M311-1 two-stage solid-propellant SAM features a fragmentation rod warhead with a proximity fuse. Missiles are housed in transport-launch containers ensuring their safe handling and reliability.

The gun mount comprises two 30mm six-barrel GSh-6-30K rapid-fire cannons with a linkless ammunition feed and evaporative cooling system.

The integrated control system simultaneously tracks targets and guides missiles onto them via its radar and TV/optical channels.

Kashtan ADGMS also comprises a below-deck storage/loading system (capacity - 32 SAMs, four-missile launch unit is loaded within 1.5 min).

Kashtan system ensures efficient self-defence of the carrier-ship thanks to high probability of interception of approaching air targets at longer distances (8,000 m to 1,500 m) with missiles, and a follow-on engagement of survived targets at a close-in range (1,500 to 500 m) with gunfire.

Fully automated combat operation of the system (from target acquisition till engagement) allows it to engage up to five targets a minute.

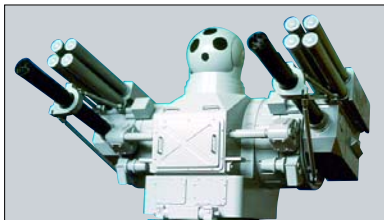
Kashtan ADGMS can be installed on ships displacing 400-plus tonnes.

Basic specifications

| | |
|---|---|
| Target engagement envelope, m: | |
| in range: | |
| with missiles | 1,500-8,000 |
| with guns | 500-4,000 |
| in altitude | 5-6,000 |
| Max target speed, m/s | 900 |
| Kill probability (for one pass through the engagement zone) | 0.96-0.99 |
| Number of targets engaged simultaneously | up to 6 (depending on a number of combat modules) |
| Overall rate of gunfire, rds/min | 10,000 |
| Type of artillery rounds | 30mm HEFI, HE/tracer, practice and dummy |

PALMA

Naval Anti-Aircraft Artillery System
with Sosna SAM and 3V-89 Fire Control System
for Small/Medium-calibre Gun Mounts



Mission

Palma anti-aircraft gun system with Sosna-R SAMs and 3V-89 small/medium-calibre gun fire control system is designed for protection against anti-ship cruise missiles and guided aerial bombs, fixed- and rotary-wing aircraft, as well as for engagement of small-displacement vessels and small-size ground targets.

Composition

- 3S-89 gun mount with 3V-89 fire control system
- up to four 3R-99E firing modules
- Sosna-R SAMs
- 3Ts-99/Positiv ME1 target acquisition radar system
- 3A-99/Delta hydro-stabilisation system
- ground support equipment

Features

- Synergetic combination of gun/missile weapons such as high-precision Sosna-R hypersonic laser-guided missiles and AO-18KD rapid-fire automatic cannons;
 - Multichannel, high-precision and ECM-resistant electro-optical fire control system
 - Fully automated operation cycle;
 - High jamming immunity, and operational covertness thanks to absence of demasking HF radiation.
- 3R-99E firing module is composed of eight Sosna-R SAMs in transport-launch containers and two 30mm AO-18KD automatic six-barrel

cannons (up to 1,500 rounds) capable of firing armour-piercing subcalibre (APDS) and HE-fragmentation/incendiary (HEFI) projectiles (max rate of fire - up to 10,000 rds/min).

The fire control system includes TV- and thermal-vision channels, laser range-finder, laser-beam missile guidance channel and missile direction finder.

Basic specifications

| | |
|---|---|
| Target engagement range, m: | |
| with missiles | 1,300-8,000 |
| with guns | 200-4,000 |
| Target engagement altitude, m: | |
| with missiles | 2-3,500 |
| with guns | up to 3,000 |
| Number of targets engaged simultaneously | up to 6 (depending on number of firing modules) |
| Gun rate of fire, rds/min | up to 10,000 |
| Gun ammunition types | APDS, HEFI and practice projectiles |
| Combat module weight, (including ammunition load), kg | 6,900 |
| Into-action time, sec | 3-5 |
| Control system: | |
| main | electro-optical |
| backup | radar |
| Missile flight time (at 5-8km range), sec | 6.0-11.5 |
| Lateral g-load factor | up to 52 |
| Max missile speed, m/s | 1,200 |

YAKHONT

Anti-Ship Missile System



Mission

Yakhont anti-ship missile system is designed to destroy surface ships and transports of different types making part of naval task forces, convoys and landing teams, as well as single ships, and high-radar-contrast land targets.

Composition

- unified anti-ship cruise missiles in transport-launch containers
- ship- and submarine-based launchers
- shipborne missile control system
- ground support equipment with automated test facilities

Features

Yakhont ASM system enjoys enhanced combat effectiveness thanks to the missile's high supersonic speed, flexible flight profiles, small radar cross-section and autonomous jam-resistant guidance system combining inertial navigation system and radar seeker. After target acquisition the missile operates in fully automatic mode.

Yakhont ASM system can be installed on surface ships, submarines, ground-based stationary and mobile launchers. Missiles can be launched from inclined and vertical launch units.

Basic specifications

| | |
|---|---------------------|
| Single-missile max flight range, km: | |
| combined trajectory | up to 300 |
| low-altitude trajectory | 120 |
| Missile flight altitude, m: | |
| cruise phase | up to 14,000 |
| terminal phase | not less than 10-15 |
| Max flight speed, m/s: | |
| cruise phase of combined trajectory | 750 |
| low-altitude trajectory/terminal phase of combined trajectory | 680 |
| Missile weight, kg: | |
| at launch | 3,000 |
| in TLC | 3,900 |
| TLC dimensions, mm: | |
| length | 8,900 |
| diameter | 720 |
| Warhead weight, kg | 200 |
| Salvo launch interval, sec | 2-5 |
| Launcher inclination, deg | 15-90 |
| Launch readiness time from off-power status, min | not more than 4 |
| Radar seeker's target detection range, km | 75 |
| Time between missile-in-TLC scheduled inspections, years | 3 |

MOSKIT-E

Anti-Ship Missile System



Mission

Moskit-E anti-ship missile system is designed to destroy large-displacement surface ships and transports making part of naval task forces, amphibious assault groupings, convoys and single ships of both displacement- and hydrofoil or air cushion types sailing at speeds of up to 100 knots, in intensive hostile fire and ECM environment.

Composition

- 3M-80E/3M-80E1 supersonic sea-skimming anti-ship cruise missiles
- missile launchers
- missile control system
- ground support equipment

Features

Moskit-E ASM system is designed for all-weather employment (snow, rain, fog, thunderstorms, etc.), by day and night, in any season of the year, in strong winds blowing from any direction with surface speed of up to 20 m/s, and in Sea State 6 conditions.

Basic specifications

| | |
|------------------------------------|------------|
| Launch range, km: | |
| maximum (3M-80E missile) | 120 |
| maximum (3M-80E1 missile) | 100 |
| minimum | 10 |
| Max flight speed, m/s | 780 |
| Cruise altitude, m | 20 |
| Launch sector, centreplane, deg | -60... +60 |
| Combat launch readiness time, sec: | |
| from 'power ON' status | |
| to the first missile launch | 50 |
| from 'combat-ready' status | 11 |
| Missile launch weight, kg: | |
| 3M-80E | 4,150 |
| 3M-80E1 | 3,970 |
| Missile length, m | 9.385 |
| Missile wingspan, m | 2.1 |

CLUB-N/CLUB-S

Integrated Missile Systems



Mission

High-performance submarine-based Club-S and ship-based Club-N integrated missile systems are designed to engage surface ships and submarines in conditions of intensive enemy fire and electronic countermeasures. Both systems employ unified combat assets – two types of anti-ship cruise missiles and an antisubmarine ballistic missile. Club-N missile system features standardized launch units and transport-launch containers.

Composition

- 3M-54E anti-ship cruise missile (Club-S) comprises a booster, low-altitude subsonic sustainer, and a separable supersonic warhead. 3M-54TE ASM (Club-N) features a TLC to ensure vertical launch
- 3M-54E1 ASM (Club-S) comprises a booster and a low-altitude subsonic sustainer. 3M-54TE1 ASM (Club-N) differs from 3M-54E1 only by having a TLC
- 91RE1 anti-submarine ballistic missile (Club-

Basic specifications

| Missiles | 3M-54E | 3M-54TE | 3M-54E1 | 3M-54TE1 | 91RE1 | 91RTE2 |
|-----------------------|---|---------|-----------|----------|---------------------|-----------|
| Length, m | 8,220 | 8,916 | 6,200 | 8,916 | 8,000 | 6,500 |
| Diameter, m | 0.533 | 0.645 | 0.533 | 0.645 | 0.533 | 0.533 |
| Weight, kg: | | | | | | |
| missile at launch | 2,300 | 1,951 | 1,780 | 1,505 | 2,050 | 1,300 |
| warhead | 200 | 200 | 400 | 400 | 76 | 76 |
| Operational range, km | up to 220 | 220 | up to 300 | 275 | up to 50 | up to 40 |
| Airspeed, Mach number | 0.6-0.8 | 0.6-0.8 | 0.6-0.8 | 0.6-0.8 | up to 2.5 | up to 2.0 |
| | (up to 3 – in terminal phase) | | | | | |
| Guidance system type | inertial navigation + active radar seeker | | | | inertial navigation | |
| Trajectory profile | low-altitude | | | | ballistic | |

S) performs a controlled flight to the target area. Its separable warhead is a high-speed homing torpedo with a sonar target seeker. 91RTEZ anti-submarine ballistic missile (Club-N) differs from 91RE1 missile in size and booster design

Features

All Club-S missiles are launched from standard submarine torpedo tubes, while Club-N missiles employ unified trussed modular vertical launch system with individual hydraulically-actuated armoured lids on launch tubes.

The Club-S/Club-N automated fire control system functions in real time on target data provided by the combat information management system, the ship's radars, or the operator (manual data input), as well as navigational information. It calculates fire data, manages pre-launch and launch procedures, and performs scheduled missile checks.

All units and components of the system, except for missile control panel, are splash/water-proof, explosion/fire-safe, have no control panels, and require no cooling and maintenance.

High-precision guidance of the anti-ship missiles is provided by a state-of-the-art inertial navigation system and jam-resistant active radar target seeker. Anti-submarine ballistic missile flies to the target area under commands of the on-board inertial navigation system. There, its warhead, a small-size MPT-1UME torpedo, separates, dives underwater, detects the target, closes in fast and destroys it.

Target-defined missiles and unified versatile shipborne components of the Club-S/Club-N systems make it possible to prepare missile loads depending on the assigned mission and specific combat scenario.

The missile systems can be installed on new designs or previously supplied Russian-made ships and submarines.



3M-54E



3M-54E1



91RE1



91RTE2

URAN-E

Missile System with Kh-35E Anti-Ship Missiles



Mission

Uran-E anti-ship missile system is designed to destroy missile/torpedo/gun boats, surface ships displacing up to 5,000 tonnes, and seagoing transports.

Composition

- Kh-35 subsonic anti-ship cruise missile in transport-launch container
- quick-release launcher with missile loader
- shipborne automated control system
- ground support equipment with test facilities

Features

Missiles in TLCs are loaded for launch into shipborne launchers. One launcher can be armed with up to four TLCs.

The automated control system is used to implement missile combat preparation and pre-launch procedures. Target designation data is fed from onboard organic and external sources, including airborne ones.

Cruise flight phase is controlled by inertial navigation system to keep the missile on the preset path and to steer it to the target area. Terminal guidance is provided by an ECM-resistant active radar seeker.

Thanks to the drastically reduced radar cross-section and sea-skimming flight profile the Uran ASM penetrates enemy ship's self-defences with enhanced probability, providing covert combat employment and surprise strike capabilities.

Uran-E missile system can be installed on fighting ships both under construction and in service (after due retrofit), transport and merchant vessels, or be stationed ashore.

