RADAR MMS

ALEXEEV'S HYDROFOIL DESIGN BUREAU

OVERTAKE TIME

ALEXEEV'S HYDROFOIL DESIGN BUREAU

CONTENTS

ABOUT COMPANY

Central hydrofoil design bureau vessels produce starts it's history from the reasearch hydrodynamic laboratory (Establishment order No. 012 from 28.08.1952).

The Company's Mission is development of modern and high-speed vessels meeting the needs of the global market and promoting Russia to the leading positions among shipbuilding industries.

JSC R. E. Alexeev's Hydrofoil Design Bureau — is a continuously growing company with advanced scientific, engineering and experimental base, a team of highly qualified professionals having vast experience in the field of research, design, construction, testing and operation of high-speed vessels. For more than 60 years JSC R. E. Alexeev's Hydrofoil Design Bureau builds high-speed civil, dual-purpose and military vehicles based on various hydrodynamic principles. At this moment the Central design bureau have built more than 8000 passenger vessels and boats, which are being operated in 35 countres all over the world.

These are hovercraft and hydrofoils, air cavity craft and gliding boats with different bottom configuration, multipurpose platforms and ekranoplans. The company is the world leader in these design fields. With regard to performance, the high-speed vessels designed by JSC R. E. Alexeev's Hydrofoil Design Bureau are ahead of the world standards of high-speed shipbuilding. The vessels feature high reliability, economical efficiency, and ease of operation.

Today, JSC R. E. Alexeev's Hydrofoil Design Bureau carries out works on design of new generation high-speed vessels for Russian navy and civil fleet.

The Bureau created the following:

70 projects of hydrofoil *—*
more than 4000 sea and river hydrofoils have been built.

Over 20 vessels with air cavity at the bottom*, more than 50 air cavity vessels have been built.*

Over 40 ekranoplan projects —
more than 30 vessels for various purposes.

ALEKSEEV
Rostislav Evgenievich

Laureate of the Lenin prize of 1962 and the state prizes of the USSR of 1951 and 1984.

He was the first one of the first in the world practice, who developed and created serial warships and passenger hydrofoils and ekranoplans.

He laid the scientific and technical basis for the design of hydrofoils and dynamic air cushion. He was a talented organizer of the whole industry of high-speed shipbuilding.

R. E. ALEKSEEV — the developer of many original ideas, having a fundamentally important impact on the development of the world high-speed fleet, doctor of technical Sciences, honored inventor of the RSFSR, the author of scientific works and many inventions, left behind a scientific and practical school for the design of hydrofoil ships — he made a huge contribution to aviation and shipbuilding, which is ahead of his time for decades!

1941 *Rosstislav Evgenievich defended his graduation project on the topic "Glider on hydrofoils". In the same year he was sent to the plant "Red Sormovo". The young engineer and ship-builder, military technician of 2nd rank stock started his career with a T-34 tanks' test master. Thus the history of the talented designer began.*

1943 *The Establishment of HYDROLABORATORY. The launch of the first sample of the hydrofoil — model boat "A-4".*

1951 *R. E. Alekseev and his closest assistants: L. S. Popov, N. A. Zaitsev, I. I. Erlykin are qualified for the award of the Stalin prize (State prize) for the new hydrofoils' design, having no analogues in the world.*

1952 *"HYDROLABORATORY" officially became known as the research hydrodynamic laboratory (RHDL). Head — R. E. Alekseev.*

1957 *The first river hydrofoil boat "Volga" is designed.*

1952 *RHDL (research hydrodynamic laboratory) was transformed into the Central Hydrofoil design Bureau of the plant Krasnoe Sormovo.*

1957 *The first river passenger hydrofoil "Rockets" is designed.*

1959 *The river passenger hydrofoil "Meteor" is designed.*

1960 *The river passenger hydrofoil "Sputnik" is designed.*

1961 *The sea passenger hydrofoil "Kometa" is designed.*

1961 *The river experimental ekranoplane "SM-1" with aircraft turbojet engine is designed.*

1962 *The sea passenger hydrofoil "Vihr" is designed.*

1964 *The first gas-turbine river passenger hydrofoil with a water-jet propeller "Burevestnik" is designed.*

1976 *The sea assault transport ekranoplane "Orlenok".*

1979 *The first coast-guard boat with submerged foil system "Antares" is designed.*

1962 *The passenger hydrofoil with water jet propulsion "Chaika" is designed.*

1962-*1977 A number of self-propelled models of ekranoplanes were created and tested.*
1962 — "SM-2", "SM-2P";
1963 — "SM-3", "SM-4" and "SM-5";
1964 — "SP-2P7"; 1967 — "SM-8", "UT-1";
1972 — "SM-6"; 1977 — 3 pcs. of "SM-9".

1966 *The first experimental full-scale sea ekranoplane "KM" is designed.*

1979 *A sea general service hydrofoil boat "Dolphin" is designed.*

Today the team of JSC R. E. Alexeev's Hydrofoil Design Bureau continues the work of Rostislav Evgenievich and revives the glorious traditions of the domestic high-speed shipbuilding. It is working on the design of new generation vessels and ekranoplanes.

HYDROFOILS


Raketa, 308 pcs. were built


Kometa, 166 pcs. were built


Meteor, 235 pcs. were built


Voshod, 139 pcs. were built


Polesye, 114 pcs. were built


Antares, 12 pcs. were built


Valdai 45R, 2 pcs. were built


Kometa-120M, 1 pc. was built

AIR CAVITY CRAFT


Linda, 15 pcs. were built


Sokzhoy, 2 pcs. were built


Merkuriy, 6 pcs. were built


Dugon, 5 pcs. were built


Serna, 16 pcs. were built

EKRANOPLANS


KM, 1 pc. was built


Lun, 1 pc. was built


Orlenok, 3 pcs. were built


Volga-2, 10 pcs. were built


Strizh, 1 pc. was built

HYDROFOIL BOATS


Volga, 6.5 th. pcs. were built


Dolphin V1, 30 pcs. were built


Dolphin V2, 1 pc. was built


Volga V2, 1 pc. was built


Sagaris, 1 pc. was built

GLIDING BOATS


Chibis, 33 pcs. were built


Marlin, 1 pc. was built

MAIN ACTIVITIES

Research and development

JSC R. E. Alexeev's Hydrofoil Design Bureau has its own Engineering Center and performs scientific research in such areas as Hydrodynamics, Aerodynamics, Structural strength and develops new models of transport.

Aerodynamic and hydrodynamic tests

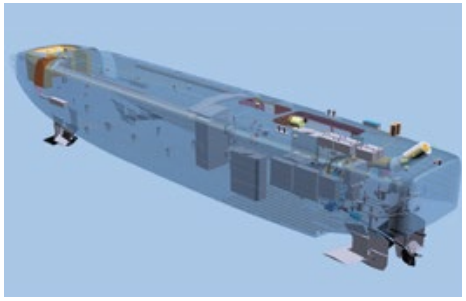
JSC R. E. Alexeev's Hydrofoil Design Bureau uses own experimental tank with towing bridge for testing and optimization of hydrodynamic characteristics of all high-speed vessels. Also the Bureau has own wind tunnel that allowed to investigate aerodynamic characteristics of aircraft models at take-off, landing and low-speed flight.

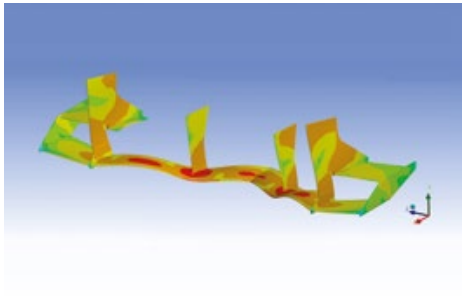
Own manufacturing / Shipbuilding

JSC R. E. Alexeev's Hydrofoil Design Bureau has own shipbuilding facilities which provide building of all type high-speed sea and river vessels, including use of composite materials.

Supervision and building technical support

The company carries out supervision over the building of vessels on its own projects: provides constant technical support, adjustment of source documentation and coordination of changes in the regulatory organizations. Changes may be associated with the use of other equipment and materials, optimization of structures and reduce the building cost.





HYDROFOILS

HYDROFOILS

Wide experience and technological advance allows to design modern sea and river hydrofoils and hydrofoil launches for passenger, cargo-passenger and cargo purposes.

he first and for the initial decades the basic mainstream for the JSC R. E. Alexeev's Hydrofoil Design Bureau activities were hydrofoils. The shallow-draught submerged foil with high level of lift-drag ration, invented by Alekseev, has served as the basis for successful development of Russian hydrofoils.

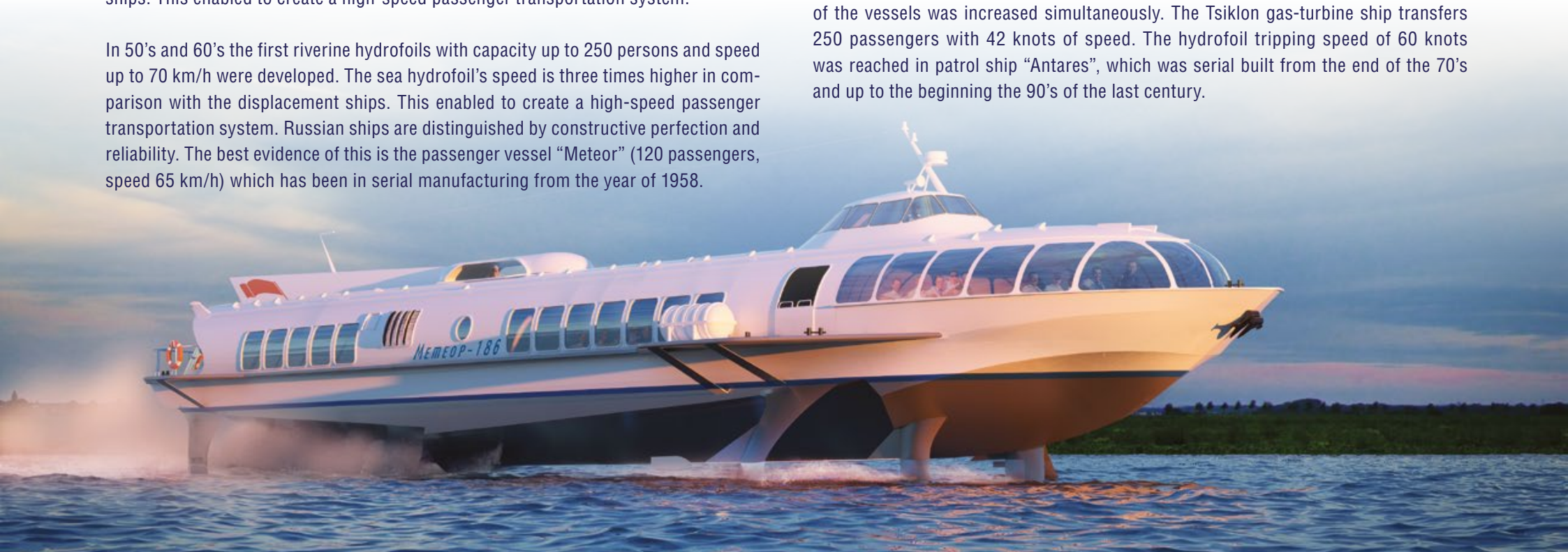
It is used the flat-plate foil in such systems: the lift magnitude near the free surface decreases while the downthrust decrease too. Due to this characteristic and with the availability of supporting stabilizing components the vertical, roll and pitch hydrofoils' motion stability on calm water can be provided. The phenomenon is the basis for self-stabilization of a foil moving in the undersurface layer. The principle is called "the Alekseev effect".

The sea hydrofoil's speed is three times higher in comparison with the displacement ships. This enabled to create a high-speed passenger transportation system.

In 50's and 60's the first riverine hydrofoils with capacity up to 250 persons and speed up to 70 km/h were developed. The sea hydrofoil's speed is three times higher in comparison with the displacement ships. This enabled to create a high-speed passenger transportation system. Russian ships are distinguished by constructive perfection and reliability. The best evidence of this is the passenger vessel "Meteor" (120 passengers, speed 65 km/h) which has been in serial manufacturing from the year of 1958.

The 60's and 70's were marked by a new qualitative stage in the development of high-speed craft including: seakeeping increase and a significant speed increase. The activities regarding seakeeping have brought the development of sea-going hydrofoils with capacity up to 150 passengers, speed up to 35 knots and seakeeping of wave height up to 2 metres. The KOMETA and KOLKHIDA sea-going hydrofoils are widely known in Russia. The activities regarding speed increase have led to the development of riverine hydrofoils with capacity up to 150 passengers and speed up to 100 km/h. The BUREVESTNIK gas-turbine ship developed the 95 km/h speed and the LASTOCHKA hydrofoil — 90 km/h.

