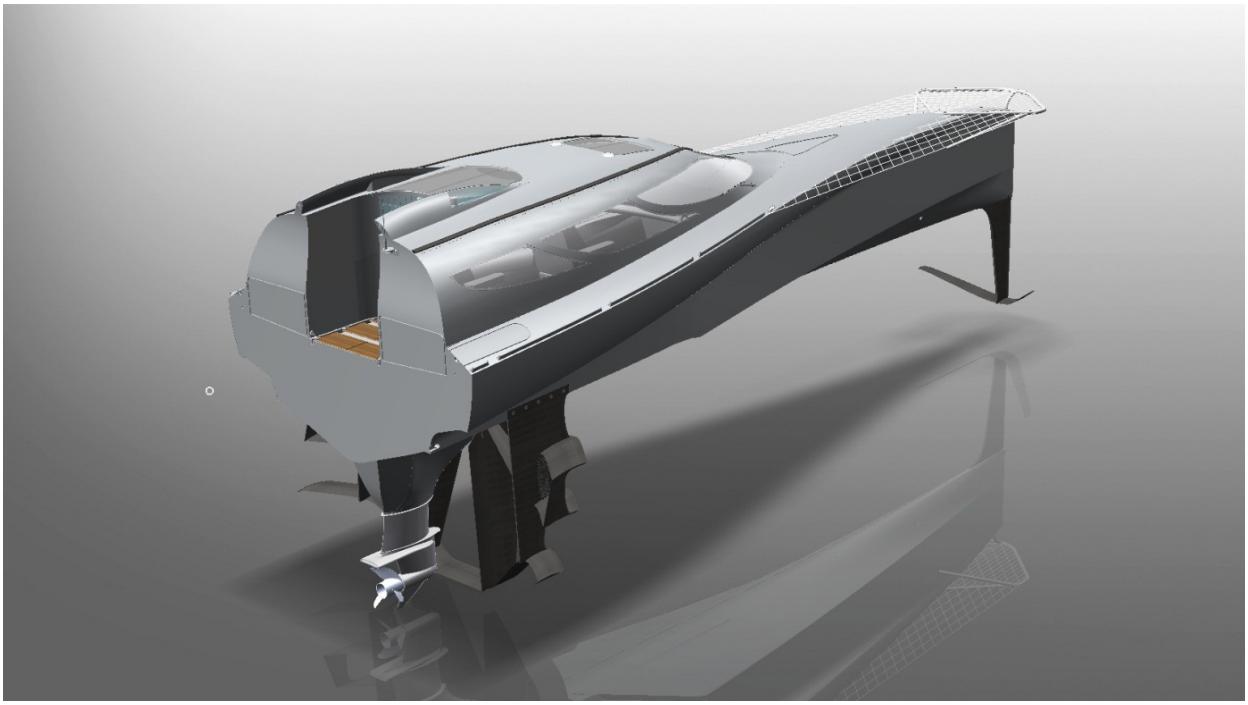
Aeromarine Transport Consortium

603002, Russia, Nizhny Novgorod, Sovetskaya st. 12;
t/f.: (831) 277-62-28, 277-62-29; www.rdc-aqualines.ru

SEA SPIRE

NAUTICAL HYDROFOIL BOAT



Main characteristics:

Length overall, m	8.0
Length according to KVL, m	8.0
Overall width, m	2.5
Width according to KVL, m	1.75
Static draft, m	1.8
Draft on the move, m	0.48 ÷ 0.75 (depending on the speed)
Side height, m	1.16
Displacement, t	2.0
Crew + passengers, people	1 + 5
Maximum speed, knots (km / h)	40 (74)
Seaworthiness (wave height), m	1.5
Range, km	120
Engine power, (diesel / petrol), hp	200/250

Purpose of the vessel

Nautical taxi. Maintenance of sea passenger lines with a length of 20 ÷ 120 km. The vessel will compete with ferries due to triple the speed of traffic and a more flexible schedule of flights. The most profitable are flights with the extent of 80 ÷ 100 km, when business visits by ferry do not fit into one working day.

Also, the boat may be of interest to fans of active water recreation as a closed hydrocycle hydrofoil.