Basic specifications

| | |
|---|------------|
| Operational range, km: | |
| maximum | 130 |
| minimum | 5 |
| Flight altitude, m: | |
| cruise phase | 10-15 |
| terminal phase | 3-5 |
| Max flight speed, Mach number | 0.8 |
| Total system weight (8-16 missiles), t | 12.5-23 |
| Weight, kg: | |
| missile at launch | 620 |
| warhead | 145 |
| Missile length, m | 4.4 |
| Missile diameter, m | 0.42 |
| Launch interval in any salvo sequence, sec | 2-3 |
| Max horizontal missile turn after launch, deg | -90... +90 |

100mm A190E UNIVERSAL

Light-Weight Gun Mount



Mission

A190E Universal light-weight, single-barrel, automatic turreted gun mount is designed to engage air, surface and coastal targets. It can be mounted on ships and boats.

Features

- High efficiency of fire against air targets (including low-flying ones), surface and coastal targets thanks to high rate of fire and precise fire control system;
- High level of combat automation and, as a result, reduced reaction time and crew;
- Reduced weight and overall dimensions;
- High jam-immunity and survivability;
- Fire delivery capability in case of total power

loss;

- Independent two-side ammunition feed (from port and starboard magazines), ensuring rate-of-fire increase by 1.5 times (if compared with similar guns of the same calibre).

Basic specifications

| | |
|-----------------------------|--------------|
| Calibre, mm | 100 |
| Rate of fire, rds/min | up to 80 |
| Range of fire, m, more than | 20,000 |
| Elevation angle, deg | -15... +85 |
| Ammunition load, rds | 80 |
| Gun mount weight, kg | up to 15,000 |

30mm AK-630M

Automatic Gun Mount



Mission

30mm AK-630M automatic gun mount is designed to engage air and surface targets, such as anti-ship missiles, aircraft, helicopters, other types of air strike weapons, as well as small-size surface ships, drifting mines, and fire emplacements and observed enemy personnel ashore.

It is a turret-type mount remotely controlled by a fire control radar system and a sighting station (backup control post). It features AO-18 automatic gun with a revolving, continuously cooled six-barrel cluster, automatic belt feed, and a breech block mechanism to ram the round and extract the case after the shot.

Features

- Replacement option for the vintage AK-230

shipborne gun mounts;

- Increased ammunition load ready for automatic fire (2,000 rounds in a round-type magazine);
- High rate of fire of AO-18 six-barrel gun with the revolving cluster unit;
- Remote laying by the fire control system and sighting station;
- Fire adjustment and crew training capabilities (fire with practice rounds at target imitators).

Basic specifications

| | |
|---|-----------------------|
| Calibre, mm | 30 |
| Max range of fire, m | up to 5,000 |
| Rate of fire, rds/min | up to 5,000 |
| Muzzle velocity, m/s | 875 |
| Laying angles, deg: | |
| elevation | -12... +88 |
| traverse | -180... +180 |
| Ammunition load, rds | 2,000 (in a magazine) |
| Gun mount weight (w/o ammunition load), kg | not more than 1,000 |



30mm AK-306

Light-Weight Automatic Gun Mount



Mission

30mm AK-306 light-weight automatic gun mount is a close-range weapon system designed for self-defence of warships against aircraft, helicopters and other air strike weapons, as well as for engagement of pin-point surface targets and drifting mines, unsheltered enemy manpower and weapon emplacements ashore. AK-306 is controlled by OPU-1 optical sight.

Features

- Replacement option for vintage AK-230 gun mounts on small-displacement ships;
- AO-18L light-weight six-barrel gun with an electrically-driven revolving cluster;
- Reduced weight of the gun mount (by nearly a half) thanks to light alloys used in load-bearing components, ammunition feed system and protective elements.

Basic specifications

| | |
|---|--------------|
| Calibre, mm | 30 |
| Target engagement range, m: | |
| against air targets (slant range) | 4,000 |
| against small-size surface/in-shore targets | 5,000 |
| Max laying angles, deg: | |
| traverse | -180... +180 |
| elevation | -12... +85 |
| Rate of fire, rds/min | up to 1,000 |
| Muzzle velocity, m/s | 875 |
| Gun mount weight (w/o ammunition), kg | 1,100 |

30mm 2M-3M-1M

Gun Mount with 2A42 Cannon



Mission

30mm 2M-3M-1M gun mount is designed to engage small-size soft-skinned mobile and stationary surface targets such as small-displacement ships and boats, drifting mines, soft-skinned shore-based targets and unsheltered personnel, as well as to repel air attacks.

Composition

- 2A42 automatic gun

- 2E 52-2 type electric drives/stabilisers
- 1P56 optical collimator sight

The upgraded 2M-3M-1M gun mount can be supplied completed with the 3V-89 control system.

Basic specifications

| | |
|--|-------------------|
| Calibre, mm | 30 |
| Rate of fire, rds/min: | |
| minimum | 200-300 |
| maximum | not less than 500 |
| Muzzle velocity, m/s | 960 |
| Laying angles, deg, not less than: | |
| traverse | -150... +150 |
| elevation | -20... +80 |
| Max angular speed, deg/s, not more than: | |
| laying | 30 |
| changeover | 50 |
| Effective firing range, km, up to: | |
| small surface ships/boats | 4 |
| floating mine | 0.5 |
| soft-skinned shore-based targets and personnel | 4 |
| air targets | 2 |
| Gun mount weight (w/o ammunition, crew, APU and cables), kg, not more than | 1,400 |
| Reaction time, sec: | |
| automatic mode | 5-7 |
| semiautomatic mode | 6-8 |
| Target acquisition range, in fair weather, km: | |
| air targets and small-size surface/shore-based targets | 8-14 |
| large surface and shore-based targets | 15-20 |

MEDVEDKA

Small-Size Anti-Submarine Missile System



Mission

Small-size Medvedka ASW missile system is intended for engaging submarines. It can be installed on surface ships displacing 350-plus tonnes.

Basic specifications

| | |
|---|--|
| Operational range, km: | |
| maximum | 20.5 |
| minimum | 1.6 |
| Effective depth, m | 16-500 |
| Missile data: | |
| weight, kg | 800 |
| length, m | 5.53 |
| diameter, m | 0.4 |
| Torpedo data: | |
| weight, kg | 285 |
| calibre, m | 0.324 |
| length, m | 3.05 |
| Launch position | inclined |
| Launcher | retractable cluster of 0.44-meter diameter tubes |
| Number of tubes in each launcher | 2/4 |
| Four-tube launcher weight with missiles, t | 9.2 |
| Dimensions, four-launcher configuration, stowed position (length x width x height), m | 5.8 x 1.9 x 2.4 |
| Launch readiness time (w/o laying), sec | 15 |
| Time between launches in a salvo, sec | 6 |
| Combat crew: | |
| fire control operator | 1 |
| maintenance personnel | 2 |

Composition

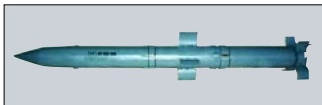
- missiles
- launchers
- fire control system
- ground support equipment

Features

The missile comprises solid-propellant motor, warhead with a flight range control unit, small-size MPT-TUE ASW homing torpedo, release mechanism, stabilisation and parachute retarding system.

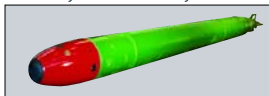
Missiles are launched from a non-stabilised launcher with high accuracy thanks to advanced sighting and launch timing procedures. Baseline version is a four-tube modular launcher, but inclined or vertical configurations can be offered on request.

Medvedka ASW missile system can be employed in a wide range of operational conditions: with ambient temperatures from -40°C to +50°C, up to 98% humidity at +35°C, rain, fog, heavy winds (up to 20 m/s), Sea States up to 6.



TEST-71ME/TEST-71ME-NK

Electrically-Driven Remotely Controlled Homing Torpedoes



Mission

TEST-71ME torpedo is designed to engage submerged submarines. TEST-71ME-NK torpedo is designed to search for, to detect and to destroy submarines and surface ships.

The torpedoes can be launched from surface ships (TEST-71ME-NK) and submarines (TEST-71ME/ME-NK). There are practice versions for combat crew training, operational effectiveness and crews' retraining assessments.

TEST-71ME/ME-NK torpedoes are stored and transported in a sealed nitrogen-filled container.

Composition

TEST-71ME

- homing system
- one proximity and two impact exploders
- warhead
- disposable storage battery
- control equipment
- electronic unit
- torpedo-mounted and towed remote control

wire coils

- electric motor

TEST-71ME-NK

- homing system
- two proximity (acoustic and electromagnetic) and two impact exploders
- warhead
- disposable storage battery
- yaw/depth/heel control equipment
- electronic unit
- torpedo-mounted and towed remote control wire coils
- electric motor

Features

TEST-71ME

The homing head, remote and yaw/depth/heel control systems steer the torpedo in two planes into engagement zone where a proximity acoustic or two impact exploders would go off.

The active sonar homing system and remote control unit provide effective torpedo guidance onto a manoeuvring target, irrespective of its noise level.

With the remote control system the operator can steer the torpedo and monitor its manoeuvres, or interrupt homing and re-lock the torpedo onto another target, which is especially valuable if a hostile submarine employs hydroacoustic countermeasures (submarine simulators, hydroacoustic decoys, etc.).

The power pack comprising a disposable battery and a birotatory electric motor ensures the torpedo's wakeless going, constant speed and range regardless of the running depth. To facilitate operation of the submarine's sonar the torpedo has two speed modes.

TEST-71ME-NK

TEST-71ME-NK torpedo, a derivative of TEST-71ME torpedo, is designed to replace earlier versions of the latter, and 53-65KE torpedoes currently installed in Project 877EKM submarines. Its operational characteristics are improved thanks to shorter preparation time at naval stations and onboard submarines, and reduced torpedo crew.

Basic specifications

| | TEST-71ME | TEST-71ME-NK |
|----------------------------|---|--|
| Calibre, mm | 534.4 | 534.4 |
| Length, mm | 7,863 | 7,930 |
| Weight, kg: | | |
| live torpedo | 1,804 | 1,820 |
| practice torpedo | 1,444 | 1,445 |
| explosive charge | 205 | 205 |
| Speed, kts: | | |
| Mode 1 | 40 | 40 |
| Mode 2 | 24 | 26 |
| Range, m | 20,000 | 20,000 |
| Target detection range, m: | | |
| submarine | up to 1,000 | 1,500 |
| surface ship | | 180 x Vs (Vs - ship) |
| speed) | | |
| Safety levels | 3 | 3 |
| Platforms | submarines with 534mm torpedo tubes | submarines and surface ships with 534mm torpedo tubes |

SET-65KE

Electrically-Driven Homing Torpedo



Mission

SET-65KE ASW torpedo is designed to engage submarines. It can be launched both from surface ships and submarines. Its practice version is used for combat crews training, evaluation of its effectiveness and repeated launches after crew's re-training.

Composition

- ECM-resistant, active/passive homing system
- proximity and impact exploders
- HE warhead
- electric propulsion assembly with a disposable self-activated battery
- control unit

Features

SET-65KE torpedo is distinguished by high speed, long operational range and autonomous operation (fire-and-forget capability). It performs two-plane manoeuvres steered by active/passive sonar homing head and yaw/depth/heel control system into target zone where acoustic proximity or impact exploder would initiate the warhead explosion.

Its propulsion unit provides wakeless movement, constant speed and range regardless of the running depth. The torpedo is stored and transported in a watertight nitrogen-filled container.

The torpedo can be upgraded or retrofitted (for example, converted to a mine variant or upgraded for launch from 6,400mm-long torpedo tubes).

Basic specifications

| | |
|--------------------------------|--|
| Calibre, mm | 534.4 |
| Length, mm | 7,728 |
| Weight, kg: | |
| live torpedo | 1,703 |
| practice torpedo | 1,342 |
| Range, m | up to 16,000 |
| Speed, kts | 40 |
| Target detection range, m | up to 1,500 |
| Submarine engagement depths, m | 27-400 |
| Homing | active/passive sonar with phased direction finding |

TE-2

Versatile Electrically-Driven Remotely Controlled Homing Torpedo

Mission

TE-2 torpedo is designed to engage cruising submarines and warships as well as fixed targets. It can be launched from submarines in the autonomous and remotely controlled modes, and from surface warships in the autonomous mode.