The successful path of the speed and seakeeping performance increasing were continued in the 80's by building of sea hydrofoils with 45 knots of speed and the sea-keeping performance of normal exploitation at wave height of up to 3.5 m. The tonnage of the vessels was increased simultaneously. The Tsiklon gas-turbine ship transfers 250 passengers with 42 knots of speed. The hydrofoil tripping speed of 60 knots was reached in patrol ship "Antares", which was serial built from the end of the 70's and up to the beginning the 90's of the last century.



MODERN CONCEPT of new generation projects

New generation hydrofoil of JSC R. E. Alexeev's Hydrofoil Design Bureau combines leading-edge technology of high-speed shipbuilding industry.

Our projects offer standards of economy, performance, environmental efficiency and passenger comfort never before seen in high-speed vessels of such class.

COMFORT

- Crew-centered design featuring intuitive controls designed with the captain in mind, designed to optimize handling, reduce crew workload, and maximize fuel efficiency.
- Economy and business classes are equipped with comfortable seats, modern air-conditioning system and more overhead baggage space per passenger.

PROFITABILITY

- Low fuel consumption is ensured due to applying new main engines, advanced hydrodynamic characteristics of foilbornes, as well as composite materials in the hull's structure.
- Low cost of maintenance is provided due to modern software ship system control which monitors the systems state.
- Vessel capacity is essentially increased by means of modern technologies, equipment and material.

ENVIRONMENT

- Gaseous emission and noise level displays/sensors are compliant with the international environmental standards.
- Low wave-making helps to save ecosystem and to minimize caving.

**MARPOL Convention (The International Convention for the Prevention of Pollution from Ships) — The Rules for the Prevention of Pollution from Ships; USSR (Inion State Standard) 17.2.4.04 9 — norm setting of external noise characteristics, Sanitary standard 2.5.2.047 — internal noise level on the sea vessels/ Sanitary rules and regulations 2.5.2-703 — internal noise level on the inner-waterways and mixed navigation vessels.*

TSIKLON 250M

Sea hydrofoil project 23170

TSIKLON 250M

Sea hydrofoil project 23170

BASIC FUNCTIONS

High-speed passenger transportation using aviation-type seats.

CLASSIFICATION

Russian Maritime Register of Shipping
KM ✪ [2] Hydrofoil craft passenger — A

SEAKEEPING

Cruising in a foilborne mode is ensured at the wave height ($h_{w3\%}$) up to 3,0 m and wind force up to 4 points. Safe motion is ensured at the wave height ($h_{w3\%}$) up to 3,5 m and wind force of 4 points.

MAIN ENGINES

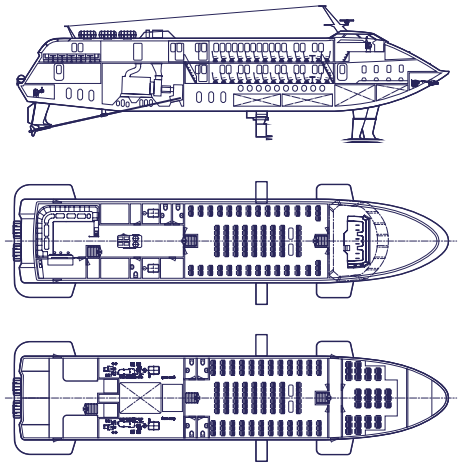
Type: 2 x M70FRU (NPO Saturn JSC, Russia)
Total power max: 2 x 10300 kW
Specific fuel rate: 2 x 2399.9 kg/h

TECHNICAL CHARACTERISTICS

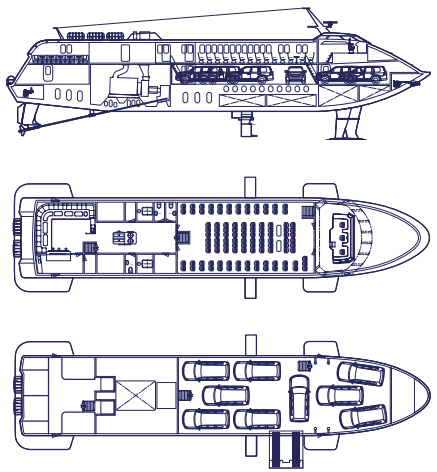
Length overall, m	42.6
Beam overall, m	11.2
Depth at foilborne, m	14.3
Hullborne draft, m	4.5
Full displacement, t	210.0
Cruising speed, knots (km/h)	up to 55 (up to 100)
Passengers	up to 320
Crew	7
Maximum range, miles (km)	up to 700 (up to 1300)
Cruising endurance, hours	8

GENERAL ARRANGEMENT (MODIFICATIONS)

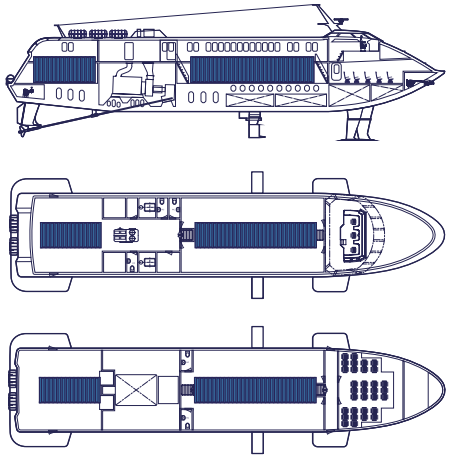
Passenger configuration



Ferry configuration



Cargo configuration



KOMETA-120M

Sea passenger hydrofoil project 23160

KOMETA-120M

Sea passenger hydrofoil project 23160

BASIC FUNCTIONS

High-speed passenger transportation during daylight hours using aviation-type seats.

CLASSIFICATION

Russian Maritime Register of Shipping
KM ★ [2] Hydrofoil craft passenger – A

SEAKEEPING

Cruising in a foilborne mode is ensured at the wave height ($h_{w3\%}$) up to 2,0 m and wind force up to 4 points according to the Beaufort scale. Safe motion in hullborne mode is ensured at the wave height ($h_{w3\%}$) up to 2,5 m and wind force of 5 points.

MAIN ENGINES

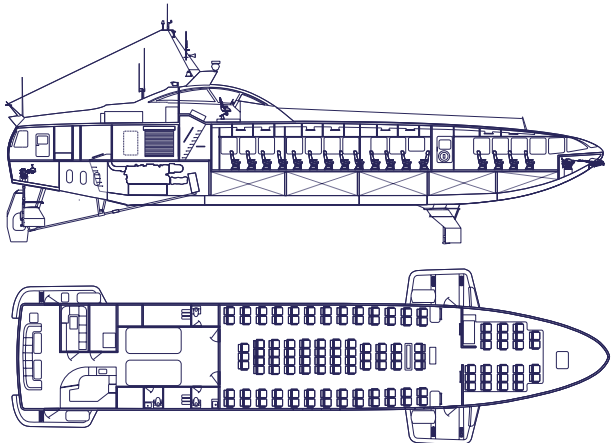
Type: 2 x D2862LE483 (MAN, Germany)
Total power max: 2 x 1066 kW
Specific fuel rate: 2 x 222.8 kg/h

TECHNICAL CHARACTERISTICS

Length overall, m	35.2
Beam overall, m	10.3
Depth at foilborne, m	11.8
Hullborne draft, m	3.5
Full displacement, t	75.0
Cruising speed, knots (km/h)	35 (65)
Passengers	120
Crew	5
Maximum range, miles (km)	200 (370)
Cruising endurance, hours	8

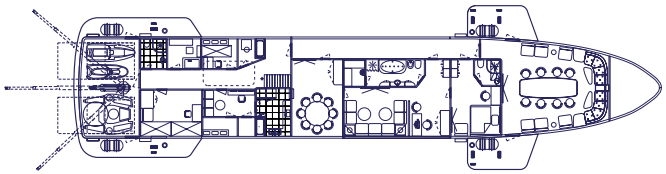
GENERAL ARRANGEMENT

Passenger configuration



GENERAL ARRANGEMENT

Representative class configuration



METEOR V2

Mixed navigation passenger hydrofoil

METEOR V2

Mixed navigation passenger hydrofoil project 03580

BASIC FUNCTIONS

High-speed passenger transportation during daylight hours in the saloons equipped with soft seats.

CLASSIFICATION

Russian River Register

✠ O-PR 2.0 / 1.3 Hydrofoil craft passenger A.

SEAKEEPING

Cruising in a foilborne mode is ensured at the wave height ($h_{w3\%}$) up to 1,3 m. Safe motion in hullborne mode is ensured at the wave height ($h_{w1\%}$) up to 2.0 m.

MAIN ENGINES

Type: 2 x D2862LE483 (MAN, Germany)

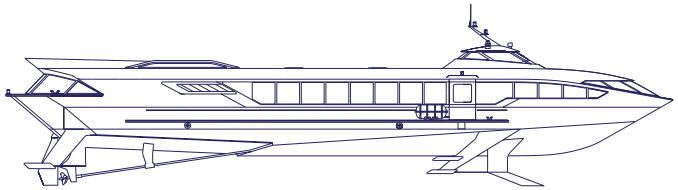
Total power max: 2 x 1066 kW

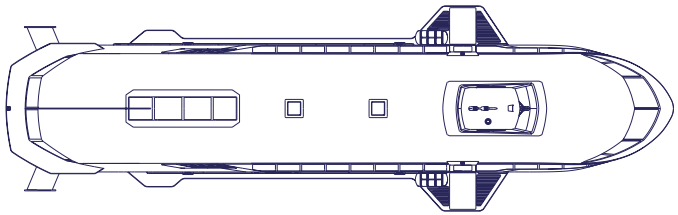
Specific fuel rate: 2 x 222.8 kg/h

TECHNICAL CHARACTERISTICS

Length, m	32.0
Beam, m	9.5
Depth at foilborne, m	6.2
Hullborne draft, m	2.5
Full displacement, t	68
Speed, km/h	65
Passengers	115
Crew	3
Maximum range, km	600
Cruising endurance, hours	8

GENERAL VIEW





VALDAI-45R

River passenger hydrofoil project 23180

VALDAI-45R

River passenger hydrofoil project 23180

BASIC FUNCTIONS

High-speed passenger transportation (up to 45 persons) using aviation-type seats during daylight hours on navigable rivers, freshwater basins and lakes in areas with a temperate climate.

CLASSIFICATION

Russian River Register

✠ R 1.2 / 0.7 Hydrofoil craft passenger A

SEAKEEPING

Safe motion in foilborne mode with speed of 45-50 km/h is provided at the wave height ($h_{w1\%}$) up to 0,7 m and wind force of 2 points according to the Beaufort scale.

Safe cruising in a hullborne mode is ensured at the wave height ($h_{w1\%}$) up to 1,2 m and wind force up to 3 points according to the Beaufort scale.

TECHNICAL CHARACTERISTICS

Length overall, m	21.3
Beam overall, m	5.2
Depth at foilborne, m	6.3
Hullborne draft, m	1.1
Full displacement, t	21.4
Cruising speed, km/h	65
Passengers	45
Crew	2
Maximum range, km	400
Cruising endurance, hours	8

MAIN ENGINES

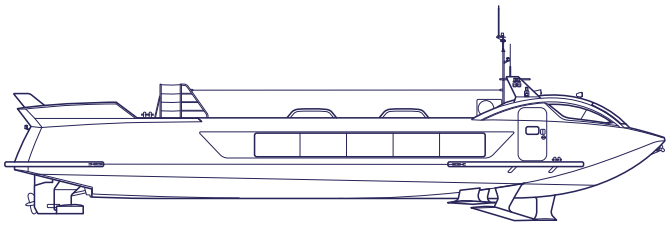
Type: D2842LE410 (“MAN”, Germany)

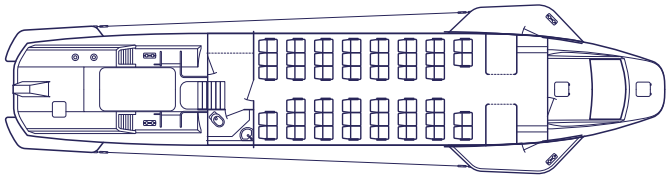
Total power max: 809 kW

Total power at cruising speed: 610 kW

Specific fuel rate: 169.9 kg/h

GENERAL ARRANGEMENT





HIGH-SPEED BOATS

DOLPHIN V1

Sea hydrofoil boat project 14624

DOLPHIN V1

Sea hydrofoil boat project 14624

BASIC FUNCTIONS

The boat is designed for water-based recreation and as a general-service boat. The possibility of skier or parachutist towing.

