

EKRANOPLANS (WIG craft)

SCIENTIFIC RESEARCH

DEVELOPMENT

PRODUCTION

SERTIFICATION

SALES

TRAINING

SUPPORT



AQUAGLIDE- 5

FIVE-SEAT MARINE RECREATION PASSENGER
EKRANOPLAN

DESCRIPTION AND DESIGNATION

SPECIFICATION AND PERFORMANCE

OPERATION ENVIRONMENT AND OPERATION BASE

TRAINING OF PERSONNEL AND FORMATION OF CREW

SALE OF EKRANOPLANS, PRICING AND DELIVERY TERMS

ekranoplan over other types of passenger craft.

The elegant design of the ekranoplan resembling the configuration of the aircraft and high quality painting make it look very attractive. When the ekranoplan is moving



at cruising speed the other ships, yachts and boats in the background look like static models.



"Aquaglide-5" can be successfully used on a sea, river or lake routes. High speed of the ekranoplan saves a lot of travel time and allows carrying much more passengers within the same time as compared with other craft of the same passenger capacity.

"Aquaglide-5" has the amphibious capability i.e. the capability of moving in deep and shallow water, to come out from water and to move on the relatively flat land, to return from land to water. Amphibious capability of the ekranoplan allows saving time, cost and other expenses

when arranging and carrying out transportation process in particular along the coast line where port terminals or mooring facilities for passengers boarding and descending are not available.



In comparison the traditional kinds of transportation the ekranoplane are more environment friendly protecting ecology and bio-resources. Protecting of ecology is achieved due to the specific design features of the ekranoplan:

- no waves generation destroying waterside;
- no water noise pollution (no propeller in the water) and no damage to the water fauna;
- no damage to vegetation when ekranoplan is used in shallow water, marsh land and when landing.

The material used for the ekranoplane shell (fiberglass) is free from an adverse effect on the human health and on the environment, it does not corrode and does not produce harmful substances when contacting a sea water.

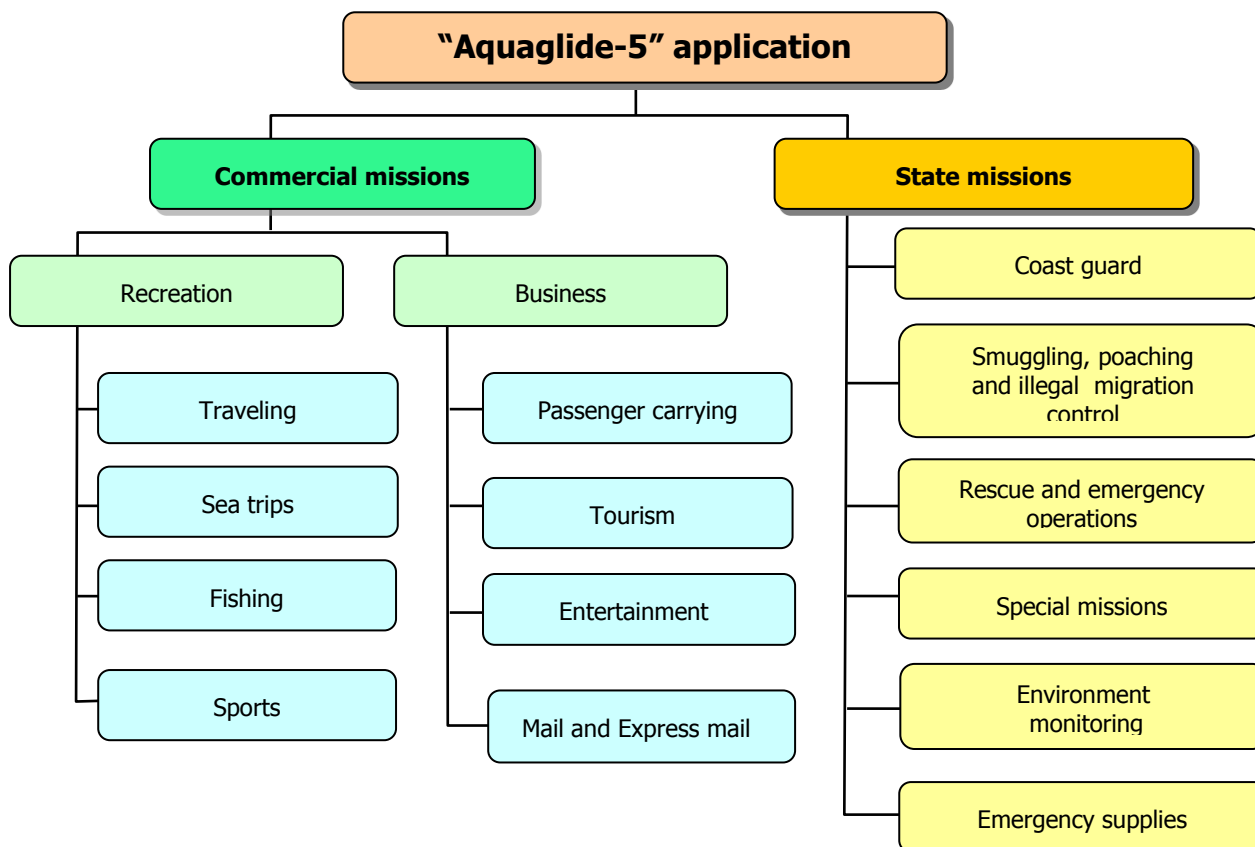
The power plant of "Aquaglide-5" ekranoplan is "Mersed-Benz" V8 engine conforming to the requirements of "Evro - 4" standards with regards to the fuel efficiency and pollution control.