Features

TE-2 torpedo can be employed in ocean areas with water salinity of 30-35 pro mille and temperatures ranging from 0°C to +25°C.

The torpedo is distinguished by a three-beam anti-ship homing system, absence of



proximity acoustic exploder, and use of active influence electromagnetic exploder with underwater target-attack capability.

There are three modifications of the TE-2 torpedo designed for employment from submarines and surface warships armed with 534mm torpedo tubes:

- TE-2-01 with mechanical data input;
- TE-2-02 with electric data input, requiring installation of UKASTU unified shipborne remote control equipment;
- TE-2-03 improved performance torpedo with electric data input, requiring installation of UKASTU unified shipborne remote control equipment.

Basic specifications

| | TE-2-01 | TE-2-02 | TE-2-03 |
|--|------------|----------|----------|
| Calibre (diameter), mm | 534.4 | 534.4 | 534.4 |
| Length, mm, not exceeding: | | | |
| live torpedo with command wire coil (submarine-launched) | 8,188 | 8,300 | 8,100 |
| live torpedo w/o command wire coil (submarine- and ship-launched) | 7,863 | 7,863 | 7,650 |
| practice torpedo with command wire coil | 8,188 | 8,400 | 8,400 |
| practice torpedo w/o command wire coil | 7,945 | 7,945 | 7,945 |
| Weight, kg: | | | |
| live torpedo with command wire coil | 2,400 | 2,400 | 2,400 |
| live torpedo w/o command wire coil | 2,350 | 2,350 | 2,350 |
| practice torpedo with command wire coil | 1,950 | 1,950 | 1,950 |
| practice torpedo w/o command wire coil | 1,900 | 1,900 | 1,900 |
| warhead | 250 | 250 | 250 |
| Average speed at full range (in water with 35 pro mille salinity at +10°C temperature), kts: | | | |
| first mode | 45±2 | 45±2 | 48±2 |
| second mode | 32±3 | 32±3 | 33±3 |
| Range of fire, m: | | | |
| first mode | 15,000 | 15,000 | 20,000 |
| second mode | 25,000 | 25,000 | 30,000 |
| Firing data input method | mechanical | electric | electric |
| Submarine engagement depth, m | 20-450 | 20-450 | 20-600 |
| Surface target draught, m, no less than | 3 | 3 | 3 |
| Live torpedo assigned service life, years | 10 | 10 | 10 |
| Onboard storage period, years | 1.5 | 1.5 | 2 |
| Storage time in periodically flooded torpedo tube, months | 6 | 6 | 6 |

RKPTZ-1E

Torpedo Countermeasures Rocket System



Mission

RKPTZ-1E torpedo countermeasures rocket system is intended to engage attacking torpedoes, or to lure them away from the ship. Also, it can be used to engage submarines, combat divers and underwater saboteur assets.

Composition

- ten-barrel remotely controlled KT-153E launcher
- rocket rounds of various types
- fire control equipment
- ammunition loading system
- ground-based equipment

Features

The launcher is fitted with ten launch tubes arranged in two rows. Below the launcher, there is a loading system and an ammunition magazine.

- The system can fire three types of rounds:
 - 1115G rocket (with HE warhead and impact-action/remotely-activated exploder) designed to destroy underwater targets at a given depth;
 - 1115Z depth barrage rocket designed for remote planting in the torpedo's path of a drifting barrage minefield with a few HE combat elements armed with proximity acoustic exploders;
 - 1115O rocket with a hydroacoustic decoy for deception of the torpedo's homing system.
- Thanks to diverse types of ammunition

RKPTZ-1E can establish multilayer defence of the ship against underwater threats. It is integrated with the ship's sonar, and is capable of destroying homing torpedoes with a single salvo.

Basic specifications

| | |
|---|--|
| Calibre, mm | 300 |
| Firing range, m: | |
| maximum | 3,000 |
| minimum | 100 |
| Weight, kg: | |
| launcher, unloaded | 6,200 |
| loading and feed system (max) | 6,168 |
| 1115G rocket round | 250 |
| 1115Z rocket round | 230 |
| 1115O rocket round | 196 |
| Weight of warhead explosive, kg: | |
| 1115G | 120.5 |
| 1115Z | 80 |
| Round length, mm | 2,200 |
| Combat readiness time, on receiving target data, sec, not more than | 15 |
| Effective depth, m | up to 600 |
| Modes of firing | salvo, programmed, series |
| Programmed launch options | 2xSO2+4xSZ+4xSG 6xSZ+4xSG 10xSG 10xSZ |
| Number of launch tubes | 10 |
| Load hoisting height, mm | 6,100-14,100 |
| Number of conveyor magazines | 21-41 |
| Torpedo kill/diversion probability by a single salvo: | |
| straight-going | 0.9 |
| homing | 0.76 |
| Operational temperature range, °C | -40... +50 |

RPK-8E

Anti-Submarine Rocket System



Mission

The system is intended for protection of surface ships against enemy submarines, attacking torpedoes and combat swimmers.

Composition

- RBU-6000 anti-submarine rocket launcher
- 212mm 90R anti-submarine rocket with underwater gravitational projectile separated after splashdown
- fire control system
- ammunition loading system
- ground support equipment

Features

- 90R ASW rocket with enhanced hit probability;
- Target designation provided by the ship's sonar.

Basic specifications

| | |
|---|--------------|
| Calibre, mm | 212 |
| Range of fire, m: | |
| maximum | 4,300 |
| minimum | 600 |
| Weight, kg: | |
| system, w/o ammunition load | about 9,000 |
| launcher, unloaded | max 3,500 |
| ammunition loading/feeding system | 4,700 |
| rocket | 112.5 |
| projectile warhead | 19.5 |
| Rocket length, mm | 1,832 |
| Submarine engagement depth, m | up to 1,000 |
| Effective homing radius, m | 130 |
| Single salvo hit probability | up to 0.8 |
| Combat readiness time, after target detection, sec, not more than | 15 |
| Number of tubes, launcher | 12 |
| Load hoisting height, mm | 5,825/14,225 |
| Number of conveyor magazines | 25/61 |



MDM-1 Mod.1, MDM-2 Mod.1 and MDM-3 Mod.1

Sea Bottom Mines



MDM-1



MDM-3

Mission

MDM-1 mod.1 and MDM-2 mod.1 sea bottom mines are intended for employment in minefields to endanger and destroy ships and surfaced or submerged submarines. MDM-3 mod.1 sea bottom mines are used in defensive minefields to destroy small-displacement ships and amphibious assault craft.

Features

The mines are fitted with local three-channel influence exploders activated by target's acoustic, electromagnetic and hydrodynamic fields sensed in a hemispherical danger zone. The exploders allow the mines to be deployed in both three- and two-channel configurations, with any combination of the channels possible. The mines possess effective anti-sweeping protection from modern influence sweepers and resistance to natural clutter owing to advanced

exploder operating principle and anti-sweep device logic, as well as mine timing and ship counting devices employed. Intricate planting patterns and camouflage painting of the mines hinder their detection by sonars of surface ships and submarines, or by mine-hunting devices of remotely operated underwater vehicles.

MDM-1 Mod. 1 Sea Bottom Mine

The mine can be laid by submarines equipped with 534mm torpedo tubes and ships fitted with mine-laying rails/ramps or mine-scattering systems. Surface ships can lay the mines at speeds of up to 15 knots, and submarines - at speeds of up to 8 knots.

When the assigned service life of the mine expires, it is self-destroyed.

MDM-2 Mod.1 Sea Bottom Mine

Basic specifications

| | MDM-1 Mod.1 | MDM-2 Mod.1 | MDM-3 Mod.1 |
|--|----------------|----------------|----------------|
| Diameter, mm | 534 | 630 | 450 |
| Length, mm | 2,860 | 2,785 | 1,580 |
| Weight, kg | 5,485* | 2,250** | 1,525** |
| | 960 | 1,370 | 525 |
| | 1,070* | 1,425** | 590** |
| Operating depth, m | 8-120 | 12-125 | 8-30 |
| Planted mine service life, years, not less than | 1 | 1 | 1 |
| Independent safety devices | 3 | 3 | 3 |
| Allowable service period (with scheduled maintenance and in standard operational conditions), years, not less than | 10 | 10 | 10 |

* – for mines laid through hydraulically-operated torpedo tubes

** – shipborne version

The mine can be planted from aircraft (airborne platforms) fitted with mine racks and safety actuation and release devices, as well as from surface ships equipped with mine-laying rails and ramps or mine-scattering systems. Mines can be laid by ships sailing at speeds of up to 15 knots, and by aircraft flying at speeds of up to 1,000 km/h from altitudes of not less than 500 m.

The mines are self destroyed when their service life expires, or if planted on land or shoals from aircraft.

MDM-3 Mod.1 Sea Bottom Mine

The mine is designed to be laid by aircraft fitted with mine racks and safety actuation and release devices, as well as by surface ships equipped with mine-laying rails and ramps, or mine-scattering systems. Mines can be laid by ships sailing at speeds of up to 15 knots, and by aircraft flying at speeds of up to 1,000 km/h from altitudes of not less than 500 m.

The mines are self-destroyed when their service life expires, or if laid on land or shoals by aircraft.

PMK-2

ASW Mine System



Mission

PMK-2 ASW mine system is designed for planting offensive and defensive minefields to endanger and destroy dived submarines, to deny access to patrol areas, to seal off submarine bases, bottlenecks and straits, and to defend sea lines of communications.

Features

The system is equipped with active/passive sonar target acquisition equipment (including mechanisms to prevent action against surface ships), which detects and identifies the target, and a warhead based on a small-size ASW torpedo.

The mines can be scattered from submarines equipped with 534mm calibre torpedo tubes; aircraft fitted with inner fuselage

racks and a parachute actuation and release system; as well as surface ships with mine-laying rails and mine-scattering devices.

Mines can be dispensed:

- automatically from the torpedo tubes of a submarine at speeds of up to eight knots and a running depth of up to 300 m;
- from surface ships at speeds of up to 18 knots;
- from aircraft flying at altitude of at least 500 m and speed of up to 1,000 km/h.

The mines can be planted automatically at preset depths in a wide range. The sonar equipment detects, acquires and designates the target, launching against it a small-size ASW torpedo. After the launch, the torpedo conducts circular target search at a preset depth. The homing system locks on the target submarine and guides the torpedo onto it. The target is destroyed by the HE warhead with a combination fuse.

Basic specifications

| | |
|--------------------------------------|-------------|
| Diameter, mm | 534 |
| Length, mm | 5,600-7,900 |
| Weight, kg | 1,400-1,800 |
| TNT equivalent of warhead charge, kg | 130 |
| Planting depth, m | 100-1,000 |
| Operational life (planted), years | 1 |



NAVAL SYSTEMS

SHIPBORNE ELECTRONIC SYSTEMS

FREGAT-Family

Radars



Mission

Fregat-family 3D radars are designed to detect air and surface targets, and provide target designation data to weapon systems. The radars are capable of performing effectively in intensive ECM environment the following tasks:

- Air/surface situation surveillance and display;
- Detection of air targets, including low-flying and small-size ones;
- Surface target detection;
- Target tracking and transmission of tracking data to command and control systems;
- Provision of primary radar information to firing units, ECM assets and data processing systems;
- Identification "friend-or-foe";
- Target tracking and provision of secondary radar information, if equipped with data processing systems, to command and control systems.

Fregat-family radars can be integrated with

other shipborne electronic equipment. They feature automatic programmed switch-on capability to exclude human errors, and automated test equipment to locate malfunctions and failures in line replaceable units.

Fregat-family radars differ in scanning range, number of microwave channels, and weight.