CLASSIFICATION

State Inspection of Small Vessels (SISV).

SEAKEEPING

Seakeeping is ensured at the wind wave height up to 0,5 m with speed of 35–40 knots. Safe motion at sea is ensured at wave up to 3 points (wave height $h_{w3\%}$ — 1.25 m) and motion speed of 8–10 knots.

OPERATION REGION AND CONDITIONS

Coastal marine waters with maximum distance from a shore is up to 3 miles and a harbor of refuge in open sea is up to 20 miles. Operating in inner basins should be complied according to the standards of State Inspection of Small Vessels.

TECHNICAL CHARACTERISTICS

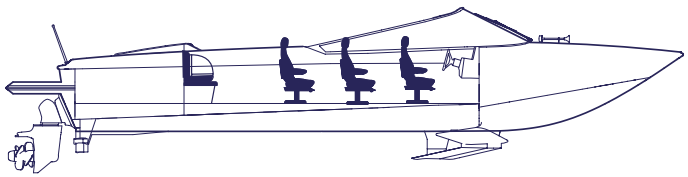
Length overall, m 10.6
Beam overall, m 2.5
Depth overall, m 1.6
Draft overall, m
- hullborne 1.1
- foilborne 0.5

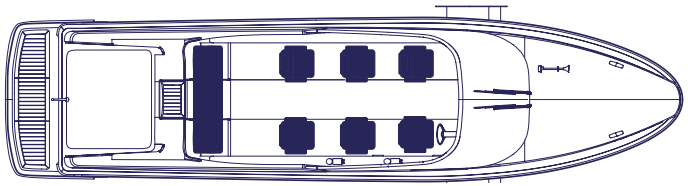
Full displacement, t 3.5
Cruising speed, knots (km/h) 45 (85)
Passengers 7
Crew 1
Maximum range, miles (km) 150 (280)

MAIN ENGINES

Type of main engine: diesel / gasoline motor STEYR MOTORS, MERCRUISER
Total power max: 1 x 270–280 hp
Cruise fuel consumption: up to 45 l/h
Propulsion device: stern drive MERCURY BRAVO III (USA)

GENERAL ARRANGEMENT





DOLPHIN V2

High-speed hydrofoil boat project 14625

DOLPHIN V2

High-speed hydrofoil boat project 14625

BASIC FUNCTIONS

The boat is designed for water-based recreation and as a general-service boat.

SEAKEEPING

Seakeeping is ensured at the wind wave height ($h_{w1\%}$) up to 0,5 m and wind force of 3 points. Safe motion in hullborne draft mode is ensured at wave ($h_{w1\%}$) up to 1,2 m.

OPERATION REGION AND CONDITIONS

Coastal marine and inland water basins as agreed with State Inspection of Small Vessels.

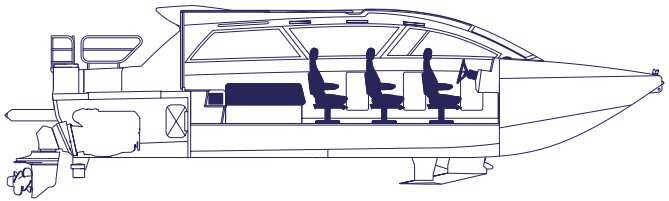
TECHNICAL CHARACTERISTICS

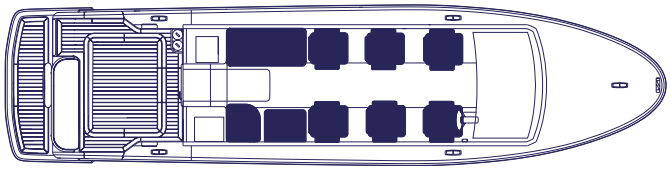
Length overall, m 10.4
Beam overall, m 2.5
Overall height with foils and mast, m 3.14
Draft overall hullborne / foilborne, m ..... 1.48 / 0.5
Full displacement, t ..... up to 4.3
Cruising speed, km/h ..... up to 85
Passengers 7
Crew 1
Maximum range, km 250

MAIN ENGINES

Type of main engine: diesel / gasoline motor STEYR MOTORS, MERCRUISER
Total power max: 1 x 270–280 hp
Cruise fuel consumption: up to 50 l/h
Propulsion device: stern drive MERCURY BRAVO III (USA)

GENERAL ARRANGEMENT





DOLPHIN V4

Sea hydrofoil boat

DOLPHIN V4

Sea hydrofoil boat

BASIC FUNCTIONS

The boat is designed for water-based recreation and as a general-service boat.

SEAKEEPING

Seakeeping is ensured at the wind wave height up to 0,5 m with speed of 35–40 knots. Safe motion at sea is ensured at wave up to 3 points (wave height $h_{w3\%}$ — 1.25 m) and motion speed of 8–10 knots.

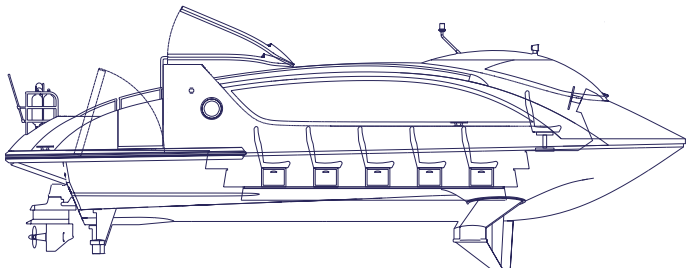
OPERATION REGION AND CONDITIONS

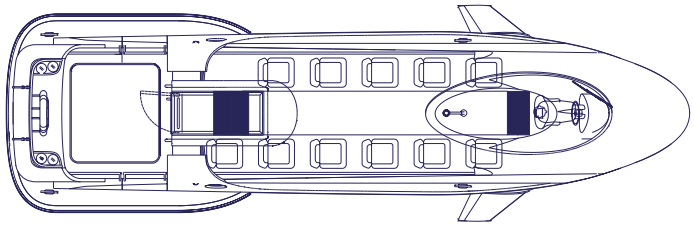
Coastal marine waters with maximum distance from a shore is up to 3 miles and a harbor of refuge in open sea is of up to 20 miles, inner waterways by agreement with State Inspection of Small Vessels.

TECHNICAL CHARACTERISTICS

Length overall, m	10.6
Beam overall, m	2.5
Depth overall, m	3.2
Draft overall, m	
hullborne	1.1
foilborne	0.5
Full displacement, t	4.3
Cruising speed, knots (km/h)	45 (85)
Passengers	10
Crew	1
Maximum range, miles (km)	150 (280)

GENERAL ARRANGEMENT





SAGARIS

High-speed hydrofoil boat project 03150

SAGARIS

High-speed hydrofoil boat project 03150

BASIC FUNCTIONS

- performance of patrol and police functions;
- delivery of special groups to the disaster and evacuation zones;
- monitoring of vessels' compliance of the established navigaion mode at inland waterways, in ports and in coastal areas of the seas;
- used as an ambulance boat in hard-to-reach areas.

SEAKEEPING

Safe motion in foilborne mode with speed of 70 km/h is provided at the wave height ($h_{w1\%}$) up to 0,5 m and wind force of 3 points according to the Beaufort scale.

Safe cruising in a hullborne mode is ensured at the wave height ($h_{w1\%}$) up to 1,2 m and wind force up to 3 points according to the Beaufort scale.

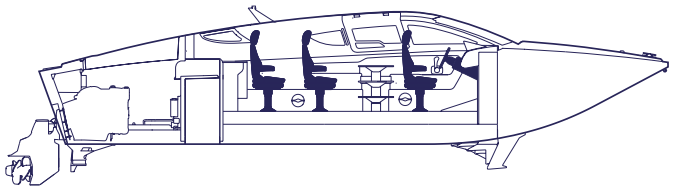
TECHNICAL CHARACTERISTICS

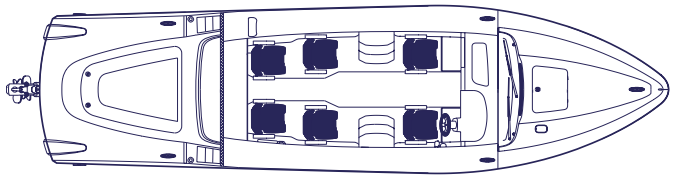
Length overall, m 10.5
Beam overall, m 2.7
Depth overall, m.....2.6
Draft, m
in foilborne mode at speed 65 / 110 km/h ..... 0.58 / 0.45
overall in hullborne mode 1.12
Displacement light-ship weight / full, t ..... 3.24 / 4.17
Speed, km/h..... up to 110
Passengers 5
Crew.....1
Maximum range, km 1000

MAIN ENGINES

Type: MERCURY RACING (USA)
Total power max: 1 x 520 hp
Cruise fuel consumption: 70 l/h
Propulsion device: stern drive MERCURY BRAVO III (USA)

GENERAL ARRANGEMENT





MARLIN

High-speed gliding boat

MARLIN

High-speed gliding boat

BASIC FUNCTIONS

The boat is designed as a general-service boat.

SEAKEEPING

Insured cruising in hullborne mode is at wave height ($h_{w3\%}$) up to 2,0 m and wind force up to 5 points.

OPERATION REGION AND CONDITIONS

Littoral and inner basins.

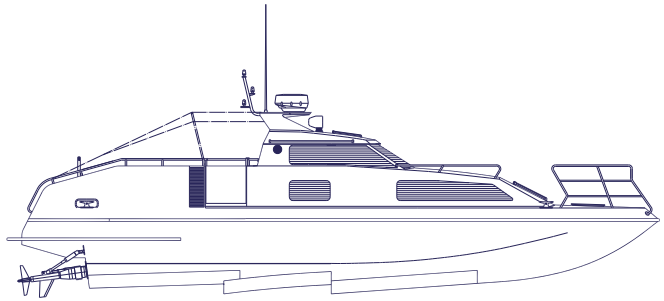
MAIN ENGINES

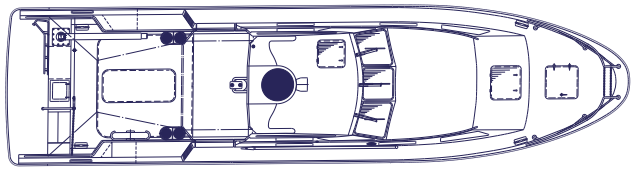
Type of main engine: diesel motor SEATEK (Italy)
Total power max: 2 x 850 hp
Cruise fuel consumption: 230 l/h
Thruster: partially-immersed screws JOLLY DRIVE MARINE (Italy).

TECHNICAL CHARACTERISTICS

Length overall, m	12.1
Beam overall, m	3.1
Depth overall with mast, m	5.0
Draft in-motion / hullborne, m	0.25 / 0.7
Full displacement, t	8.5
Maximum speed, knots (km/h)	60-65 (up t-o 120)
Passengers	6
Crew	2
Cruising range, miles	up to 200 (up to 370)
Cruising endurance, days	2

GENERAL VIEW





CRECHET

High-speed boat with planning skies

CRECHET

High-speed boat with planning skies

BASIC FUNCTIONS

- performance of patrol and police functions, combating poaching and drug trafficking, interception of violators;
- delivery of special groups to the disaster and evacuation zones;
- monitoring of vessels' compliance of the established navigation mode in inland waterways, in ports and in coastal areas of the seas;
- used as a medical boat in remote areas;
- used as a pleasure boat for extreme river and sea walks.

SEAKEEPING

Sea-keeping performance at wave height:

- up to $h_{w3\%}$ — 0.5 m — without speed limits;
- up to $h_{w3\%}$ — 0.75 m — at the speed of up to 100 km/h;
- 4 points — safe movement and maneuvering in hullborne mode.

OPERATION REGION AND CONDITIONS

The boat is considered to be operated in costal sea areas and water basins.