At present this five-seat passenger ekranoplan "Aquaglide-5" is in serial production at JSC "Arctic Trade and Transport Company" (JSC ATTK) production facility. The engineers, designers, production engineers and production crew engaged at this production facility and in the Design bureau are highly qualified and experienced in ekranoplan technology gained under the leadership of the great Russian high-speed craft designer Rostislav Alekseev.



"Aquaglide-5" ekranoplan typical application areas



2. Specification and performance

Specification and performance of "Aquaglide-5" ekranoplan

Length [m]	10,66	Max displacement [kg]	2400
Width [m]	5,9	Empty weight [kg]	2010
Height [m]	3,35	Deadweight [kg]	506
Width at middle [m]	1,4	including:	
Crew	1	- crew and outfit [kg]	106
Passenger capacity	4	- payload [kg]	300
Cruising speed [km/h]	150-170	- fuel [kg]	100
Range [km]	350-450	Hull material	Fiberglass

Power plant and transmission

For the power plant of "Aquaglide-5" a "Mercedes-Benz" V8 gasoline engine of 326 h.p. (240 Kwt) @ 5500 rpm is used. Optional "Mercedes-Benz" diesel engine of 313 h.p. can be used.

Fuel consumption at cruising speed is about 32 kg/h.

Another engine option - aviation rotary engine of 360 h.p. is available.

Transfer of power from the engine to two propellers is carried out through the transmission, consisting of one central and two side gear boxes. Maximum torque at each output shaft of the transmission is 335 Nm. Side gear boxes and propellers are turning in relation to the gear box at 60 degrees.



Four-blade propellers types AB-110 with diameter of 1400 mm with variable pitch provide the required thrust and maneuverability.

Seaworthiness

Lift-off and moving of the ekranoplan at cruising speed is permissible at waves of up to 0.3 m and the wind force of up to 7 m/sec. Free drifting with no damage to the ekranoplan structure is permissible at waves of up to 1,25 m and wind force of up to 7 m/sec.

Maneuverability

High maneuverability of the ekranoplan is provided by the manipulation of the propellers thrust difference.



When floating at low speed and with maximum of propellers' thrust difference the radius of circulation of the ekranoplane is not more than 1 length of the hull. At low speed maneuvering the hydrodynamic rudder can be extended and used in addition to the manipulation with propellers' thrust difference. Complete circulation at cruising speed is not more than 1400 м. When the ekranoplan is on the land then the the turning radius is about 0.5 of the hull length.

Airframe

Airframe of the ekranoplan consists of the following parts: hull, wing with a flap, skegs, fins with aerodynamic rudders and stabilizer. Most of the airframe structures are made of corrosion-resistant materials and alloys (fiberglass, foamed plastic, polyurethane, aluminum-magnesium alloys and stainless steel). All the compartments are painted inside and outside. Airframe load-carrying structure elements (frames, stringers, ribs, walls) are made of composite materials. For better rigidity of the entire

hull and some elements of the structure – frames, engine foundation, beams, nose stringers, ribs of the central section of the wing, towing fragment of construction – are made of aluminum-magnesium alloy.