Depending on version, the radars can be mounted on various ships displacing 500-plus tonnes: Fregat-MAE – on small- and medium-displacement ships; Fregat-MAE-1 and Fregat-MAE-4k – on small-displacement ships; Fregat-MAE-2 – on medium-displacement ships; Fregat-MAE-3 and Fregat-MAE-5 – on medium- and large-displacement ships.



Basic specifications

| | Fregat MAE | Fregat MAE-1 | Fregat MAE-2 | Fregat MAE-3 | Fregat MAE-4k | Fregat MAE-5 | Fregat M2EM |
|----------------------------|---------------------|-----------------|-----------------|-----------------|------------------|-----------------|----------------|
| Frequency band | E | E | E | E | H | E | E |
| Number of radar channels | 1 | 1 | 1 | 2 | 1 | 2 | 2 |
| Scanning zone: | | | | | | | |
| in range, km | 150 | 300 | 300 | 300 | 150 | 300 | 300 |
| in azimuth, deg | 360 | 360 | 360 | 360 | 360 | 360 | 360 |
| in altitude, km | 30 | 30 | 30 | 30 | 20 | 30 | 30 |
| in elevation, deg | 45 (55)* | 30 | 45 | 55 | 40 | 55 | 45 (55)** |
| Detection range, km: | | | | | | | |
| fighter | 130 (125)* | 125 | 200 | 180 | 58 | 230 | 230 |
| missile | 30 (27)* | 27 | 43 | 38 | 17 | 50 | 50 |
| ship | line-of-sight range | | | | | | |
| Min operational range, km | 2 | 2 | 2 | 2 | 1.5 | 2 | 2 |
| Measurement accuracy: | | | | | | | |
| range, m | 120 | 120 | 120 | 120 | 120 | 120 | 120 |
| azimuth, ang.min | 24 | 24 | 24 | 24 | 14 | 24 | 24 |
| elevation, min | 26 (40)* | 43 | 26 | 30 | 18 | 30 | 30 |
| Max scan rate, sec | 4 | 4 | 4 | 2.5 | 2 | 2.5 | 2.5 |
| Number of targets tracked | - | - | - | - | 40 | 40 | - |
| Antenna rotation rate, rpm | 15 | 15 | 15 | 12/6 | 30 | 12/6 | 12/6 |
| Number of units | 7 | 8 | 10 | 15 | 8 | 22 | 20 |
| Area occupied, sq.m | 16 | 16 | 24 | 34 | 20 | 51 | 48 |
| Weight, t: | | | | | | | |
| equipment | 2.9 | 3.1 | 4.56 | 6.6 | 2.60 | 9.6 | 9.25 |
| antenna station | 2.2 | 1.0 | 2.25 | 2.5 | 0.39 | 2.5 | 2.50 |
| Power consumption, kW | 30 | 30 | 60 | 45 | 30 | 90.3 | 90 |
| Into-action time, min | 5 | 5 | 5 | 5 | 3 | 5 | 5 |

* – parameters in parentheses are given for the low-frequency E-band version

** – the first and second channels respectively

PODBERYOZOVIK-Class

Radars



Mission

Podberyozevich-ET1 and Podberyozevich-ET2 3-D radars are designed to detect air and surface targets, and to designate them to weapon systems. The radars can be mounted on medium and large displacement ships with the purpose to:

- provide information on air/surface situation;

- detect surface and air targets, including low-flying and small-size ones;
- track targets and transmit tracking data to combat control systems;
- provide primary radar information to firing units, ECM and data processing systems;
- perform identification "friend-or-foe";
- track the detected targets and provide secondary radar information, if completed with

appropriate data processing equipment, to combat control systems.

Composition

- antenna assembly
- transmitter
- radar controls and displays

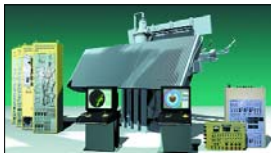
Features

The Podberyozevich-ET2 radar's vertical antenna aperture is two times smaller than that of Podberyozevich-ET1.

Both radars are equipped with automated built-in test equipment capable of locating malfunctions and failures in any line replaceable unit. Podberyozevich-class radars can be integrated easily with other shipborne electronic systems.

Basic specifications

| | Podberyozevich-ET1 | Podberyozevich-ET2 |
|--------------------------------|--------------------|--------------------|
| Frequency band | C | C |
| Number of coordinates measured | 3 | 3 |
| Scanned zone: | | |
| in range, km | 500 | 500 |
| in altitude, km | 40 | 40 |
| in azimuth, deg | 360 | 360 |
| in elevation, deg | 30 | 30 |
| Detection range, km: | | |
| fighter | 300 | 240 |
| missile | 55 | 45 |
| ship | line-of-sight | line-of-sight |
| Min operational range, km | 5 | 5 |
| Measurement accuracy: | | |
| range, m | 150 | 150 |
| azimuth, ang.min | 24 | 24 |
| elevation, ang.min | 30 | 60 |
| Antenna rotation rate, rpm | 12; 6 | 12; 6 |
| Number of components | 7 | 7 |
| Area occupied, sq.m | 30 | 30 |
| Weight, t: | | |
| equipment | 3.2 | 3.2 |
| antenna | 4.7 | 2.9 |
| Power consumption, kW | 45 | 45 |
| Into-action time, min | 0.5 | 0.5 |



POZITIV-ME

Radars

Mission

Pozitiv-ME and Pozitiv-ME1.2 3D active radars are an integral self-contained part of multi-purpose radioelectronic systems of small- and medium-displacement ships. The radars are designed to detect and track air and surface targets.

Features

Pozitiv-family radars perform the following tasks:

- Air/surface situation surveillance and display;
- Automatic detection and tracking of surface and air targets, including small-size, low-flying, and diving ones;
- Target detection and tracking in preselected sectors with automated mode selection depending on the ECM environment;
- Target identification "friend-or-foe" by means of shipborne IFF equipment and built-in antennas;
- Target coordinates and motion parameters determination;
- Target classification by trajectory parameters;
- Target threat prioritisation;
- Automatic target distribution;
- Target distribution plan display with on-line correction possibility;
- Targeting data feed to cooperating ship's systems;
- Automatic operational modes selection;
- Automatic operability control and trouble-shooting;
- Interface with shipborne navigation systems;
- Recording of target data pro-

cessing output, worked-out solutions, and interfaced system status;

- Personnel training in simulated radar environment.

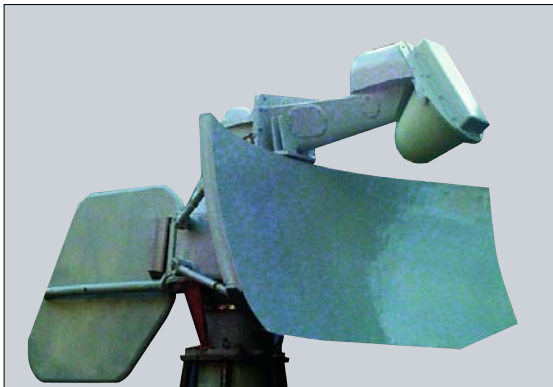
Thanks to use of high-speed rotation antenna with electronic elevation scanning, special target surveillance/lock-on/tracking/prioritisation modes and algorithms, automation of target designation and data distribution, Pozitiv radars feature short reaction time, high throughput capacity and target designation accuracy, thus enhancing combat capabilities of the conjugated weapon systems.

Basic specifications

| | Pozitiv-ME1 | Pozitiv-ME1.2 |
|--|-------------------------------|-------------------------------|
| Operational frequency band | X (3 cm) | X (3 cm) |
| Target coordinates determined simultaneously | 3 (bearing, range, elevation) | 3 (bearing, range, elevation) |
| Aerial: | | |
| type | flat phased array | flat phased array |
| directional diagram | multi-beam | multi-beam |
| directional diagram | frequency-position | frequency-position |
| elevation control | | |
| revolution cycle, sec | 2; 5; 10; 20 | 1; 2; 5 |
| Scanned zone: | | |
| in range, km | up to 150 | up to 80 |
| in altitude, km | up to 30 | up to 20 |
| in elevation, deg | up to 85 | up to 85 |
| in azimuth, deg | 360 | 360 |
| Max target detection range (w/o ECM, normal radar visibility, Sea State up to 3, 12-m high aerial, 0.5 probability per cycle), km: | | |
| air target (RCS=1 sq.m, flight altitude - 1,000 m) | 110 | 50 |
| anti-ship missile (RCS=0.03 sq.m, flight altitude - 15 m) | 15 | 13-15 |
| surface target (RCS=10,000 sq.m) | 0.9-0.95 radio horizon range | 0.9-0.95 radio horizon range |
| Min detection range, m | 1,000 | 1,000 |
| Coordinates detection root-mean-square error: | | |
| in range, m | 20 | 20-40 |
| in azimuth, mil | 3-4 | 3-6 |
| in elevation, mil | 3-4 | 4-6 |
| Lock on-to-designate reaction time, sec | 3-5 | 2-4 |
| Simultaneously tracked targets | 3-5 | up to 40 |
| Weight, kg: | | |
| antenna station | 1,460 | 750 |
| underdeck equipment | 1,740 | 1,400 |
| Power consumption, kW | max 45 | 45 |
| Into-action time, min | 3 | 3 |

3Ts-25E

Target Designation Radar



Mission

3Ts-25E target designation radar is designed to provide ECM-resistant secure information on long-range surface (and partly air) tactical situation using active and passive assets. The radar accomplishes the following tasks:

- acquisition and automatic tracking of surface targets, determination of their coordinates and movement parameters;
- air/surface target detection, classification and location based on their electronic equipment emissions;
- target identification by means of coupled IFF interrogators;
- generation and transfer of target designation data to ship's automated missile/torpedo weapons control system, and surface situation data to combat information management system;
- interaction with external data sources (e.g. task force ships, air reconnaissance/designation systems, etc.) via ship's standard and special communication systems integrated with the radar as specified by the ship designer;
- operation in the navigation mode to ensure safety of navigation.

Composition

- active radar channel
- passive radar channel
- equipment used by both channels (multi-band dish antenna, control panels, power management unit, antenna hydraulic drive, high-frequency channels, and offset antenna)

Features

The radar makes coordinated use of active and passive channels to acquire and designate targets. It boasts increased operational range thanks to employment of high-energy active channel, advanced methods of signal generation and complex modulated signal processing, coupled with passive channel data, and requirements of covert operation, in severe ECM and sea clutter conditions.

The active channel uses a multiprocessor system to generate probing signals and radar data. It is integrated with a multi-computer secondary data processing, control and display network.

The passive channel performs hardware/software-based analysis and classification of incoming radar signals by comparing their parameters with those available in the database (up to 1,000 entries).



Control panel

| Basic specifications | |
|--|---|
| Active channel | |
| Carrier frequency band | I (NATO) |
| Probing signal types | pulse, complex with intrapulse phase manipulation |
| Scan modes | circular, sector |
| Target detection range (target RCS - 1,000 sq. m), km: | |
| normal radar visibility | 35-45 |
| high radar visibility | up to 90 |
| super-refraction | up to 250 (depending on the area covered) |
| Resolution in active mode: | |
| range, m | 40-960 (depending on range scale) |
| elevation, deg | 1.5 |
| Passive channel | |
| Input signal frequency band | centimetric-wave, decimetric-wave (complete waveband coverage) |
| Input signal types | pulse, continuous with random polarisation |
| Surface target detection range, km | 50-500 (depending on signal potential and frequency band of electronic equipment emissions) |
| Root-mean-square range error, % | 5-20 (at ranges of up to 50-150 km, depending on time of operation) |
| Root-mean-square bearing error, deg | 0.5-2 (depending on frequency band of electronic equipment emissions) |
| Classification of input signals | probabilistic automatic naval target classification using customer theatre-of-war models |

VAYGACH-U-NAYADA-M

Navigation Radar in MR-212/201-1 Configuration



Mission

MR-212/201-1 version of Vaygach-U-Nayada-M baseline navigation radar is intended to perform short-range surface surveillance,

to augment safety of navigation in poor visibility conditions, and to support implementation of specific tasks in cooperation with other systems.