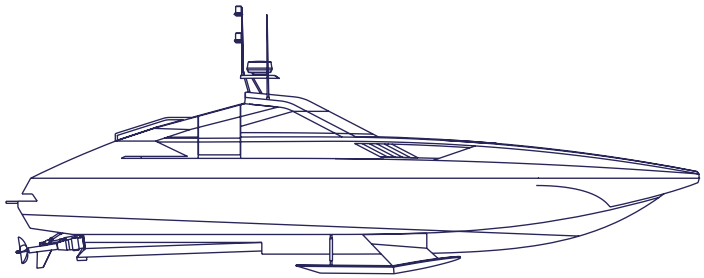
TECHNICAL CHARACTERISTICS

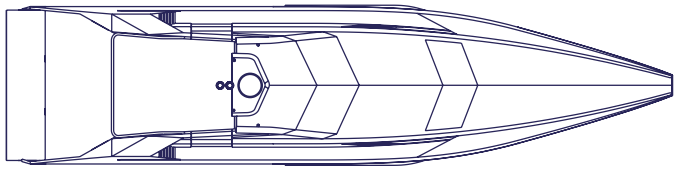
Length overall, m 12.5
Beam, m 3.1
Overall depth with stowed mast, m .....about 3.75
Overall depth at full displacement, m ..... up to 0.7
Displacement full / light, t .....up to 7.0 / about 8.5
Speed, knots (km/h) .....up to 85 (up to 160)
Passengers 5
Crew.....1
Cruise range, miles (km).....220 (no less than 400)

MAIN ENGINES

Type: diesel engines SEATEK (Italy)
Maximum capacity: 2 x 850 hp
Cruise fuel consumption: 230 l/h
Thruster: partially-submerged propeller JOLLY DRIVE MARINE (Italy)

GENERAL VIEW





CHIBIS

High-speed patrol boat project 21850

CHIBIS

High-speed patrol boat project 21850

Promotional Passport № 564/14/EP

BASIC FUNCTIONS

- Guarding of coastal boarders;
- Coastal waters patrolling, internal and external ports and harbours for small and medium-sized target searching;
- Detection and interruption of small-size fast-moving target;
- Transportation of frontier guards, counter-terror units, passengers and cargo;
- Search and rescue of shipwrecked people, medical evacuation.

CLASSIFICATION

Boat class: service and combat ship. Subclass: small-size coastal boat

SEAKEEPING

Seakeeping performance is not limited in sea state up to 1 point. Insured sea-keeping in full displacement is provided in seas higher up to 4 points on the scale ($h_{w3\%}$=1.4 m).

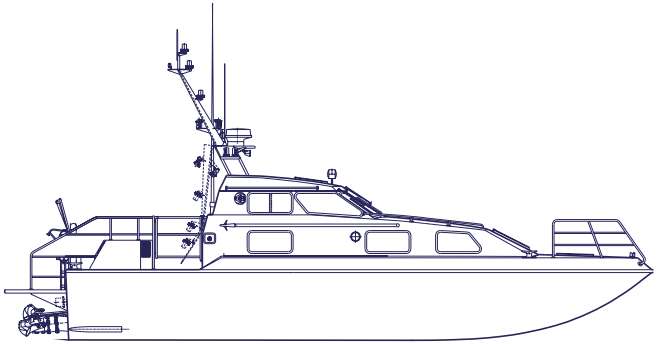
TECHNICAL CHARACTERISTICS

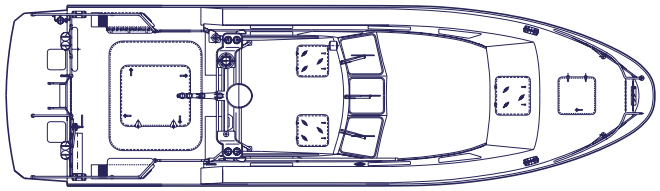
Length overall, m 11.0
Beam overall, m 3.06
Amidships depth, m 1.4
Draft overall, m 0.6
Displacement full / light, t ..... 6.0 / 4.8
Maximum speed, knots (km/h).....37 (70)
Passengers 5-8
Crew.....2
Cruising range, miles (km)
(in full displacement at cruising speed).....150 (280)
Cruising endurance, days.....2

MAIN ENGINES:

Type of main engine: STEYR MOTORS, VOLVO PENTA, MERCRUISER, MITSUBISHI
Total power max: 2 x 260 hp
Cruise fuel consumption: up to 90 l/h
Propulsion device: 2 water-jet propeller KAMEWA (Sweden)

GENERAL VIEW





AIR-CAVITY VESSELS

AIR-CAVITY VESSLS

Wide experience and technological advance allow to design modern sea and river hydrofoils and hydrofoil boats for passengers, cargo-passenger and cargo purposes with follow specifications:

- passenger capacity up to 250 persons;
- cargo capacity up to 180 tons;
- speed up to 50 knots.

Starting from the 80's, the JSC R. E. Alexeev's Hydrofoil Design Bureauu has been actively busy in the development of planing ships and boats with air cavity (bottom air lubrication).

The basic idea is rather simple. Ship friction drag is reduced due to air interlayer between bottom and water as the air density is much less than that of water. The ship hydrodynamic drag is reduced by 30% due to lower air viscosity as compared with water. The power consumption needed for air lubrication shall not exceed 3% of the total engine power.

The economic efficiency of this type of ship is expressed in reduction of fuel consumption and also in design simplicity, which reduces construction and operational costs.

The absence of protruding parts available on hydrofoils. Shallow draught enables operation of such ships in shallow water regions. Air-cavity high-speed ships and boats are being successfully operated both in sea and river basins.

During the 80-90's the JSC R. E. Alexeev's Hydrofoil Design Bureau had developed passenger vessels with speed up 30 knots (55–60 km/h) and passenger capacity of 150 persons, as well as cargo vessels with cargo capacity of 120 tonns and with speed of 30 knots and more.

Apart from commercial ships, the boats of 100 tons displacement and speed of 50 knots are developed and built in series for Russian Customs and Coast Guard.

SVK-100

MSea cargo-passenger air-cavity ship project 23210

SVK-100

Sea cargo-passenger air-cavity ship project 23210

BASIC FUNCTIONS

Sea high-speed transportation and boarding / landing from / to unimproved shore of passengers, cargo and self-propelled and non self-propelled vehicles.

OPERATION REGION AND CONDITIONS

A1 and A2 coastal and marine areas along the sea shore (excluding winter operation). Maximum distance from the port — up to 50 miles.
Distance between the ports — up to 100 miles.

CLASSIFICATION

KM ✪ [2] HSC Passenger — A

SEAKEEPING

Sea-going qualities in full displacement are following:

- 35 knots of speed at sea state of 3 points on the scale ($h_{w3\%} \leq 1.25$m)
- At full speed of 52 knots at sea state of 1 point on the scale ($_{hw3\%} \leq 0.25$ m).
- Loading and unloading operations of passengers and self-propelled machineries from equipped and unequipped shore in seas up to 4 points on the scale ($h_{w3\%} \leq 1.6$ m).
- Safe sea-keeping in full displacement is ensured at wave height up to $h_{w3\%}$ 3.5 m.

TECHNICAL CHARACTERISTICS

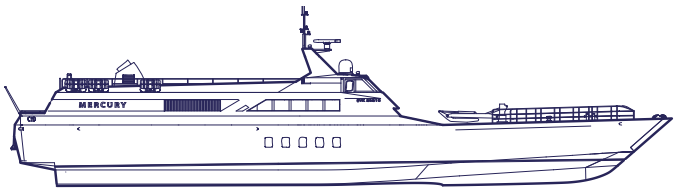
Length overall, m	46.95
Beam overall, m	8.54
Depth overall from moulded base, m	14.8
Draft design / light, m	1.76 / 1.1
Displacement full / light, t	272.0 / 142.0
Full speed, knots (km/h)	up to 52 (up to 100)
Passengers	120
Crew	8
Maximum range, miles (km)	up to 420 (up to 780)
Cruising endurance, hours	16

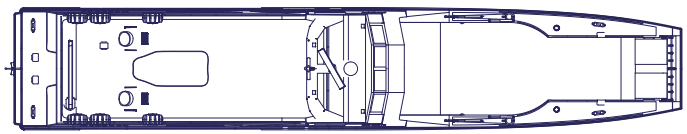
PAYLOAD

The following transports can be transported in cargo section

- two buses of PAZ-3206 + three Jeeps of UAZ-3163-030
- one truck + one Jeep of UAZ-3163-030;
- two passenger cars “GAZelle” + two Jeeps of UAZ-3163-030 + one transport car “GAZelle”;
- three 20-feet standard sea containers.

GENERAL VIEW





SVK-10

River cargo-passenger air-cavity ship project 23220

SVK-10

River cargo-passenger air-cavity ship project 23220

BASIC FUNCTIONS

River high-speed transportation and boarding/landing from/to unimproved shore of passengers, cargo and self-propelled and non self-propelled vehicles.

CLASSIFICATION

Russian River Register

✠ O-PR 2.0 / 0.5 air cavity craft A

SEAKEEPING

Sea-going qualities in full displacement are following:

- At full speed of 60 km/h at sea state of 1 point ($h_{w3\%} \leq 0.5$ m).
- Loading and unloading operations of passengers and self-propelled machineries from/to unequipped shore at sea state conditions up to 3 points ($h_{w3\%} \leq 2.0$ m).
- 13 km/h of speed at sea state of 4 points on the scale ($h_{w3\%} \leq 2.0$ m).

PAYLOAD

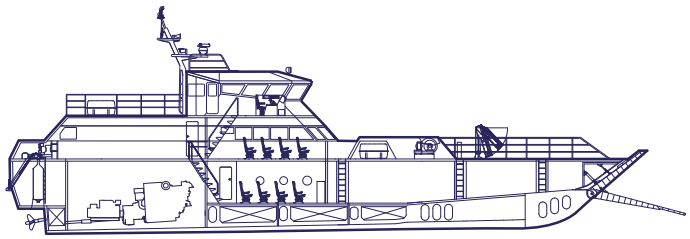
The following transports can be transported in cargo section:

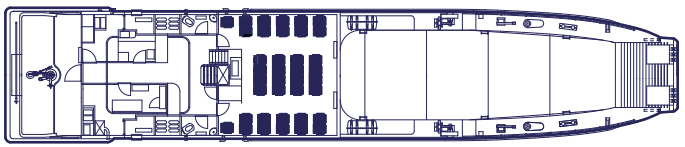
- four cars
- one truck or one bus
- one 20-feet standard sea container.

TECHNICAL CHARACTERISTICS

Length overall, m	32.5
Beam overall, m	6.5
Depth overall, m	12.27
Draft design / light, m	1.3 / 1.03
Displacement full / light, t	100.4 / 74.8
Full speed, km/h	up to 60
Payload, t	9.0
Passengers	60
Crew	5
Maximum range, km	up to 620
Cruising endurance, hours	16

GENERAL ARRANGEMENT





KVK-1200

High-speed basic air-cavity platform for sea operation

KVK-1200

High-speed basic air-cavity platform for sea operation

BASIC FUNCTIONS

Expedition vessel — the vessel is intended for scientific research implementation/solving, geo surveillance, ecology monitoring, transport support of energy industry.

Cargo-passenger ferry — high-speed passengers and cargo transportation, including caterpillar and wheeled vehicles. Landing (disembarkation) from (to) the unequipped coast.

Yacht-business trips, official receptions and recreation for the top management of the state.

CLASSIFICATION

Russian Maritime Register of Shipping
KM ★ [2] HSC

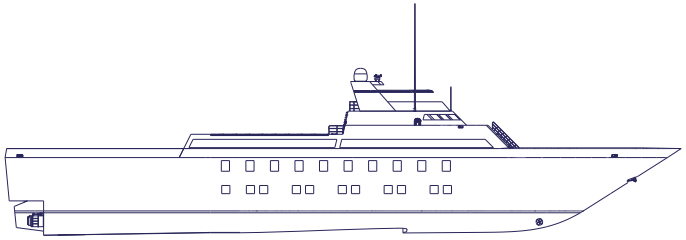
SEAKEEPING

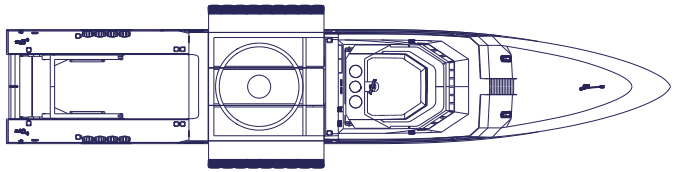
Insured seakeeping in full full displacement is provided at sea state up to 7 points.

TECHNICAL CHARACTERISTICS

Length overall, m	81.3
Beam overall, m	14.2
Depth overall, m	22.7
Length overall of cargo deck, m	22.0
Beam overall of cargo deck, m	8.0
Draft overall, m	3.0
Displacement full / light, t	1375.0 / 847.5
Speed, knots (km/h)	up to 50 (up to 90)
Carrying capacity, t	150
Crew	35–100
Cruising range, miles (km)	4000 (7400)

GENERAL VIEW





LINDA

River cargo-passenger air-cavity ship

LINDA

River cargo-passenger air-cavity ship

BASIC FUNCTIONS

High-speed passenger transportation during daylight hours on navigable rivers.

CLASSIFICATION

✠ O 2,0 / 0,5 AIR-CAVITY passenger A

SEAKEEPING

50 km/h — operational speed in calm water and wind force up to 3 points.