The wing consists of the central section, two detachable sections and a four-section flap. Detachable sections of the wing are attached to the central section by bolts. Star board and port side skegs with attached floats of shock absorbing system are the integral parts of the wing sections.

Ship-type outfit

The ekranoplan is provided with 10 kg anchor and with the anchor cable.

For mooring of the ekranoplan there are four mooring shackles attached to the wing (two shackles on each wing).



For towing of the ekranoplan in the nose part of the hull there is a special bracket for fixing the tow cable.

Shock absorbing air-inflatable equipment of the ekranoplan consists of three floats attached to the bottom of the hull and skegs.

The volume of the floats, their positioning in relation to the ekranoplan CG

and the air pressure in the floats provide the ekranoplan with required hydrostatic, shock absorbing and amphibious capabilities. When the ekranoplan is floating the air pressure in the floats maintained at 2,0-2,5 kPa, when used as an amphibian the pressure maintained at 1,0-1,5 kPa.



Ekranoplan systems

Air conditioning system provides air conditioning and ventilation of the passenger cabin. The system is controlled by the Captain from control board.

Heating system provides heating of the passenger cabin. Heating system is functioning only when the engine is running.

Hydraulic system supplies the hydraulic liquid to the drives of propellers pitch control, changing of angular position of the transmission side gear boxes, extension and retraction of hydrodynamic rudder.

Inflation system of shock absorbing equipment provides inflation and maintaining of the required air pressure level in the cenral and side floats. The system includes two compressors of 430 W each, valves of the floats and air pipes. Maintaining of the required air pressure in the floats in case of air leaks is provided by

activating-deactivation of compressors by the pressure sensor signals.

Firefighting system is activating the fire extinguishers either automatically or manually by the Captain from the control board с пульта водителя through "1st turn" and "2nd turn" switches.

Speed indicator system provides dynamic and static pressures from the airspeed tube to the speed indicator.

Windshield washing-and-wiping system consists of two-speed wiping mechanism with gear box using 24v power supply, a tank with the electrical pump and two nozzles connected with the tank by plastic tube.

Electrical equipment

The electrical system of ekranoplan provides the electrical power consumers with DC electrical power supply of 12V and 27V. Power supply of 12V is provided for the engine, ventilation and air conditioning systems, signal horn and firefighting system. Power supply of 27V is provided for signaling lights, radio and navigation equipment, lighting system, ekranoplan control facilities, compressors of floats inflation system and firefighting system.

Communication and navigation equipment and signaling aids

For providing a short range duplex communication with other ships, motor boats and water area authorities using ГМССБ sea area A1 system and for automatic transmission of distress signal the ekranoplan is provided with VHF transceiver. At transmission the frequencies are 156,025 - 159,175 MHz and at receiving the frequencies are 156,025 - 163,275 MHz. Power supply of transceiver is provided from



27V DC electrical power supply system.

For transmission of the ekranoplan's bearings the transceiver has a special provision for communicating with GPS/GLONASS satellite navigation system. Satellite navigation system also allows monitoring the absolute speed of the ekranoplan and real time regardless weather conditions. The navigation system indicator is installed at the left panel of control board.

For providing of the course indication there is a magnetic compass showing magnetic or true courses.

For making radio communication easy and comfortable the transceiver has a connection with the captain's headset and transmission is performed by the button installed on the steering wheel.

For radio communication including emergency communication there are also



two sets of VHF duplex radiotelephone as a rescue aids with frequency range of 156,300 - 156,850 MHz. The radiotelephone sets are kept at the captain's work station.

For transmission of distress signals to COSPAS-SARSAT satellite system there is an emergency radio buoy.

The functioning of radio and navigation equipment is provided by two antennas – VHF and VHF/DSC. Both antennas are installed on the stabilizer.



The ekranoplan is provided with the set of signaling aids including signal lights, signal horn, flares, floating smoke cans, false fires and a black ball used as a signal sign when the ekranoplan is anchored at day time.

3. Operation environment and operation base

The ekranoplan is designated for operation at a day time along sea coast line, at rivers and lakes with the distance from the coast line not more than 20 miles and from a place of refuge not more than 100 miles. Wind-and-waves environment should not exceed critical seaworthiness capability of the ekranoplane.

The operation of the ekranoplan is permissible at air temperatures range $-30^{\circ}\text{C} \sim +35^{\circ}\text{C}$ with the limitation of the operation on the water at the temperature of $-5^{\circ}\text{C} \sim +5^{\circ}\text{C}$ under icing conditions.