The radar is capable of accomplishing the following missions:

- presentation of surface and low-flying air threats on tactical situation displays;
- own ship location in reference to coastline and surface prominent points, as well as based on signals of satellite navigation system;
- determination of target location and movement parameters;
- data feed to electronic chart display system.

Basic specifications

| | |
|---|---------------------|
| Range resolution, m | 30 |
| Bearing resolution, deg | 1.3 |
| Max bearing error, deg | 0.5 |
| Max range error, m | 20 or 0.8% of scale |
| Antenna directional pattern width, deg: | |
| in horizontal plane | 1.1±0.1 |
| in vertical plane | 20±2.0 |
| Transmitter peak power, kW | 12 or 20 |
| Operational frequency, MHz | 9,400-9,460 |
| Receiver sensitivity, dB/W: | |
| on scales of up to 1.5 n.miles | 127 |
| on other scales | 131 |
| Radar display diameter, mm | 270 |
| Overall equipment weight, kg | max 1,100 |
| Onboard power consumption, kW | max 4.5 |

Composition

- antenna
- pulse magnetron transmitter
- receiver
- display system



Features

The radar ensures improved navigation performance thanks to:

- Introduction of electronic direction and range finders;
- Image orientation modes: Heading, North, Heading-stable, scan centre shift within 2/3 of the radius;
- True motion parameter presentation;
- Coordinate marker and tracks display;
- Tracks of target's previous position with adjustable duration time;
- Positioning of electronic ruler in any part of the screen;
- Coverage areas selection;
- Automatic detection and warning of targets entering the coverage area;
- Input and display of outlined map (250 lines);
- Display of electronic charts (option – MK54-IS) with superimposed SARP data; target path logging;
- Display of scaled image sections on a free screen space (electronic magnifying lens), data on own ship's heading and speed, radar mode information, and target data records.



POYMA-E

Radar Data Processing System



Mission

Poyma-E system is designed for processing and displaying data from shipborne surveillance and target designation radars. It can be installed on small, medium and large displacement ships.

Poyma-E supports implementation of the following missions:

- processing and fusion of information from two radars simultaneously;
- air/surface situation display;
- surface/air target automatic acquisition, lock-on, tracking, and designation.

Basic specifications

| | |
|---|-----------|
| Root-mean-square coordinate-measurement error: | |
| in range, m | 120* |
| in azimuth, ang.min | 6* |
| in elevation, ang.min | 7* |
| Number of targets tracked simultaneously by one workstation | 20 |
| Target data determination time, sec | 1 |
| Number of workstations | 2-9 |
| Workstation power requirements, kW | 1.0-4.5 |
| Workstation weight, kg | 150-3,000 |
| Workstation area, sq.m | 3.0 -150 |
| Into-action time, min | 3 |

* – when integrated with Fregat-MAE radar

Features

Depending on battle/control station integration requirements as well as types of ships and weapon systems, Poyma-E can incorporate from two to nine workstations.

In automatic mode, one workstation can handle about 20 targets, but this parameter can be enhanced significantly with additional workstations integrated into local area network.

DATA PROCESSING AND CLASSIFICATION SYSTEM

for Ladya Air/Surface Surveillance Radar



Mission

Data processing and classification system is designed for processing, classification and display of target information received via one to three independent radar channels from shipborne surface and air search radars, as well as from up to ten shore-based radars.

Composition

- radar interface units
- multifunction workstations of target detection/tracking/distribution operators

Features

The system provides target designation data

for naval anti-air/anti-missile weapons by integrating information from all available sensors. It can be adapted to any structure of shipborne/coastal weapon systems due to modular design and Ethernet local area networking. The system also can generate, record and display simulated tactical situation for training purposes.

The system can be mounted on ships of any type and displacement, as well as coastal air/surface surveillance radar stations, in order to establish continuous radar coverage of particular sea surface and coastal areas.

Basic specifications

| | |
|---------------------------------------|--|
| Number of independent radar channels: | |
| shipborne version | up to 3 |
| shore-based version | up to 10 |
| Radar coverage: | |
| range, km | 500 |
| azimuth, deg | 360 |
| elevation, deg | 90 |
| Information update rate, sec | 1-18 |
| Resolution: | |
| range | one quantisation step |
| angular | 0.5 of radar directional pattern width |
| Root-mean-square computation errors: | |
| range | 0.8 of range quantisation step |
| angular | 0.1-0.5 of directional pattern width |
| Continuous operation, hrs | 24 |
| Readiness time, min | 1 |

PODZAGOLOVOK-23

Basic Collective Mutual Interference Avoidance System

Mission

Podzagolovok-23 mutual interference avoidance system is designed to ensure electromagnetic compatibility of surveillance and navigation radars, anti-aircraft gun and missile fire control systems, data exchange equipment and aircraft takeoff and landing systems, with one another, as well as with electronic intelligence and jamming systems of the carrier ship. It is also intended to provide EMC between the onboard electronic equipment of missile weapon systems and the own ship's active ECM assets.

Features

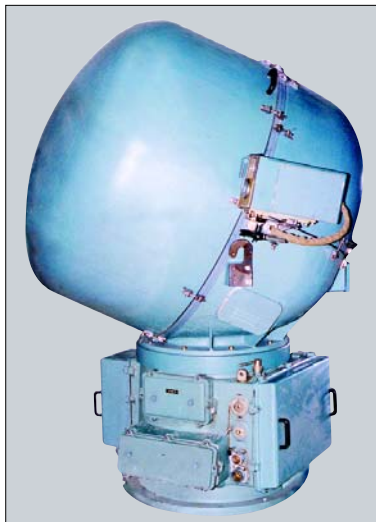
The system's combat operation is automated and does not require operator's intervention.

Podzagolovok-23 system can be installed on ships of any type and displacement and is offered as a replacement of Zvyozdochka mutual interference avoidance system.

| Basic specifications | |
|--|---|
| Number of data acquisition channels | 8-32 |
| Number of the protected channels: | |
| pulse radar receivers | 4-16 |
| autotracking gate radars | 4-16 |
| active ECM and ELINT receivers | 8-32 |
| Number of devices | 1-2 |
| Input radar signal parameters: | |
| amplitude, V | 2-4 (40-50)* |
| polarity | positive |
| duration, mcsec | from 0.3 to constant potential (0.3-100)* |
| on-off time ratio | unlimited (min 4)* |
| delay time, mcsec | 2-2.5 |
| input impedance, Ohm | 75 (150)* |
| Output signal parameters: | |
| amplitude, V | 2-5 |
| polarity | positive |
| duration, mcsec | from 0.5 to constant potential (0.3-100)* |
| output impedance, Ohm | 75 (150)* |
| Readiness time, min | max 1 |
| Power consumption, W | max 300 |
| Continuous operation, hrs | 24 |
| Weight, kg | 45-200** |
| Area required, sq.m | max 5 |
| * – applied to interfaces with electronic equipment meeting requirements for Zvyozdochka system. | |
| ** – depends on the system's version for a particular ship platform. | |

LASKA

Versatile Small-Size Fire Control Radar
for 30mm – 76mm Shipborne Guns



Features

- Self-sustained acquisition and identification of radar-contrast targets in circular and sector scanning modes;
- Track-while-scan of up to four air/surface/coastal targets in one-layer circular or sector surveillance mode;
- Fire control of one or two artillery gun mounts of various calibres against one aerial or two surface targets (among the tracked ones);
- Reception of designation data from ship's surveillance radars and mono-pulse tracking of one target with firing data generation;
- acquisition and lock on the attacking missile launched from the tracked target with solution of the engagement priority problem.

Mission

Laska fire control radar is designed to monitor surface/air situation and to control fire of 30mm-76mm close-range shipborne artillery systems against air/missile and small-size surface targets.

Composition

- surveillance and precision tracking radar
- integrated laser/TV channels
- fire control system comprising display and control panel
- interfaces with artillery mounts and ship systems

Basic specifications

| | |
|--|----------------|
| Operating frequency band, cm | 3 |
| Effective range, depending on range scale selected, km | 14; 21; 30 |
| Instrumental range, km | 30 |
| Elevation scan sector, depending on scan programme selected, deg | 10; 20; 30; 40 |
| Scan time, at 14-km range scale, sec | 2.5-10 |
| Total weight, t | 1.4-1.5 |
| Combat crew | 1 |

PUMA 5P-10E

Multifunction Fire Control Radar System
for 25mm – 305mm Naval Artillery



Mission

Puma 5P-10E radar system is designed to control fire of 25mm – 130mm (up to 305mm) shipborne guns against air, sea- and shore-based targets within the whole engagement envelope. It provides independent circular or sector-bound scanning, automatic lock-on and tracking of air, surface, and radar-contrast shore-based targets. Puma 5P-10E radar can be fitted onto new ships under construction or used for replacement of aged naval artillery fire control systems during ship retrofits.

Basic specifications

| | |
|--|------------------------|
| Data channels | radar, electro-optical |
| Radar channel frequency band, cm | 3 |
| Operational limits: | |
| In all-round scanning mode | |
| azimuth, deg | all-round |
| elevation, deg | -5... +40 |
| range, km | up to 30 |
| In tracking mode | |
| azimuth, deg | -200... +200 |
| elevation, deg | -5... +85 |
| range, km | 60 |
| Target detection time (scan period), sec | 1.5-10 |
| Combat readiness time, sec: | |
| from 'all off' status, not more than | 180 |
| in forced mode | 60 |
| from 'high voltage off' status | 2 |
| Continuous operation time, hrs | 8 |
| Reaction time, sec: | |
| against air targets | 5 |
| against surface targets | 10 |
| Fire transfer time within a 6x3-deg tracking sector, sec | 1 |

MR-123-02 BAGIRA

Upgraded Fire Control System for 30mm, 57mm, 76mm and 100mm Shipborne Anti-Aircraft Guns



Mission

MR-123-02 Bagira fire control radar is designed to simultaneously direct up to four 30mm, 57mm, 76mm and 100mm anti-aircraft gun mounts.

Features

Bagira performs target surveillance, identification and selection tasks either independently or using guidance from detection stations and data gathering/processing systems. It locks on and automatically tracks selected targets, calculates target parameters and generates fire control commands using data from

TV/optical and optronic guidance equipment.

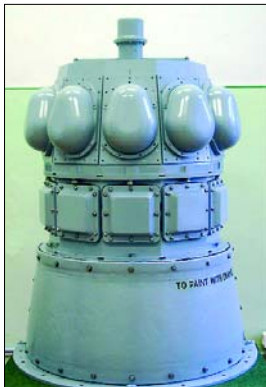
Bagira automatically tracks and engages two targets with two or three automatic guns simultaneously via radar channel (one target) and day/night optronic channel (the other target).

Basic specifications

| | |
|---|---|
| Air surveillance in search mode: | |
| azimuth | all-round (360 deg), sector (60 deg) |
| elevation | in layers within scan area |
| antenna circular rotation period, sec | 4 |
| Continuous operation, hrs | 8 |
| Ship speed, kts | up to 60 |
| Wind speed, m/s | up to 45 |
| Target angular speed, bearing/elevation, deg/sec | up to 30 |
| Overall weight, kg | max 3,600 |
| Readiness time, from HIGH VOLTAGE ON status, sec: | 3 |
| Surface target detection range | radio horizon range |
| Root-mean-square autotracking range error, m | 5 |
| Standby firing modes | day/night, with TV-optical sight |

TK-25E-5

Electronic Suppression System



Mission

TK-25E-5 ECM system is designed to intercept emissions of airborne and shipborne target acquisition radars, weapons control radars and anti-ship missile radar seekers, to perform automatic signal classification, to determine

most dangerous approaches of attacks against the ship, and to provide jamming in threat directions.

TK-25E-5's configuration depends on carrier-ship type and displacement.