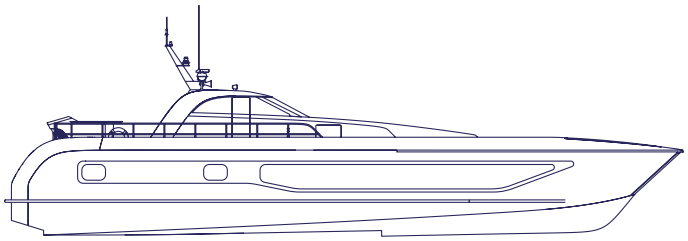
At wave height $h_{w1\%}$ 1.0 m — speed is about 40 km/h

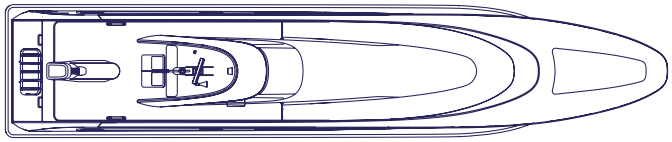
At wave height $h_{w1\%}$ 2.0 m — speed is about 15 km/h

TECHNICAL CHARACTERISTICS

Length overall, m	24.55
Beam overall, m	5.13
Depth overall from moulded base, m	5.1
Hullborne draft, m	1.0
Full displacement / light displacement, t	24.6 / 16.8
Speed, km/h	55
Passengers	70
Crew	2
Maximum range, km	400
Cruising endurance, hours	8

GENERAL VIEW

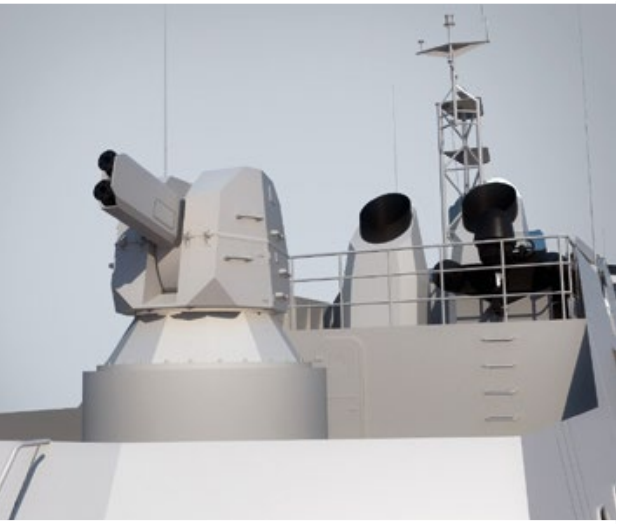


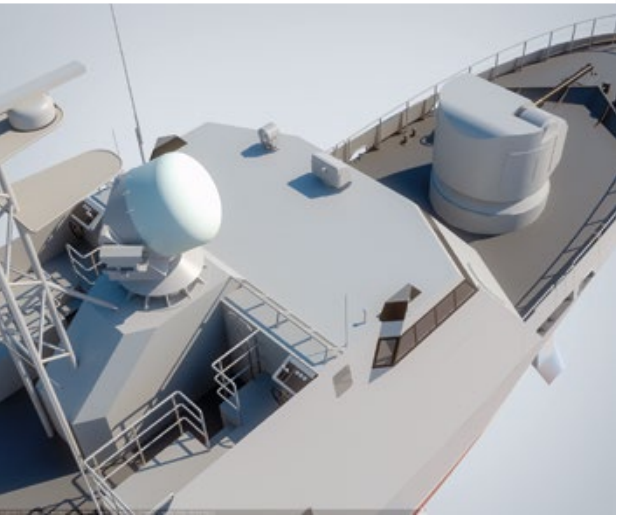


SPECIAL PURPOSE SHIPS

ANTARES RA

High speed hydrofoil missile gunboat
project 133RA





ANTARES RA

High speed hydrofoil missile gunboat project 133RA

Promotional passport № 3502/09/NEK

BASIC FUNCTIONS

- Destruction of above water ships of different classes and types.
- Destruction of surface-mounted installations.

SEAKEEPING

- Movement without speed limitation at sea state up to 2 points.
- Movement with speed limitation is up to 50 knots at sea state of points. Safe navigation with full displacement at sea state of 7 points.

TECHNICAL CHARACTERISTICS

Overall length, m	40.3
Beam (near the middle foils), m	15.1
Amidships depth, m	4.1
Overall draft full/light displacement, m	4.8/4.6
Displacement full / lightship, t	226.0 / 190.0
Speed, knots (km/h)	up to 60 (up to 110)
Crew	24
Navigation range (with full displacement), miles (km)	350 (650
Cruising endurance, days	5

ARMAMENT

ROCKET-ANTIAIRCRAFT ARMAMENT:

- Guided missile system “Kalibr-NKE” type (4 pcs.)
- Portable antiaircraft missile system OF “Igla” type.

ARTILLERY ARMAMENT:

- Automatic single line tower-type canon AK-176M of the 76.2 mm bore.
- High rate-of-the fire lite artillery automatic unit AK-630M of the 30 mm bore remotely operated.

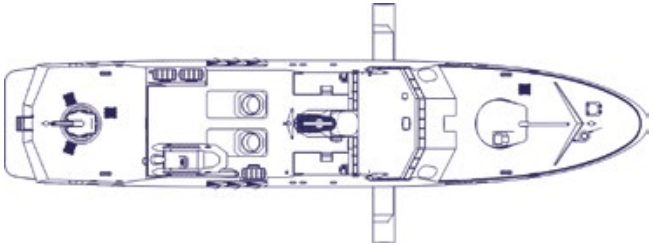
ANTI-DIVERSIONARY ARMAMENT:

- Grenade dispenser MRG-1.

RIFLE ARMAMENT:

- The Kalashnikov gun;
- The Makarov pistol.

GENERAL VIEW



DUGON

Assault air-cavity ship project 21820E

DUGON

Assault air-cavity ship project 21820E

Promotional passport № 6411/10/NEP

BASIC FUNCTIONS

- high-speed transportation of troops, tracked and wheeled vehicles of up to 120 tonnes;
- logistics support for manufacturers and other industry facilities;
- transport tasks related with rescue operations during disasters and catastrophes.

SEAKEEPING

- Seakeeping performance is not limited in conditions at sea state up to 3 points on the scale.
- Seakeeping performance is limited in conditions at sea state higher than 2 points on the scale.
- Insured seakeeping in full displacement is provided at sea state with wave height up to 5 points on the scale and the wave's height — 3.5 m.

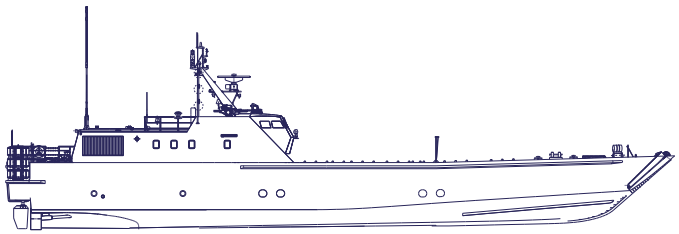
ARMAMENT

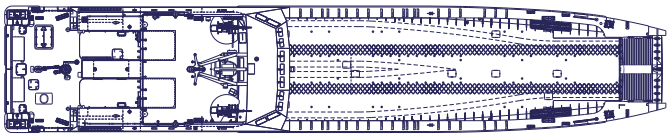
- Missile Antiair warfare capability: man-portable SAM weapon "Igla", 8 pcs.
- Artillery and rifle armament: machine-gun marine pedestal machine-gun mount (MTPU) — 14.5 (14.5 mm), 2 pcs.

TECHNICAL CHARACTERISTICS

Length overall, m	44.98
Beam overall, m	8.5
Amidships depth, m	4.5
Length overall of cargo deck, m	27.0
Beam overall of cargo deck, m	6.8
Hull height of cargo deck, m	2.34
Draft in full/light displacement, m	1.9/1.6
Displacement full / light-ship, t	305.0 / 149.0
Full speed, knots (km/h)	up to 35 (up to 65)
Payload, t	120.0
Crew	8
Cruising range (in full displacement), miles (km)	500 (930)
Cruising endurance, days	1

GENERAL VIEW





SERNA

High-speed assault air-cavity ship
project 11770E

SERNA

High-speed assault air-cavity ship project 11770E

Promotional passport № 6319/10/NEK

BASIC FUNCTIONS

- military use: landing of armaments and military, tracked and wheeled vehicles as well as military personnel to unimproved port facilities;
- civil use: transportation of cargo and military personnel to coastal areas up to 600 miles.

SEAKEEPING

- Seakeeping performance is not limited at sea state up to 2 points on the scale and the wave height — 0.75 m.
- Seakeeping performance with speed limitation up to 27 knots is provided at sea state of 3 points on the scale and the wave height — 1.25 m.
- Insured seakeeping in full displacement is provided at sea state of 5 points on the scale and the wave height — 3.5 m.

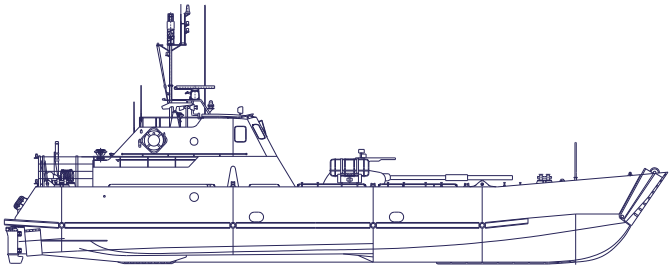
TECHNICAL CHARACTERISTICS

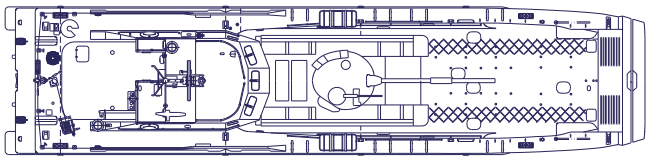
Length overall, m	25.6
Beam overall, m	5.8
Amidships depth, m	2.9
Length overall of cargo deck, m	15.0
Beam overall of cargo deck, m	4.1
Draft in full/standard displacement, m	1.52/1.47
Displacement full / standard, t	105.0 / 100.0
Speed, knots (km/h)	30 (55)
Payload, t	45.0
Crew	4
Cruising range, miles (km)	up to 600 (up to 1110)
Cruising endurance, days	1

ARMAMENT

- Antiaircraft-missile weapons — Portable air defense system “Igla”, 4 pcs.
- Small arms — Pedestal-type machine guns with a caliber of 7.62 mm, 4 pcs.

GENERAL VIEW





MERKURIY

Sea customs air-cavity vessel project 14232

MERKURIY

Sea customs air-cavity vessel project 14232

Promotional passport № 2466/00/NEK

BASIC FUNCTIONS

- National and customs boarder control;
- Counter-contraband operations;
- Patrol Duty in economic zone;
- Ecological monitoring.

SEAKEEPING

Weapon use in sea state up to 4 points.
Safe navigation with full displacement at sea condition of 5 points and wave height up to 3.5 m.

TECHNICAL CHARACTERISTICS

Length overall, m 35.4
Beam overall, m 8.3
Amidships depth, m 3.72
raft (full displacement), m 2.0–2.1
Displacement full / standard, t .....100.0–102.0 / 87.0–89.0
Maximum speed, knots (km/h) 45 (85)
Crew 14
Maximum range, miles (km) 500 (930)
Cruising endurance, days 5

ARMAMENT

ARTILLERY-TYPE WEAPON.

1st variant: nose-mounted BPU-1 turret machine gun mount with: Machine gun 14,5 mm; Machine gun 7,62 mm (bi-tubes); 1P3-7 Periscopic Sight; OU-Z GA 2M Illuminator for night firing.

2nd variant: nose-mounted AK-306 30 mm six-barreled artillery mount with: K-219-1 "Kolonka" tools for visual remote control during daytime; Optical-Electronic Fire Control Complex (day/night operation).

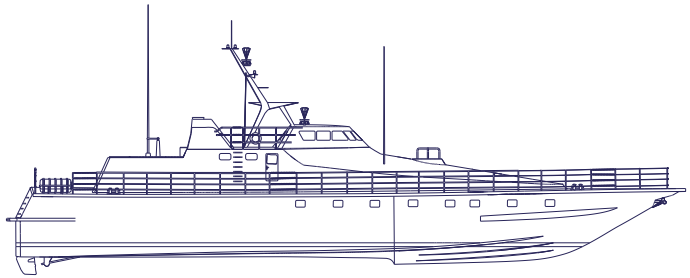
3rd variant: "Vihr-K" gun-missile integrated weapon system with: AK-306 30 mm six-barreled artillery mount; Four "Vihr" supersonic guided missiles with automated optical-electronic fire control complex on surface and air targets; Stabilized optical-laser sight; Command station with computer system and automatic target tracker.