In winter time the preceding procedure of routs inspection should be carried out to ensure the routs to be free of ice packs and other obstacles. Preceding routs inspection will provide safe winter navigation of the ekranoplan on the frozen rivers, lakes and on other ice covered water surfaces.

The design of the ekranoplan allows mooring at any terminal, self-landing for embarkation/disembarkation of the passengers, for maintenance and for basing.

Standard basing (parking) for the ekranoplan is the land basing.



For short time on land parking the floats of the ekranoplan are used, for long time on land parking– the keel-blocks under wings bottom or special wheeled carts are used. These carts are also used for moving the ekranoplan on the parking place and on the base territory. The lifting and placing of the ekranoplan on the wheeled cart is carried out with the help of air jack.

Periodical maintenance and repairs are better to be carried out in a covered hangar.

The maintenance of the ekranoplan should be carried out by the specially trained qualified personnel.



Low operation cost of using the ekranoplan for the exclusive transportation services in the segment of high-speed craft offer the commercial profitability of acquisition and operation of the ekranoplan.

In general the ekranoplan as a way of high-speed transportation does not have competitors at water arena. In combination with high reliability, safety, comfort and year round operation it is bound to be profitable. The ekranoplan is commercially most efficient when used on the routes of 30 Km and longer. The average cost of passenger/Km is estimated as 0,12 US Dollars and that is less than transportation by aviation (helicopters) at comparable speeds.



Acquiring "Aquaglide-5" ekranoplan for the personal use the owner demonstrates not only prestige and high social status but also the recognition of the availability of high-tech product improving the life style.

4. Training of personnel and formation of the crew

The personnel allowed to perform the control and maintenance the ekranoplan should be trained either at the training facility of JSC ATTK or at the Customers' facility with the adequate arrangements.

The basic training and advanced training of specialists and formation of the crew is carried out in accordance with two programs:

- the program of training of the captain (navigator/pilot) of small ekranoplan "Aquaglide-5";
- the program of training of the maintenance team.

Training of the maintenance team includes the following specializations:

- mechanic in charge of power plant and systems of the ekranoplan;
- specialist in charge of electrical-radio-navigation systems and equipment of the ekranoplan;
- specialist in charge of hull, control facilities and outfit of the ekranoplan.

The training program for each specialization includes theoretical and practical parts.

The concept of the self-stabilization and stability laid in the design of the hull, S-shaped wings and empennage makes the control of the ekranoplan easy at the various kinds of maneuvering, moving and transition configurations. Therefore the process of gaining the skill of the ekranoplan control with the help of instructor does not take much time – about 1,5-2 weeks.

Later on the captain(s) who were trained according to the basic program of the ekranoplan control can undertake the advanced training to be qualified as captain-instructor.



The candidate to be trained as a captain of the ekranoplane should have the skills of piloting of light aircraft or navigating a ship/motor boat.

The training programs and terms of training can be found at w-site www.attk-invest.com

5. Sale of ekranoplans, pricing and delivery terms

The sale of "Aquaglide-5" ekranoplans is carried out through the head office of "ATTK-INVEST" in Moscow.

The ekranoplans are offered for delivery on FCA terms.

The Offer for delivery and prices on base configuration of "Aquaglide-5" ekranoplan and options see at w-site www.attk-invest.com

The request for offer and for pricing can be sent at the addresses shown below.

Depending on the number of the ekranoplans intended to be acquired starting from a lot of 5 ekranoplans there is a flexible system of discounts to be negotiated and agreed upon additionally on signing the sale contract.

Along with the contract for the sale of ekranoplans the aspects of transportation of the ekranoplans to the destination, insurance, training of the personnel and after-sale support are to be negotiated and agreed upon.

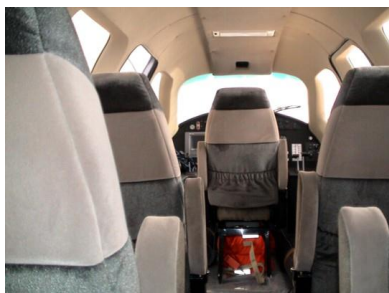
«ATTK-INVEST», Moscow – Nizhniy Novgorod, Russia

www.attk-invest.com

e-mail: invest@attk-invest.com ; dan@attk-invest.com

*At present the company is working on the projects of developing the ekranoplans of higher payload and passenger capacity of different classifications.
You can learn more about these projects at our web-site*

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