Basic specifications

| | |
|---|--|
| Emission detection envelope: | |
| bearing, deg | 360 |
| elevation, deg | 0-40 |
| range | exceeds by 10-20% detection range of the carrier-ship by hostile radars being analysed |
| Root-mean-square bearing error, deg | 2.5-5 |
| Root-mean-square carrier-frequency measurement error, % | 0.3-0.5 |
| Number of targets analysed simultaneously, more than | 100 |
| Reaction time, sec | 3 |
| Jamming frequency band | X-Ku |
| Interception frequency bands: | |
| | P-L |
| | S-C |
| | X-Ku |
| | K4 |
| Jamming energy potential, kW | 8-80 |
| Number of threat directions jammed simultaneously | 2 |
| Power consumption, kW | 10 |

120mm PK-10E

Close-Range Decoy System



Mission

PK-10E decoy system provides a close-range passive ECM capability for surface ships and vessels of various classes. Special rounds fired by its KT-216-E launch system form decoys to protect carrier-ships from radar- and optically-guided weapons.

Composition

- KT-216-E launch system (with 2/4/8/12/16-round launchers depending on the ship type)
- AZ-SO-50/AZ-SOM-50 rounds
- AZ-SR-50 rounds

Features

PK-10E system disperses decoys with physical signatures, more intensive than those of a protected ship, and in close vicinity to it so that hostile weapon seekers lose their track of the ship, or re-lock on a decoy.

KT-216-E launch system can fire decoys day and night, all year round. Its remote control unit and portable control panel have dimensions allowing their passage through 594mm-diameter hatches. Routine maintenance of the

launch system is carried out by a crew of two. Launchers are loaded/reloaded manually with ten rounds in any order (the same type for one launcher - SO or SR). The launchers provide reliable retention of the rounds in launch tubes under any operational loads, transfer of their status information to the remote control unit and automatic control system, and their protection (with canvass bags) from sand, atmospheric precipitates, solar radiation and sea water during the cruise.

Round specifications

| | AZ-SR-50 | AZ-SO-50 | AZ-SOM-50 |
|------------------------------|------------|------------|------------|
| Calibre, mm | 120 | 120 | 120 |
| Length, mm | 1,226 | 1,226 | 1,226 |
| Weight, kg | 25.5 | 20 | 21.8 |
| Payload, kg | 10 | 6 | 7.3 |
| Payload type | chaff | IR, laser | IR, laser |
| Operational temperatures, °C | -40... +50 | -40... +50 | -40... +50 |

Basic specifications

| | |
|---|--------|
| Single launcher readiness time, min: | |
| unloaded launcher | max 29 |
| loaded launcher | max 1 |
| reloading | max 20 |
| Number of bursts | 1-10 |
| Number of rounds in a burst (from each launcher) | 1-10 |
| Interval between bursts, sec | 1-2 |
| Continuous operation, hrs | 12 |
| Launchers with an elevation angle depending on the ship's foundation: | |
| weight, kg | 215 |
| length, mm | 655 |
| width, mm | 962 |
| height, mm | 540 |
| Launchers with a variable elevation angle: | |
| weight, kg | 285 |
| length, mm | 800 |
| width, mm | 962 |
| height, mm | 800 |

MGK-400EM

Sonar System for Submarines

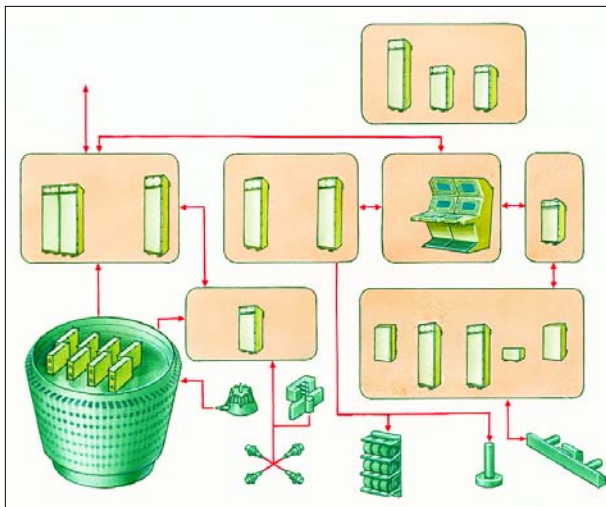
Mission

MGK-400EM sonar system is intended for surveying underwater and surface situations, providing target designation data for weapon systems, as well as detecting navigational obstacles and coastlines, and ensuring passage through narrows.

Features

MGK-400EM sonar system can perform the following missions:

- Detection of submarines, surface ships and torpedoes by their noise signatures;
- Automatic target tracking (submarines, surface ships and torpedoes);
- Interception of signals emitted by active sonars mounted on submarines, surface ships, torpedoes;
- Detection of submarines in the active mode;
- Finding range to submarines tracked in the listening mode;
- Detection of moored mines and navigational obstacles in the active mode;
- Data exchange via hydroacoustic channel and identification of the detected targets (submarines and surface ships);
- Target classification (submarines, surface ships and torpedoes) in the passive (listening) modes;
- Transfer of basic target data to combat infor-



mation management system for weapons targeting;

- Measurement of hydroacoustic interference with the MGK-400EM system operation;
- Target detection range prediction and display
- Automated functional testing of the system, malfunction diagnostics, and trouble-shooting recommendations.

MGK-400EM system sonar system features

advanced antennas with new piezoelectric ceramic compounds and electroacoustic transducers of improved design.

The system can be installed on submarines during their construction or modernisation.

| Basic specifications | |
|---|--|
| | Listening mode |
| Space coverage, deg | 360 |
| Detection range, km: | |
| submarines with 0.05 Pa/Hz noisiness | 16 |
| surface vessels with 10 Pa/Hz noisiness | 100 |
| Automated detection | available |
| Carrier and envelope frequency spectral analysis (LOFAR and DEMON procedures) | for two tracked targets |
| Number of targets tracked automatically | 12 |
| Target bearing measurement accuracy, ang.min | 10 |
| Hydrolocation | |
| Forward scan sector, deg | -30... +30 |
| Range, km | 16 |
| Use of complex signals resistant to reverberation interference | available |
| Mine detection | |
| Moored mine detection range (equivalent radius of 0.4 m), km | 1.8 |
| Passage-through-narrows and coastline detection | available |
| Sonar signal interception | |
| Frequency band, kHz | 1-60 |
| Target bearing measurement accuracy, deg: | |
| 1-10 kHz | 5 |
| 10-30 kHz | 10 |
| 30-60 kHz | incoming signal quadrant is determined |
| Signal parameter measurement | available |
| Hydroacoustic communications | |
| Low-frequency telephone/telegraph and code communication range (directional emission/reception), km | 60 |
| Low-frequency telephone/telegraph communication (non-directional emission), identification and distance-measuring range, km | 30 |
| High-frequency telephone/telegraph communication range, km | 20 |
| NATO-band telephone communication | available |
| Target classification | |
| Automated man-in-the-loop target classification | submarine/surface ship/torpedo classes |
| Measurement of acoustic interference with the system operation | available |
| Operational range prediction | available |
| Automated testing system | available |

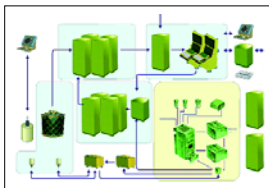
ZARYA-ME

Sonar Suite for Surface Ships

Mission

Zarya-ME sonar is designed to perform the following missions:

- detection of submarines and surface ships in the hydrolocation mode with underkeel, towed and dipping antenna arrays;
- detection of torpedoes, submarines and surface ships in the listening mode with underkeel, towed and dipping antenna arrays;
- automatic target tracking, coordinates and motion parameters determination;
- automatic target classification into submarine, surface ship, torpedo and decoy classes;
- detection of torpedoes in the active mode
- hydroacoustic communications with submarines and surface ships, and identification "friend-or-foe";
- continuous automatic system's functional testing, malfunction diagnostics and location;
- interactive training of the operators;
- communications with the shipborne systems.



Features

Zarya-ME family sonars share a typical structure, differing only in array dimensions and number of hardware components on a particular ship project. Such unification is obtained thanks to the use of real-time multi-processor computers and standard information readouts as well as sonar management and visualisation systems using colour displays for target acquisition/classification and auxiliary data presentation.

Modifications of Zarya-ME sonar are installed on ships of small, medium and large displacement.

Basic specifications

| Underkeel array | |
|---|-----------------------------|
| Energy-linked detection range (directed emission mode, 10-m equivalent radius target), km | up to 35 |
| Range scales (depending on the modification), km | 2.5; 5; 10; 20; 40; 80; 160 |
| Mean coordinate-measuring error: | |
| range, % of scale | 1.1 |
| bearing, deg | 0.7-1.2* |
| Electronic stabilisation angle limits of array pitching (for a range of 160 km), deg | -10... +10 |
| Hydrolocation scan sector, deg: | |
| directional emission (in 30/60-deg sector) | from ±135 to ±150* |
| non-directional emission | from ±135 to ±150* |
| Towed array | |
| Energy-linked detection range (directed emission mode, 10-m equivalent radius target), km | 14-15* |
| Mean coordinate-measuring error: | |
| range, % of scale | 1.1 |
| bearing, deg | 1.3 |
| Hydrolocation scan sector, deg: | |
| directional emission (in 30/60-deg sector) | -160... +160 |
| non-directional emission | -160... +160 |
| Max tow speed, kts | 18 |
| Dipping array | |
| Energy-linked detection range (directed emission mode, 10-m equivalent radius target), km | 16* |
| Mean coordinate-measuring error: | |
| range, % of scale | 1.1 |
| bearing, deg | 1.3 |
| Active hydrolocation scan sector, deg: | |
| directional emission (in 30/60 deg sector) | -180... +180 |
| non-directional emission | -180... +180 |

* - depending on modification

MGK-335EM-03

Sonar System for Surface Ships



Mission

MGK-335EM-03 sonar system is designed to detect submarines in the short-range hydroacoustic surveillance zone, to generate targeting data for ASW weapons, and to provide underwater acoustic communications with submerged submarines.

Features

The system has a distinguishing capability of intercepting signals emitted by active sonars, defining their bearings and parameters, as well as classifying the targets detected.

Its missions include:

- submarine detection in the active mode;
- automatic target tracking;
- provision of initial data for weapons targeting;
- target acquisition by noise emissions in the listening mode, and torpedo attack warning;
- high- and low-frequency sonar communi-

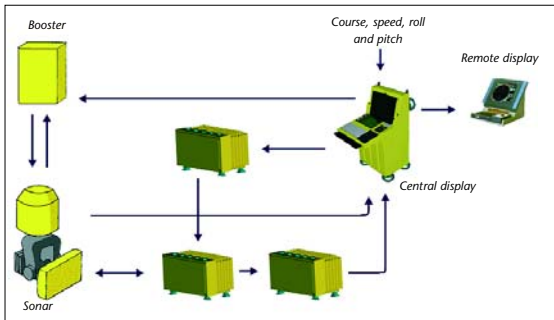
- cations, coded communications, and target identification with range-finding;
- detection of active sonar signals;
- automatic classification of the detected targets;
- monitoring of acoustic interference with the sonar's operation;
- target range prediction and display;
- automatic testing of the system's operational status.

Basic specifications

| Hydrolocation | |
|---|-----------------------------------|
| Spacial scan sector, deg | 260 |
| Submarine detection range (10-m equivalent radius), km | 10-12 |
| Use of complex signals resistant to reverberation interference | available |
| Intercycle signal accumulation, target track display | available |
| Automatic target tracking | available |
| Coordinates-measurement accuracy: | |
| bearing, deg | 0.5 |
| range, % of range scale | 1 |
| Listening mode | |
| Torpedo detection range, km | 2 |
| Automatic target tracking | available |
| Target bearing measurement accuracy, deg | 0.5 |
| Hydroacoustic signal interception | |
| Frequency band, kHz | 1.5-7.0 |
| Signal source bearing measurement accuracy, deg | 10 |
| Signal parameter measurement | available |
| Hydroacoustic communications | |
| Telephone/telegraph communication range, LF/HF, km | 20 |
| Code communication, identification and distance-measuring range, km | 30 |
| NATO-band telephone communications | available |
| Target classification | |
| Automatic operator-assisted target classification | for submarine/ torpedo classes |
| Measurement of acoustic interference with the system operation | available |
| Operational range prediction | available |
| Automated testing system | available |

MG-89ME

Sonar Station for Moored/Seabed Mines and Sunken Objects
Detection/Location



Mission

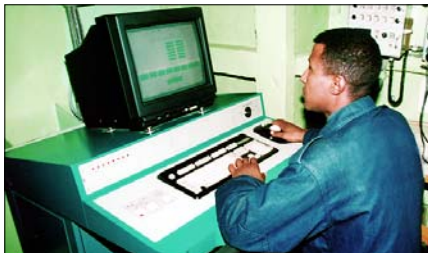
MG-89ME sonar is designed to search for, to detect and locate (range, bearing) moored/seabed mines and sunken objects.