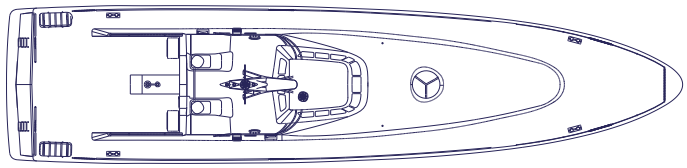
ADDITORY: the boat can be optionally equipped with 1-2 AFT MACHINE GUN(S) 7.62 or 12.7 mm.

SURFACE-TO-AIR SYSTEM. "Igla" MANPADS (6 pcs.).

HAND-HELP WEAPON. Special room is made for keeping automatic weapon and guns.

GENERAL VIEW





SOKZHOY

High-speed boarder guard air-cavity vessel
project 14230E

SOKZHOY

High-speed boarder guard air-cavity vessel project 14230E

Promotional passport № 635/11/EP

BASIC FUNCTIONS

- Territorial and inner sea waters' and sea environmental resources' security;
- Safety and security arrangements of national maritime shipping and harbor's guard;
- Counter-terrorism and illegal drug and weapon dispensing;
- Preclusion of fishery contraband and ecological control of marine environmental;
- Lifting off inspection and counter-terror team to place of destination;
- Rescue servicing.

SEAKEEPING

Movement without speed limitation with the sea condition — up to 2 balls.

Movement with a speed limitation with the sea condition — more 3 balls.

Safe navigation with full displacement and with the sea condition — 5 balls, wave height ($h_{w3\%}$) up to 3.5 m.

TECHNICAL CHARACTERISTICS

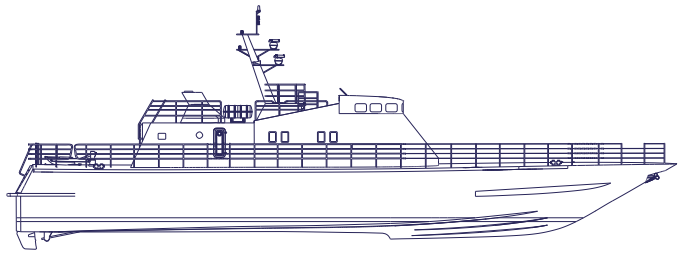
Length overall, m 35.4
Beam overall, m 8.0
Amidships depth, m 3.7
Draft in full displacement / in light displacement, m ..... 2.1 / 1.84
Displacement full / light, t .....105.9 / 83.7
Maximum speed, knots (km/h) 50 (95)
Crew 16
Cruising range in full displacement, miles (km) 800 (1480)
Cruising endurance, days 5

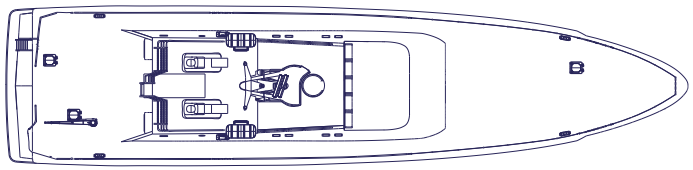
ARMAMENT

ARTILLERY ARMAMENT: The light artillery automatic unit AK-306 with ammo of 500 fixed ammunition.

RIFLE ARMAMENT: machine-gun marine pedestal machine-gun mount (MTPU) — 14.5 (14.5 mm), 2 pcs.

GENERAL VIEW





SUPPORT VESSEL

Drive-through displacement-type vessel

SUPPORT VESSEL

Drive-through displacement-type vessel

BASIC FUNCTIONS

The vessel is designed for supply provision of remote bases, positions, Border Guards' garrisons.

The vessel is able to board from unimproved shore the self-propelled machineries and man power, to transport them by sea and land them on unimproved shore.

SEAKEEPING

Vessel's sea-keeping characteristics at full displacement will provided as follow:

- carrying-out operations of equipment and man power delivery at full speed, which is no less than V=15 knots in seas 3 points on the scale ($h_{w3\%} \leq 1.25$ m);
- carrying-out operations of equipment and man power landing/ unloading in seas not more than 3 points ($h_{w3\%} \leq 1.25$ m);
- Secure floating at displacement mode iat sea state up to 5 points ($h_{w3\%} \leq 3.5$ м).

TECHNICAL CHARACTERISTICS

Overall length, m 27.5
Beam overall, m 7.0
Midship cargo deck's hull height, m 3.3
Cargo deck length/width, m 23.0/6.4
Bow/quarter ramp width, m 4.1
Overall draft, m 0.8
Displacement, t 105.0
Speed, knots (km/h) 15 (28)
Payload, t 60.0
Cruising range, miles (km) 500 (930)

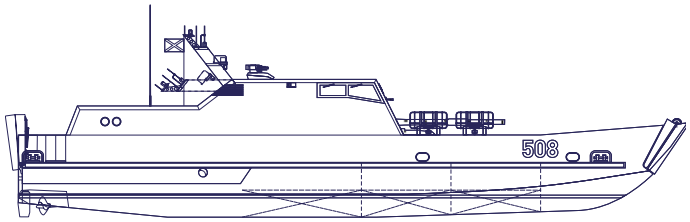
CLASSIFICATION

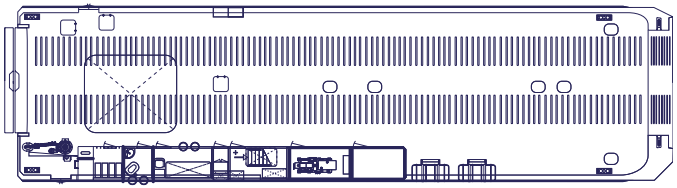
Russian Maritime Register of Shipping
KM ✪ [2] HSC

OPERATION REGION AND CONDITIONS

Sea littoral areas, shallow waters.

GENERAL VIEW





EKRANOPLANS

EKRANOPLANS

Ekranoplans were created under the guidance of Alekseev. These is a new type of ultra-high-speed vehicles, an unparalleled sea aircraft with a new motion principle based on the use of aerodynamic effect of supporting surface proximity — a “surface effect” for ultra low cruising.

From physical point of view, the effect is demonstrated in a significant increase of airwing lift when reaching the surface of water (land, snow, ice), i.e. it is a mirror reflection of “the Alekseev effect”. Also, its physical point of view is the hydrofoil lift decreasing at the approach to the open water surface. In fact, the “surface effect” and “the Alekseev effect” are mutual mirror reflection.

The changeover from foils to airwings has enabled to withdraw ship speed limitations and to bring it closer to the aircraft speed. Hydrofoil speed is limited by 120 km/h because of cavitation of foils and protruding parts. However, there are no limitations for ekranoplans in the subsonic speed range. Thus, the adoption of ekranoplans may lead to ten-fold speed increase for the water transport. WIGs are transportation means which combine the positive qualities of both ships and aircraft.

In 60-80’s the Russian shipbuilders in JSC R. E. Alexeev’s Hydrofoil Design Bureau built the ekranoplans with weight of 1.5 to 500 tons and speed of 200 to 525 km/h.Ekranoplans are the XXI century transportation means with aviation — type speed, they do not need any aerodromes and can be operated above any relatively even surface. Limitations by seakeeping for ekranoplans exist at takeoff and water landing only.

Unlike the aircraft wing, the ekranoplans wing has a special profile and form most suitable for effective use of free — stream flow that is pressurized between the wing and the surface (screen). A new system of alighting gears which provides a considerabledecrease in intensity of main structures-to-water contacts is used in the JSC R. E. Alexeev’s Hydrofoil Design Bureau ekranoplans.

The decrease begins from lowermost speeds due to effective use of jet energy (supply of pressurized jets under wing) and of hydrodynamic element system including hydroski. The jet energy system was initially suggested, developed and introduced in the JSC R. E. Alexeev’s Hydrofoil Design Bureau for home-made ekranoplans as an effective means of take — off/landing provision.

The availability of jet energy system provides tractive resistance decrease during takeoff run: in combination with the damped hydroski the motion stability characteristics are improved and the acting loads are decreased. The following motion regimes are possible during ekranoplan operation: flight, takeoff and landing, navigation on calm water and at waves, coming ashore, launching, moving on shallow water etc.

Many operational modes influence a wide range of aerodynamic and other loads acting on ekranoplan airframe and give rise to a wide spectrum of strength, vibration, hydro-aeroelasticity problems which are greatly influencing the safety of ekranoplan operation.

Basing on experience and done research, the riverine and sea ekranoplans with the following specifications can be developed, including passenger, cargo-and-passenger and special-purpose: passenger capacity up to 500 persons; cargo capacity up to 64 tons; speed up to 550 knots.

CHAIKA-2

Sea multi-purpose ekranoplan project A-050-742d

CHAIKA-2

Sea multi-purpose ekranoplan project A-050-742d

BASIC FUNCTIONS

High-speed passengers and cargo transportation in marine littoral areas, solving dedicated purposes of Emergency Control Ministry (EMERCOM). It is possessed as amphibian, which can boarding/landing from/to unimproved shore with the shore grade in 5 degrees. Water and second-class airfield is provided. Type C.

SEAKEEPING ($h_{w3\%}$)

- takeoffl / landing — 1.5 m
- in flight — no limits
- in drifting — 2.0 m

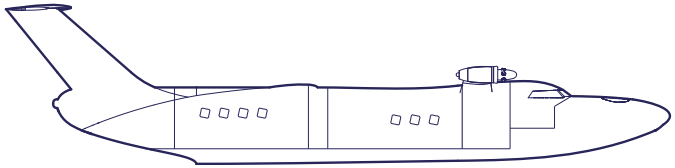
OPERATION REGION AND CONDITIONS

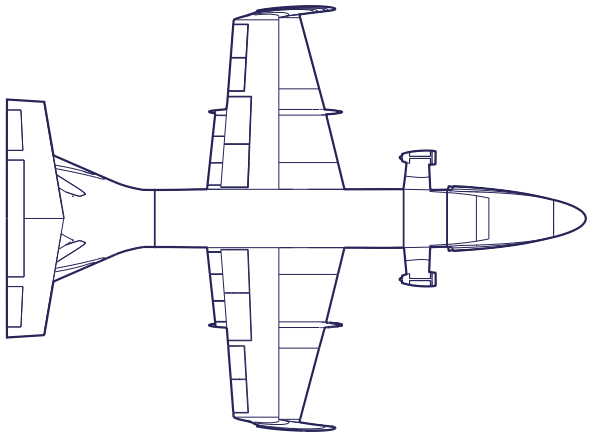
Large lakes and water storage basis, marine marginal land areas; wind speed no more than 12 m/s, the possibility of exploitation on snow and ice flush surface in cold weather.

TECHNICAL CHARACTERISTICS

Length overall, m	34.8
Beam overall, m	25.35
Depth overall, m	8.85
Draft overall, m	1.1
Full displacement, t	54.0
Cruising speed, km/h	
at screen near	360-400
at screen away	450
Passengers	100
Payload, t	9.0
Crew	4
Flight range, km	
at screen near	3000
at screen away	1900

GENERAL VIEW





Ekranoplans of new generation

PROJECT A-005-514

BASIC FUNCTIONS

High-speed passengers and cargo transportation, can be used as a transportation mean od special purposes, such as: administration operations, sanitary and ambulances, ecological control.

Length overall, m 11.6
Beam overall, m 11.6
Depth overall, m 3.65
Draft overall, m 0.3
Full displacement, t 3.1
Maximum speed, km/h 165
Passengers 8
Payload, t 0,72
Crew 1
Flight range at screen near, km 500
Seakeeping ($h_{w3\%}$), m
- takeoffl/landing 0.5
- in flight 1.25
- in drifting 0.75

PROJECT A-020-533

Length overall, m 17.6
Beam overall, m 11.0
Depth overall, m 5.0
Draft overall, m 0.6
Full displacement, t 6.0
Cruising speed, km/h 180–260
Passengers 12
Payload, t 1.3
Crew 1
Flight range at screen near, km 500
Seakeeping ($h_{w3\%}$), m
- takeoffl/landing 1.5
- in flight ..... no limits
- in drifting 2.0

PROJECT A-020-538

BASIC FUNCTIONS

High-speed passengers and cargo transportation, solving dedicated purposes of Emergency Control Ministry (EMERCOM).

Length overall, m 27.3
Beam overall, m 19.1
Depth overall, m 7.3
Draft overall, m 0.74
Full displacement, t 19.0
Cruising speed, km/h
at screen near 265–290
at screen away 290–340
Passengers 50
Payload, t 4.5
Crew 3
Flight range at screen near, km 600
Seakeeping ($h_{w3\%}$), m
- takeoffl/landing ..... 1.2 / 1.4
- in flight 3.0
- in drifting 3.0

The main advantages of new generation ekranoplans

- Air speed in screen mode (400–600 km/h)
- High sea-keeping performance
- All-weather capability
- Autonomy
- High survivability
- Low radar visibility
- Large useful load
- Large range of operating speeds
- The ability of manoeuvrable basing in the unequipped area
- The flexible payload
- The flying possibility at altitudes of up to 3000 meters
- The possibility of airfield-basing and landing on the water
- High fuel efficiency*
- Amphibious

** In comparison with high-speed vessels*

JSC R. E. Alexeev's Hydrofoil Design Bureau carries out the design of ekranoplans from 1960 year.
- More than 50 development works were conducted
- About 40 projects of ekranoplans were developed
- More than 30 ekranoplans of different purposes were built

HOVERCRAFT

HOVERCRAFT

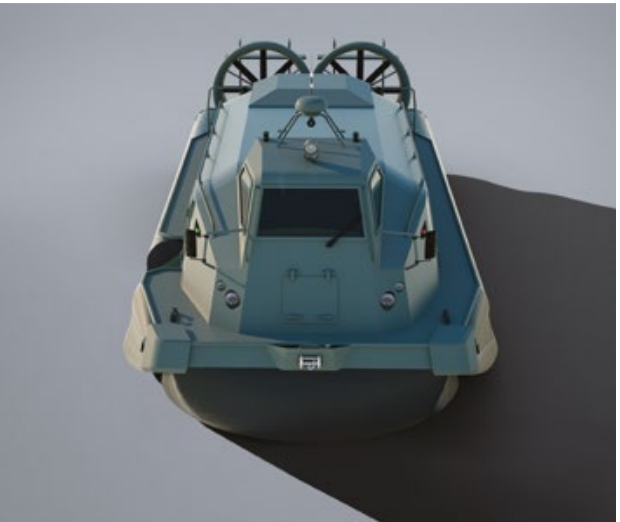
Hovercraft are high-speed knockdown amphibious transportation mean of good cross-country ability. Mission: multi-purpose service and national economy using (includes personal consumption) in inner and marine waterways and surroundings land areas in conditions of all-year-round exploitation.

NEW GENERATION HOVERCRAFT'S' PRIME ADVANTAGES

- Hovercraft's unorthodox guard chart with inflatable, variable geometry pneumocylinders using, which adopt to bottoming surface (smooth water, estimated rough water, ground, ice, obstacle crossing dry-gap crossing).
- Pneumocylinders' charging centralized system with automatic optimum pressure maintenance and control system;
- Bow door's Availability for shipment where total landfall is impossible for hovercraft and expansion of nomenclature of freight within loading gauge, convenience of injured people rescue;
- Availability of emergency tyre sleeve in low contact pneumocylinder of the same configuration as the main one, which issue safety traffic in ice-pack conditions;
- Availability of navigational safety system and radar equipment, which should provide ice obstacle location over 1-3 m with producing crew and supervision system with data for the purpose of hovercraft's traffic according to a certain route and automatic obstacle avoidance);
- Availability of small and midsized hovercrafts' helilift, ferry and auto transportation to a direct accommodation.

PROJECT X-15

Multipurpose hovercraft



PROJECT X-15

Multipurpose hovercraft

BASIC FUNCTIONS

- Hovercraft is allowed to be operated in emergency situations in term of delivery the first-aid-to-the-injured appliances and specializedstaff (doctors, rescue workers, firefighters, experts of Sanitary and Epidemiological Inspectorate, policy and other specialistsof emergency situations) to the prompt action regions.
- The combating with boarder crosses, fishery rule-breakers, the suppression of the smuggled goods, including independent finding out, searching and arresting of trespassers by boarder guard force, who are included in hovercraft crew.
- Multipurpose machinery is projected for passenger transportation, administration operations, recreation, fishing and hunting within convenient reach and inaccessible places far away from thruway, is equipped with a device for moving in the reeds.

SEAKEEPING ($h_{w3\%}$)

- Cushion-borne — seakeeping performance is provided at sea state up to 3 points on the scale.
- Hull-borne propulsion on ballonettes — seakeeping performance — is provided at sea state up to 4 points on the scale.

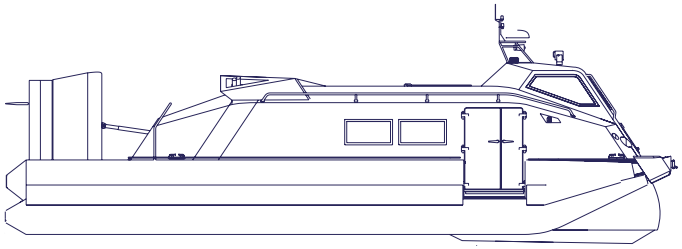
TECHNICAL CHARACTERISTICS

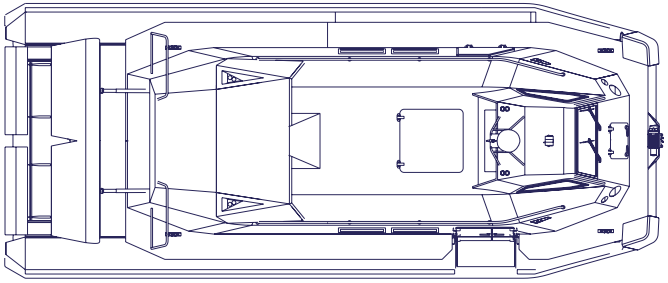
Length overall, m 13.0
Overall width on the air-cushion stop, m 5.5
Load-transfer width, m 3.8
Full displacement, t 6.0
Speed, km/h
commercial 60–65
maximal .....over 70
on ice and snow..... over 100
Payload, kg 1500
Passengers .....min 15
Maximum range, km .....over 560

OPERATION REGION AND CONDITIONS

Including seas of the Arctic Ocean, on the water and in ice conditions with air temperature of ±35 °C.

GENERAL VIEW





SIBIR-2

Universal amphibious self-propelled hovercrafts platform

SIBIR-2

Universal amphibious self-propelled hovercrafts platform

BASIC FUNCTIONS

- The modular construction allows the use of an open cargo area for transportation of: bulky cargo, tracked vehicles, 20-foot containers, pipes, drilling equipment, constructional materials.
- The closed autonomously heated module is designed for transportation up to 50 passengers, as well as medical modules (mobile hospital).
- It is possible to use in emergency situations for the delivery of first aid items, special staff-doctors, rescuers, firefighters, police and other emergency specialists to the operational action areas.
- As well as: fighting against border crossers, fishing rule-breaker, the suppression of smuggling, including self-detection, inspection and detention of violators by the border guards forces.

PROPULSION PLANT

Lifting PP: 2 x HP turbine by 1000 kW
Sustained PP: 2 x HP turbine by 1000 kW
Fuel: jet fuel TS-1, Diesel, LNG

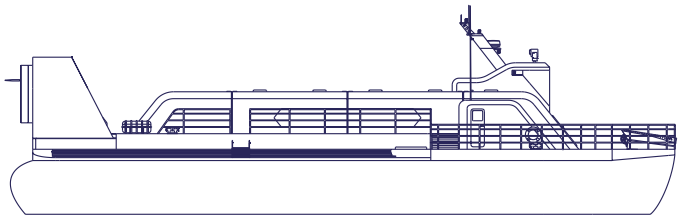
TECHNICAL CHARACTERISTICS

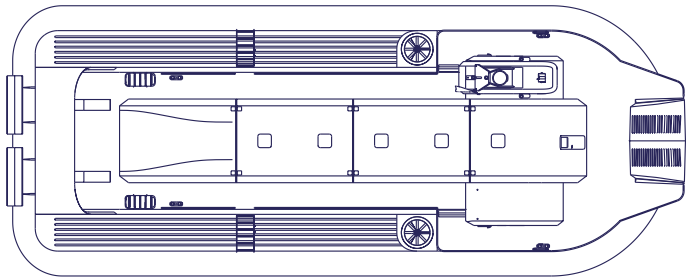
Length overall, m 35.0
Overall width, m 15.5
Depth overall, m 6.0
Full displacement, t 50.0
Speed, km/h ..... up to 70
Payload, t 25
Passengers 50
Maximum range, km 400

SEAKEEPING ($h_{w3\%}$)

At cushion-borne — seakeeping performance is provided in seas higher up to 3 points on the scale.
Hull-borne propulsion on ballonettes — seakeeping performance — is provided in seas higher up to 4 points on the scale.

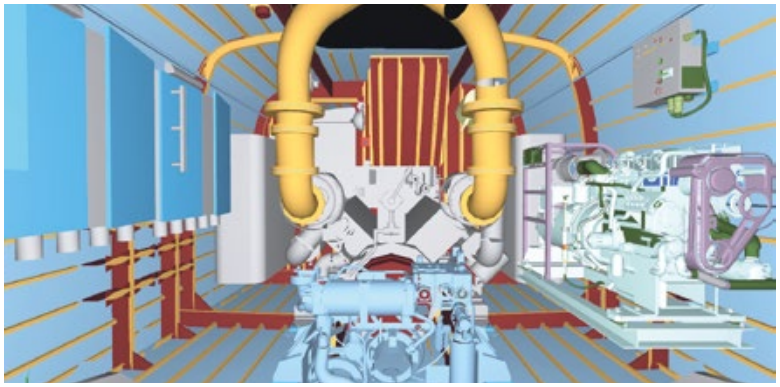
GENERAL VIEW





SERVICES

SHIP DESIGN



At the present, JSC R. E. Alexeev's Hydrofoil Design Bureau develops new projects of high-speed boats, ekranoplans, hydrofoils, air-cavity vessels and hovercrafts, which applied advanced technological solutions that ensure high comfort level and passengers' safety as well as economic efficiency of vessel operation.

The Integral System is the main engineering source of JSC R. E. Alexeev's Hydrofoil Design Bureau, supported full cycle of design, technological production preparation and building, including all necessary engineering calculations for vessel architecture.

FORAN, ANSYS and CAD/CAM/CAE technology, used in JSC Alexeev's Design Bureau, provide an integrated solution for the complete design of the ship, including hull forms definition, naval architecture calculations, hull structure, outfitting, electrical and accommodation spaces, which allows the application of the concurrent engineering concept in a distributed design office environment.

All engineering projects are being created according to:

- Individual customer's requirements
- Class society's rules
- Conventions on International Security
- International Quality Standards

RESEARCH AND DEVELOPMENT

With constant growth of competition, modern economy becomes more knowledge-intensive. JSC R. E. Alexeev's Hydrofoil Design Bureau has its own Engineering Center and offers R&D works.

STRUCTURAL STRENGTH ANALYSIS

Experience in researches of such characteristics as static and fatigue strength, resource connections, full-scale panel and using software Ansys, allows to carry out vessel's structural strength taking in account influence of external factors and to get advantage in ship design.