MG-89ME is mounted on coastal and sea-going mine-hunters and rescue vessels.

| Basic specifications | |
|--|-----------|
| Energy detection range (with 0.9 probability and $P=0.01$ Pa/Hz noise level), m: | |
| moored mines ($Re=0.4$ m) | 1,200 |
| seabed mines ($Re=0.4$ m) | 600 |
| sunken objects ($Re=0.4$ m) | 1,800 |
| Target classification capability (with at least 0.8 probability) at ranges of up to 300 m: | |
| mine-like | available |
| not mine-like | available |
| Simultaneous surveillance sector, deg: | |
| traverse | 60 |
| elevation | 9 |
| Full surveillance sector, deg: | |
| traverse | 240 |
| elevation | 60 |
| Coordinate-measuring accuracy (root-mean-square error according to measuring data): | |
| range, m | 3.0 |
| bearing, deg | 1.0 |
| Combat crew | 1 |
| Readiness time, ignoring array extension time, min | 5 |

PALLADA

Combat Swimmers Detection Sonar for Surface Ships



Mission

Pallada sonar is designed for underwater detection in the active mode of combat swimmers with (and without) their delivery vehicles, from the stopped ship. The sonar is capable of classifying and tracking up to three detected targets.

Composition

- receiving/emitting acoustic antenna
- single-unit switchboard/receiver-amplifier
- control console, comprising data processing and control equipment, video monitor and transceiver



Receiving/emitting acoustic antenna

Features

The sonar provides a 360-deg underwater coverage, and its acoustic array can be dipped to a depth of up to 20 m. Electronic equipment housed in the junction box and control console serves to emit, receive and process hydroacoustic signals. All relevant data is represented on a display panel with a keyboard and a trackball.

Pallada sonar is controlled by one operator.

Basic specifications

| | |
|--|---------------------------------------|
| Array dipping depth, m | up to 20 |
| Field of view, deg: | |
| in horizontal plane | 360 |
| in vertical plane | 20 |
| Energy-linked detection range from the stopped ship, m: | |
| combat swimmer w/o delivery vehicles (target equivalent radius - 0.1 m) | 150-200 |
| combat swimmer with delivery vehicles (target equivalent radius of 0.3 m) | 200-400 |
| Measurement accuracy (root-mean-square instrumental error): | |
| range, % of scale | 2 |
| bearing, ang.deg | 2 |
| Emitted signal | audio, linear frequency modulation |
| Number of targets tracked | 3 |

ANAPA-ME

Underwater Saboteur Detection Sonar

Mission

Anapa-ME sonar is designed to detect underwater combat swimmers with flippers or underwater delivery vehicles, to protect vessels stopped in the open sea, unprotected roadsteads or basing points, and to safeguard important military and industrial installations, hydrotechnical facilities in ports, open sea and other water areas.

Its main missions are as follows:

- automatic underwater saboteur detection, tracking and identification;
- automatic measurement of target current coordinates and their feeding into fire control systems of antisaboteur weapons.



Features

Anapa-ME sonar is intended for Russian-built ships offered for export. To ensure anti-saboteur underwater protection of different ships and sea platforms, five Anapa-ME modifications with different module composition are proposed for delivery.

Basic specifications

| | |
|--|--------------|
| Energy-linked detection range (with probability of not less than 0.9, in water layer from 1 to 60 m, at noise level - 0.01 Pa/Hz, with on-site depth - not less than 2 m for Anapa-ME1/Anapa-ME4, and 20 m for Anapa-ME5), m, not less than: | |
| swimmer with flippers | 200-300 |
| swimmer in delivery vehicle | 300-400 |
| Simultaneous scan sector (for all modifications), deg | 360 |
| Array dipping depth, m, not more than: | |
| Anapa-ME1/Anapa-ME4 | 40 |
| Anapa-ME5 | 1.6 |
| Automatic target classification (for all modifications, with probability of not less than 0.8): | |
| swimmer with flippers | available |
| swimmer in delivery vehicle | available |
| decoy (other targets) | available |
| Resolution (for all modifications), at least: | |
| in range, m | 5 |
| in bearing, ang.deg | 4 |
| Root-mean-square current coordinates-measurement error, not exceeding: | |
| range, m | 2 % of scale |
| bearing, deg | 2 |
| Min detection range, m | 25 |
| Number of targets tracked simultaneously (for all modifications), min | 4 |
| Automatic target coordinates (range and bearing) measurement (for all modifications) | available |
| Target coordinates data feed to fire control assets (for all modifications) | available |
| One-shift operational crew (for all modifications) | 1 |
| Mean time between failures, hrs, not less than (for all modifications) | 1,200 |
| Continuous operation, hrs, not less than (for all modifications) | 120 |
| Combat readiness time (w/o antenna deployment time), min, not more than | 5 |
| Max power consumption, W | 1,000 |



NAVAL SYSTEMS

STATIONARY ELECTRONIC SYSTEMS

MYS-ME and MR-10ME

Coastal Surface Target Acquisition Radars



Mission

MR-10ME and Mys-ME coastal radars and their modifications are designed to detect, track, locate, and identify surface ships and small-size high-speed targets in the open sea and littoral areas.

Features

The radars determine target coordinates and motion parameters in the relative and geographic coordinate systems, and transfer the data to automated data gathering and processing systems. They can also be used for ship pilotage in narrows, straits and inner/outer roads.

MR-10ME is a stationary radar, and Mys-ME – a trailer-mounted one ensuring rapid deployment to the appointed position.

- omnidirectional electromagnetic emission;
- presentation of radar situation on the colour liquid-crystal display;
- shift of the radar position blip on the screen in any direction within two thirds of the preset range scale;
- convenient means of relative/geographic coordinates measurement;
- automatic target detection and tracking in two areas of responsibility, defined by the operator;
- automatic tracking of up to 89 targets at ranges of up to 32 miles;
- semiautomatic tracking of up to 10 targets;
- display of relative/geographic coordinates and motion parameters (bearing, speed) of the tracked target, etc.

Their capabilities include:

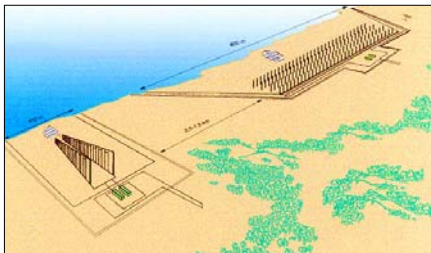


Control panel

| Basic specifications | | |
|---|----------------------|----------------------|
| | MR-10ME | Mys-ME |
| Antenna type | truncated paraboloid | truncated paraboloid |
| Number of data receive/transmit channels | 2 | 2 |
| Scan mode | omnidirectional | omnidirectional |
| Target detection range (with target RCS – 5 sq. m, probability of detection – 0.9, radar site altitude – 300 m, target reflection centre height – 1 m), km: | | |
| channel 1 | 48 | 48 |
| channel 2 | 19 | 19 |
| Max range of large surface target detection (target height – 25 m, radar antenna site altitude – 2,000 m above sea level), km | 200 | 200 |
| Small-size target coordinates measurement accuracy, not more than: | | |
| range, m | 30 | 30 |
| bearing, deg | 0.5 | 0.5 |
| Continuous operation with one-hour break, hrs | 24 | 24 |
| Combat crew | 1 | 1 |

PODSOLNUKH-E

Coastal Stationary Over-the-Horizon Surface Wave Radar



Mission

Podsolnukh-E over-the-horizon radar is intended for use in shore-based surface and air surveillance assets operating within the 200-mile exclusive economic zone.

Composition

- antenna/feeder equipment
- computer-based receive/transmit posts

Features

Podsolnukh-E is designed to ensure all-weather surface and air situation coverage by providing an all-altitude radar field with short-wave signals propagating over the horizon. It is a coast-based radar system with containerized equipment situated on two installation sites at a distance of 0.5-3.5 km from each other.

The system can carry out the following tasks:

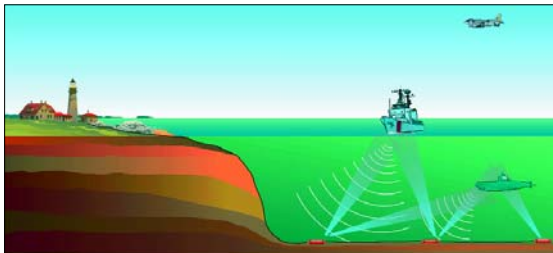
- Surface/air target over-the-horizon detection and tracking;
- Automatic surface/air target location and transmission of designation data to weapon systems;
- Automatic identification of target types and determination of their motion parameters;
- Tracked target data transfer to end users for decision-making;
- Direction of manoeuvring forces to the detected targets;
- Analysis of interference environment, as well as meteorological and physical conditions at sea level in the area of responsibility.

Basic specifications

| | |
|---|------------|
| Wave band | decimetre |
| Scanning area: | |
| range, km | 15-300 |
| bearing, deg | 110-120 |
| elevation, deg | 0-30 |
| Max target detection range, km: | |
| ships with up to 1,000-t displacement | 200 |
| ships with up to 2,000-5,000-t displacement | 250 |
| ships with 7,000-t displacement | 300 |
| aircraft above 7,000 m | 300 |
| aircraft at 200-5,000m altitude | 200 |
| aircraft at 3-200m altitude | 150 |
| Number of targets tracked simultaneously: | |
| surface targets | 100 |
| air targets | 100 |
| Combat crew | 3 |
| Service life, years | 15 |
| Operational environment: | |
| ambient temperatures, °C | -40... +50 |
| relative humidity at +25°C, % | 95 |
| max wind speed, m/s | 45 |

MGK-608E

Fixed Passive Sonar System



Mission

MGK-608E sonar system is designed for surveillance of surface and underwater targets within the 200-mile exclusive economic zone.

Features

MGK-608E in the minimum configuration provides:

- Hydroacoustic detection and surveillance of surface ships with the determination of their heading, speed and bearing;
- Classification and identification of vessels by

their noise signatures, tracking of vessels including those carrying out trawling missions;

- Transfer of information to coast guards on ships, including those performing unauthorized trawling.

MGK-608E in the maximum configuration can perform:

- Hydroacoustic detection and surveillance of underwater and surface objects (vessels);
- Classification, identification and tracking of objects;
- Information on ships travelling in the protected sea area without authorisation.