PROJECT EXPERTISE

JSC R. E. Alexeev's Hydrofoil Design Bureau evaluates projects of hydrofoils, hovercrafts, WIGs and gliding boats:

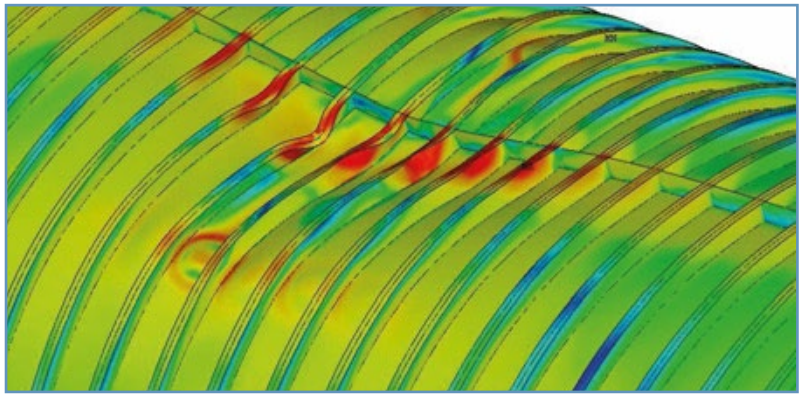
- Technical-and-economic evaluation
- Metrological evaluation
- Survivability evaluation
- Electromagnetic compatibility evaluation
- Ergonomic evaluation
- Medical evaluation

Main directions of scientific research:

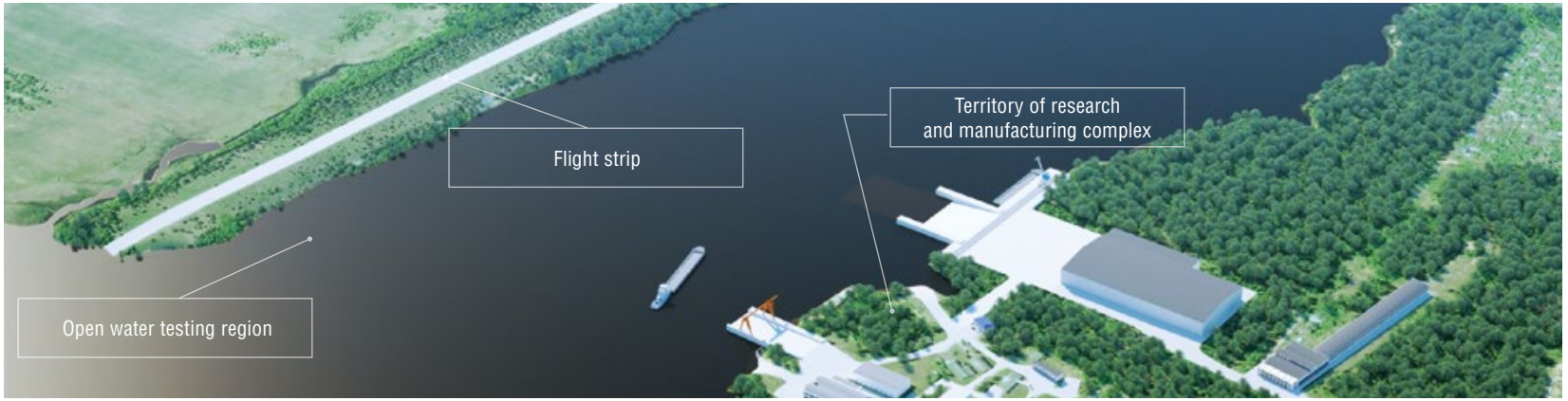
- Hydrodynamic
- Aerodynamics
- Structural strength
- Design of high-speed vessels and WIGs

Main directions of R&D:

Design and building of high-speed vessels and WIGs.



EXPERIMENTAL-TESTBED BASE



Laboratory test facilities include: gas-dynamic stands, wind tunnel, experimental production, experimental tank, a set of forces for tests in open water, a complex of buildings and funds for research of the hovercrafts'' amphibiotic and patency characteristics.

JSC R. E. Alexeev's Hydrofoil Design Bureau has its own production site and research and experimental base in Chkalovsky district, which allows solving a complex of experimental, design and technological issues related to the development, design and construction of ekranoplans and high-speed vessels of all types.

The test facilities let us carry out the following studies of hydrofoils, air-cavity vessels and ekranoplans:

- experimental and calculated studies in the experimental tank and open water using dynamic scale models;
- research of hydrodynamic, aerodynamic, gas-dynamic properties on physical models;
- structural strength studies on elastic-like models;
- special trials conducting, including: design, factory, government ones, and trial operation;
- certification and repair determination of vessels and ekranoplans.

The experimental and production base consists of a covered berth, made for the building and final completion of ekranoplans.

The covered berth is designed for:

- creating separate units and ekranoplans' assembling;
- building of high-speed vessels of different types.

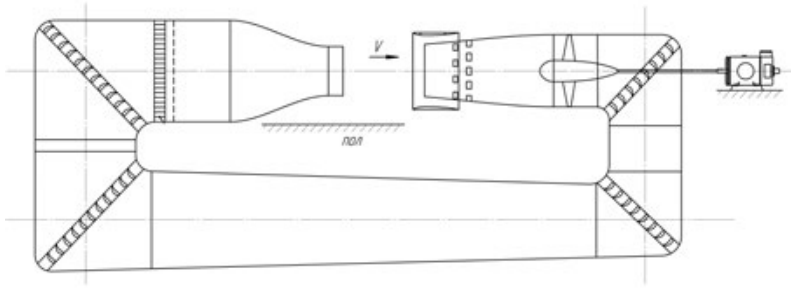
The model area equipped with a 3D CNC milling machine is designed for the models production of various types and purposes:

- Towed;
- Aerotube;
- Stand;
- RC;
- Stubborn-like;
- Ejection;
- Small self-propelled.

The mechanical workshop, equipped with modern bending, turning, milling, drilling and boring machines, allows to perform mechanical processing of parts and structural elements of ekranoplans and high-speed vessels.

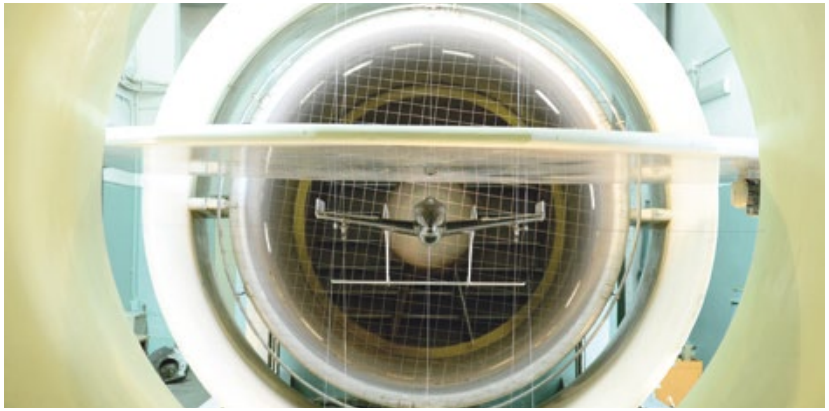
AERODYNAMIC TEST

AT-2 — is a continuous-operation, closed-layout wind tunnel with reverse channel and an open test section designed to investigate aerodynamic characteristics of aircraft models at take-off, landing and low-speed flight. Fan, each driven by a constant-current electric motor of 200 kW, generate the flow. Six-component aerodynamic balance is been used for general measurements. Model with wing span up to 1200–1300 mm.



BASIC PARAMETERS

Air flow speed (V) ..... 0-50 m/s
Pressure ratio (n) 1
Critical Reynolds number for sphere with diameter of 150 mm (Re) 2,65*10
Stream turbulence (ξ) 0,6%
Total pressure ..... atmospheric
Stagnation temperature ..... environmental
Test section dimensions ..... ∅ 1750 mm



HYDRODYNAMIC TEST

In experimental tank

JSC R. E. Alexeev's Hydrofoil Design Bureau uses experimental tank with towing bridge for testing and optimization of hydrodynamic characteristics of all high-speed vessels, including:

- Ekranoplans
- Hydrofoils
- Gliding boats
- Hovercrafts
- Air-cavity vessels

Main technical parameters of experimental tank

Dimensions of the hydrochannel bowl 74,0/4,0/1,2
Towing speed of the model 0,8–12,0
Acceleration 10,0
Acceleration of braking 15,0
Accuracy of speed maintenance in a measured area 0,5
Length of measuring section.....40,0
The permissible mass of the tested models .....up to 50
Wave generator generates waves
by height, mm 40-15
by lenght, m 1,0-4,5

HYDRODYNAMIC TEST

On open water

JSC R. E. Alexeev's Hydrofoil Design Bureau offers open water test organizing and realization, which determine and optimize the main technical characteristics of product. Usually towing boat and towed models are used for such testing.

After that, JSC R. E. Alexeev's Hydrofoil Design Bureau makes technical report with analysis of hydrodynamic parameters and photo/video of movement in calm and rough water.

Open water test includes:

- Optimization of hydrodynamic hull shapes.
- Optimization of hydrodynamic design for foil systems.
- Characterization of seakeeping performances, wettability, splashing, floating stability, buoyance, propulsion quality, resistance to flooding, ship motions, course-keeping qualities.
- Defining of model acceleration during its movement.
- Characterization of towing characteristics for test models.
- Defining of hydrodynamic parameters of test models including angle of list, pitch, speed, course, angular speed
- Characterization and optimization of aero-and-hydrodynamic WIGs configuration.
- Characterization and optimization of aero-and-hydrodynamic configuration for hydrofoils, gliding boats and air-cavity vessels.
- Characterization and optimization of aero-and-hydrodynamic configuration for hovercrafts.

MANUFACTURING/SHIPBUILDING

JSC R. E. Alexeev's Hydrofoil Design Bureau has its own manufacturing complex in chkalovskiy district of the Nizhny Novgorod region.

The infrastructure, building sites, all types of technological equipment, company's qualified staff allow to build all types of high-speed vessels (the slim of which is up to 60 tons) and manufacture products of composite materials.

AFTER-SALES SERVICES

JSC R. E. Alexeev's Hydrofoil Design Bureau has the opportunity to realize maintenance service and modernization of hydrofoils, air-cavity vessels, hovercrafts and gliding boats.

- We have the necessary material and technical base and updated equipment;
- We have comprehensive construction and repair documentation set of all vessels' projects, designed by JSC R. E. Alexeev's Hydrofoil Design Bureau;
- We possess upgraded shipbuilding technologies;
- We work closely with direct manufactures of vessels' propulsion systems and equipment, cooperating with maritime and River Register;
- We are ready to execute a piece of your vessels' service work or modernization, which were designed by the JSC R. E. Alexeev's Hydrofoil Design Bureau.

We guarantee that we will carry out all the operations with the highest accuracy like no one else because we love our work.

To provide vessels' dependable exploitation, service unit offers full range of services in concurrence with shipowners:

- Vessels' internal combustion engine modernization for updated and more economic ones with long effective life than previous
- Internal combustion engine and vessel equipment maintenance service;
- Propeller-rudder system inspection and replacement in case damaged joints fail;
- Vessel's electric system modernization and replacement;
- Vessel's fire-protection system testing and elimination the aborts, by turning on the alerters and temperature detections;
- Vessel's emergency flashing testing and elimination;
- Vessel's navigation support equipment testing and elimination;
- Vessel's foil inspection and repair;
- Vessel's hydraulic installations and actuators inspection and repair;
- Deck equipment inspection and repair;
- Onboard repair, linked with passenger seats and replacement and restoration;
- Heating arrangement's and conditioning system's inspection and repair.

HYDROFOIL RESTYLING

JSC R. E. Alexeev's Hydrofoil Design Bureau provides a full range of services for hydrofoils' modernization, restoration and repair:

- Metal, wood and composit materials produscts' design;
- The hull redesign and installation of additional devices. 3D modeling and visualization.
- Projects for the replacement of propulsion plants (motor-propulsion system characteristics' changing).
- Creation of interior design projects according to customer's individual requirements.

VOLGA V2

Update pleasure hydrofoil launch

Design options of the “Volga 2“ hydroofil boat’s exterior and interior

CERTIFICATES, LICENSES AND PERMITS

1. License of the Ministry of Industry and trade of the Russian Federation for the projects development, building, testing, installation, mounting, maintenance, repair, disposal and selling of armament and military equipment No. 002296 BBT-OPR dated 16.05.2012, remain in force without limit of time, per grade: Dynamically-supported ships (UCIA 1905); Search and rescue vessel (UCIA 1925); launchers (UCIA 1940); airplanes in general (UCIA 1510); unmanned systems and drones I general (UCIA 1550).
2. License of Russian Federal Security Service Authority in Nizhny Novgorod Region No. 1621 dated 30.04.2015 on implementation of projects, using information, which is included in National Security Information (the authorized data's level of sensitivity — top secret) (the conditions of the activity implementation — the compliance with the requirements of the Russian Federation legislative actions and other regulations, which provide information classified as state secret protection).
3. Notification of SUE "ROSOBORONSTANDARD" on registration and including into the list of organizations executing the state defense order on provision of documents for defense product standardization No. 352428041552 dated 30.07.2010.
4. Certificate of Russian Maritime Register of Shipping "Code 22018000 — Research and development in high-speed vessels engineering" No. 15.51959.130 dated 11.11.2015.
5. Certificate of Compliance of QMS with the requirements of GOST RV 0015, GOST ISO 9001. No. BC 16.794.026 dated 14.03.2016 (can be used in term of development, manufacturing and repairing according to types Universal Codifier of Issue Article (UCIA): 1210, 1230, 1410, 1440, 1441, 1442, 1510, 1550, 1670, 1905, 1925, 1940).
6. Certificate of the Russian River Register on recognition No. 02879-on the possibility of building, modernization and repair of vessels with a dock weight up to 60 tons (including vessels with dynamic maintenance principles) with a River Register class, production of spare parts for vessels of own production, as well as the developments of technical and working documentation (design) for vessels with a River Register class.

JOINT STOCK COMPANY
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RADAR MMS