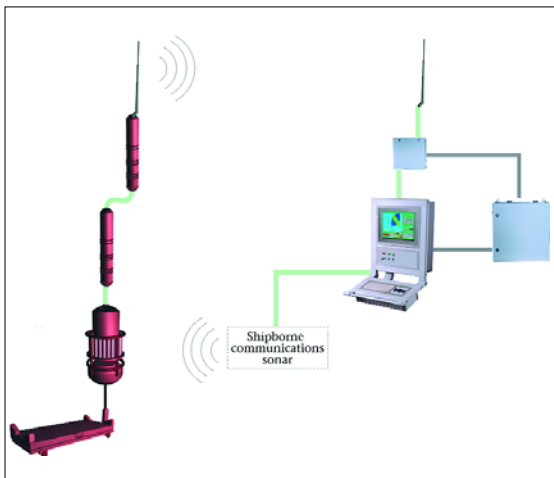


Basic specifications

| | Min config. | Max config. |
|---|-------------|-------------|
| Number of sonar arrays | 8 | 60 |
| Underwater scan area (for objects with 0.05-0.1 Pa noise levels), sq.km x10 ³ | 1 | 9 |
| Surface scan area (for objects with 0.05-5 Pa noise levels), sq.km x10 ³ | 30 | 300 |
| Area occupied by coast-based equipment, sq.m | 20 | 30 |
| Shift crew: | | |
| operator | 1 | 2 |
| technician | 1 | 2 |
| Power consumption, kW | 2 | 4 |
| Service life, years | 10 | 10 |

AMGA

Autonomous Submarine Detection System
with Unified Radio/Sonar Communication Channel



Mission

Amga is a system of anchored, self-contained passive radio/sonar stations with ground/ship-based receiver designed to detect submarines in naval base and other littoral areas, as well as in the reconnoitered directions of their cruise.

Basic specifications

| | |
|--|-----------|
| Number of networked radio sonars | 20 |
| Simultaneous scan sector, deg | 360 |
| Target bearing measurement accuracy, deg | 6 |
| Target classification | automated |
| Radio data reception range with 20m-high receiving antenna, km | about 60 |
| Receiving post power consumption, W | 300 |
| Receiving post mean-time-between-failures, hrs | 1,000 |
| Operators per shift | 1 |

Features

The system is capable of:

- automatically detecting, tracking and classifying submarines;
- automatically calculating the heading of detected submarines.

Information provided by anchored, self-contained passive radio sonars is transmitted to:

- shipborne receiving/processing stations on surface combatants (Amga-K);
- shore-based receiving/processing stations of base underwater surveillance systems (Amga-B).



NAVAL SYSTEMS

COASTAL WEAPON SYSTEMS

A-222E BEREG-E

130mm Coastal Mobile Artillery System



Basic specifications

| | |
|--|--|
| Effective range of fire, km | 20 |
| Moving sea target engagement time (kill probability - 0.8), min | 1-2 |
| Number of targets engaged simultaneously with any gun combination | 1-2 |
| Calibre, mm | 130 |
| Barrel length, cal | 54 |
| Ammunition | 130mm complete rounds |
| Rate of fire, rds/min | 12-14 |
| Laying angles, deg: | |
| traverse | -120... +120 |
| elevation | -5... +50 |
| Combat crew: | |
| SP gun | 8 |
| central post | 7 |
| combat duty support vehicle | 4 |
| Platform | cross-country four-axle wheeled chassis |

Mission

A-222E Berég-E coastal artillery system is designed to destroy/suppress enemy sea/coast-based assets, and to protect friendly land forces operating in coastal areas from attacks of enemy surface ships. It is employed to repel enemy amphibious landing operations, to protect shore-based installations and littoral communications, to provide anti-landing defence of littoral areas, unprotected anchorages and straits. The system can effectively engage high-speed (up to 200 knots) moving sea and ground targets.

Composition

- central post with BR-136 fire control system
- six self-propelled (SP) gun mounts
- one/two combat duty support vehicles

*Central post*

Features

Central post

The central post is designed to control battery fire. The fire control system includes a radar, TV/optical station with laser range-finder, surveillance and target detection/designation sight, digital computer providing firing data, battle damage recording equipment, target simulation system for crew training, life-support and power supply systems, and auxiliary equipment. The Bereg-E's fire control system provides calculation of firing data for four targets and simultaneous engagement of two targets in passive and active countermeasures environment.

Self-propelled guns

Self-propelled guns can deliver fire by remote commands from the central post, or in the self-contained mode using their

organic optical/mechanical sight, ballistic computer and laser range-finder. The guns are loaded semi-automatically with complete rounds. The guns can fire rounds with HE projectiles with a base fuse, and anti-aircraft projectiles with a nose fuse, as well as drill and dummy rounds.

Combat support vehicles

Combat support vehicles provide power supply of the central post and self-propelled guns, as well as room for crew's rest, messing and medical care. Electric power is supplied by two diesel generators. Fuel tank capacity is sufficient for the system to operate in the self-contained mode for seven days.

All Bereg-E elements are mounted on the single-type platform: MAZ-543M 8x8 wheeled all-terrain truck.

*Combat support vehicle*

BAL-E

Coastal Missile System with Kh-35E Anti-Ship Missiles

Mission

Bal-E missile system is intended to control straits and territorial waters, to protect naval bases, strategic installations and coastal infrastructure, to defend and provide combat resistance quality to littoral zone facilities, to defend shore areas in amphibious landing threat directions, to protect sea lines of communication, and to control sea within the missile launch range.

Bal-E can detect, track, distribute, and engage surface targets with Kh-35E anti-ship cruise missiles.

Composition

Bal-E baseline configuration includes:

- up to two command, control and communications vehicles
- up to four self-propelled launchers
- up to four transporter-loader vehicles
- communications vehicle

Various Bal-E configurations can be proposed at customer's request.

Features

The missile system boasts high mobility, short deployment and combat readiness time, large missile load and organised salvo launch capability. It provides high combat effectiveness, reliability and comfortable conditions for



Self-propelled launcher

the crew. Missiles can be launched from positions located at highland sites up to 1,000 m above sea level, with man-made or natural obstacles in the direction of fire.

Missile System Architecture

- Active and passive radar channels for target detection, selection (against active and passive interference background), classification, and tracking;
- Two separate radar channels for triangulation tasks in the passive radar mode;
- Control equipment providing optimal target distribution between launchers;
- Four self-propelled launchers, with eight missiles on each, providing varied single/salvo launch combinations with high total firepower;
- Dedicated communications vehicle for fast data reception from higher-echelon command posts and reconnaissance/target designation assets.



Transporter-loader vehicle

Basic specifications

| | |
|----------------------------------|---|
| Max range of fire, km | up to 120 |
| Number of missiles per launcher | 8 |
| Into-action time, min, less than | 10 |
| Platform | cross-country four-axle wheeled chassis |



Command, control and communications vehicle



NAVAL SYSTEMS

AUXILIARY VESSELS

PROJECT 14232 MERKURY

Air Cavity Customs Launch



Mission

The boat is designed to guard state and customs borders, counter smugglers, patrol the EEZ, and carry out environmental monitoring at a range of 200 miles from the home base and a maximum allowable range between bases of 400 miles.

Main propulsion plant

Main propulsion plant is composed of two M533 diesels, each driving a fixed-pitch propeller.

Three centrifugal fans are employed to pump air into cavity. Two fans are driven by hydraulic motors via hydraulic pumps, mount-

ed on the main diesel engines, while the third one is powered by an electric motor.

Electric power (3-phase 220V, 50Hz AC) is provided by two DGR75M2/1500-1 diesel generators. There are also two EKPA-2/150 electric compressors.

Main machinery and diesel generators are controlled by the shipborne automated control system arranged in the pilot house.

Armament & Equipment

Option 1

BPU-1 turret-mounted machine gun system:

- 14.5mm KPVT machine gun
- 7.62mm PKT machine gun
- six Igla MANPADS

Option 2

- 30mm AK-306 six-barrel gun mount

- six Igla MANPADS

Option 3

Vikhr-K multipurpose gun/missile system:

- 30mm AK-306V gun mount
 - four Vikhr guided missiles
 - six Igla MANPADS
- Navigation equipment
- Merkury-NK navigation system, comprising Yakhta gyrocompass
 - LEM 2-2 log/echosounder
 - NS-2125 video course-plotter
 - SN-3401 satellite navigation equipment, and SATS-17 interface device
 - RN (ARP-85) automatic radio direction finder
 - Liman-T navigation radar
 - KM69-M2 magnetic compass

Basic specifications

| | |
|--|-----------|
| Displacement, t: | |
| full load | about 100 |
| normal | 87.01 |
| Length, overall, m | 35.0 |
| Beam, overall, m | 7.85 |
| Hull height, midship, m | 3.7 |
| Draught overall, full load, m (at propellers) | 2.0 |
| Speed, at ambient temperature up to +25°C, kts: | |
| maximum | 50 |
| flank (sustained) | 45 |
| economical | 35 |
| Speed, at ambient temperature up to +34°C, kts: | |
| maximum | 45 |
| flank (sustained) | 40 |
| economical | 30 |
| Range, at economical speed, with full fuel stock, n.miles | 460 |
| Endurance, days | 5 |
| Complement | 14 |

PROJECT 14613 MARS

Fire-Fighting Vessel



AUXILIARY VESSELS

FIRE-FIGHTING VESSELS

Mission

Project 14613 Mars fire-fighting vessel is designed to:

- escort tankers with flammable liquids;
- provide fire safety to offshore oil/gas fields;
- extinguish fires on watercraft and ground-based facilities accessible from the sea;
- extinguish burning fuel and other flammables on water surface;
- tow distressed ships and craft;
- perform surface/underwater salvage operations;
- carry out primary special treatment of external surfaces of ships and craft;
- carry out decontamination;
- clean oil products from water surface.

Mars can operate in all, but arctic, waters. It can go off up to 200 miles from home base to fight fires, etc.

Features

Mars is a small-displacement seagoing fire-fighting vessel. It is a twin-propeller single-deck craft made of steel with a raised fore body and a two-tier pilot house.

Its special anti-fire equipment includes water screen system, and versatile water and powder fire-fighting systems.

The water fire-fighting system is composed of two 1,000 cu.m/h DPZhN-14 fire pumps with 500kW (680hp) M827 diesels delivering water via four carriage pipes with a throughput of 1,500 cu. m/h to a range of 70 m from the vessel, or water and foaming agent via dispensing columns at a range of 200 m.

The vessel conforms to KM L4 (1) A3 Class in accordance with the Sea Register of the Russian Federation.

Main propulsion plant

Project 14613 vessel is powered by two ZKD12N520 diesels with a total output of 764 kW (1,040 hp). Maximum crankshaft angular speed is 1,500 rpm.

Electric power is supplied by two automated diesel generators: DGF2A200/1500M in the bow compartment, and DGF2A100/1500M in the engine room.



Basic specifications

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| Displacement, full load, t | 385 |
| Basic dimensions (length x beam x draught), m | 39.8 x 7.8 x 2.2 |
| Main propulsion plant | 2xZKD12N520 diesels |
| Main propulsion plant output, kW | 764 (1,040 hp) |
| Number of propellers | 2 |
| Max speed, kts | 11.5 |
| Range at full speed, with fire-fighting for 10 hrs, n.miles | 250 |
| Complement | 20 |

PROJECT 16640 VIUN

Fire-Fighting Boat



Mission

Project 16640 Viun is designed to transport fire-fighters with fire-fighting equipment and means to ground fire areas and watercraft offshore on lakes and rivers.

Features

Viun is a small-displacement single-deck fire-fighting river boat made of steel, with a slightly raised fore body.

The boat refers to O-category of the Russian River Register.

Main propulsion plant

Project 16640 boat has the main propulsion plant including two 1,620kW M419A diesels powering two-stage water-jet propulsors with an axial-flow pump, reverse steering arrangement and unloading devices.

Special equipment

The boat's special fire-fighting system consists of three stationary carriage pipes with a throughput of 216 cu.m/h each and a portable hose line. Water and foaming agent are delivered by four main PN-60B fire pumps with a throughput of 60 l/s and a lift of 100 m. Water jet can be up to 70 m long. The fire pumps are driven by the main propulsion plant.

In addition to that, Viun is fitted with water-screen-producing and foam-film-forming systems.

Basic specifications

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|----------------------------------|-------------------------------|
| Displacement, full load, t | 67.40 |
| Max length, m | 30.80 |
| Beam, m | 5.00 |
| Draught, full load, m | 0.81 |
| Hull height, midship, m | 2.42 |
| Main propulsion plant | 2xM419A diesels |
| Main propulsion plant output, kW | 2x810 |
| Propulsors | 2 water jets |
| Max speed, kts | 19.4 |
| Complement | 8 (including 6 fire-fighters) |