The boat creates a new niche of water transport, characterized by:

- High mobility, thanks to small dimensions (auto-size);

- the ability to transport passengers on a 1.5 meter wave at a speed of 45 km/h with living conditions higher than classic gliding boats with "deep V" or any other water vehicles at comparable speed;

- high economic indicators in comparison with all similar in speed types of vessels;

- commercial attractiveness: the overall length of 8 m significantly reduces the cost of parking and maintenance in most marinas in the European Union and in other countries

Engine

There are two variants of engines:
- diesel OXE brand CIMCO Marine AB (Sweden)
Type: Turbo Diesel Intercooler
Working volume: 2.0 liters
Number of Cylinders: 4
The twisting moment: 370 Nanometers
Capacity of 200 hp at 4300 rpm
Weight: 300 kg
Length of deadwood: 30 "(762 mm)

- gasoline E 250 DPZ brand Evinrude (Canada)
Type: gasoline, atmospheric, injector, V-shaped
¬¬ Working volume: 3.3 liters
Number of Cylinders: 6
Power: 250 hp
Maximum operating range: 4500-5800 rpm
Weight: 240 kg
Length of deadwood: 30 "(762 mm)

EXPECTED PERFORMANCE OVERVIEW

Refer to the issue of calculation of the **expected operational costs** for RDC Sea Spire sea foil boat, the following figures emerged.

- The expected fuel consumption per one passenger/kilometer is 0,06 liters of diesel;
- The current cost of diesel in Russia is 1,5 USD for one liter;
- Thus, the fuel cost for 1 kilometer of travel will be approximately 0,01 USD per one passenger;
- World statistics of the storage and maintenance annual cost for speedboats show that this parameter usually is about 10% of the boat value per one year of operation. Consequently, for Sea Spire it will be not higher than $ 12'000 per year.

Refer to the **comparison of the performance** of standard speed boat (gliding hull) and the RDC Sea Spire sea foil boat, the following figures emerged.

With the same displacement (2 tons), and the same length of the boat (8 meters), the Sea Spire boat will need 150 h.p. engine (currently, the 200h.p. is chosen to provide the ability for cruising on the 1,5 meters high waves). In its turn, the gliding speed boat of the same dimensions will need 250h.p.

The comparative data of performance is presented in the chart below:

Compared characteristics	*SEA SPIRE*	*GLIDING SPEEDBOAT*
Displacement	2 tons	2 tons
Lenght of the boat	8 meters	8 meters
Minimum required engine power	**150 h.p.**	**250 h.p.**
Level of overload *while cruising on the wave $h_{3\%}$ = 1 meter,* *with the speed v = 45 kmh*	**1,5g**	**9g**
Fuel consumption	**25 liters/hour**	**40 liters/hour**

Herewith, while cruising on the 1 meter high wave, the expected **level of the overload** onboard of the Sea Spire boat (which apparently means the level of passengers comfort) will be about 1,3g – 1,5g with the speed level of 45 kmh.

For the gliding speedboat cruising on the 1 meter high wave, level of the overload will reach 9g, which is comparable for the passenger to the shaking on the extreme amusement ride.

To decrease the level of overload to 1,5g the gliding speedboat will have to reduce the speed down to 10-15 kmh. Without reduction of speed the same level of onboard comfort may be provided

by the gliding speedboat with the displacement of 18 tons, length 20 meters, with the hull of a high deadrise. Such a vessel would require the engine of 2000h.p. with the fuels consumption 250 liters per hour.

For the practical analysis of **expected performance** of these two types of boats in terms of fast marine transport services, the existing operational route line may be taken as the example (Tallinn – Helsinki, Baltic Sea (80 km).

For the analysis the sea conditions of the wave $h_{3\%}$ = 1 meter are presumed, so the boats will have to move with the different speed to provided the appropriate passenger comfort.

This route will be taken by Sea Spire almost five times faster than by the standard gliding speedboat which provides additional competitive advantage on the marine transport service market.

The comparative data of performance is presented in the chart below:

Compared characteristics	*SEA SPIRE*	*GLIDING SPEEDBOAT*
Cruising speed on the route *with the wave $h_{3\%}$ = 1 meter*	45 kmh	15 kmh
Time to destination	**1 hour 47 minutes**	**5 hours 18 minutes**

SUMMARY:

Thus, it is evidently justified that RDC Sea Spire boat have the following expected **performance advantages** in relation to the standard gliding speedboat:

1. Lower fuel consumption;
2. Higher cruising speed;
3. Higher passenger comfort in the tough sea conditions (up to wave $h_{3\%}$ = 1,5 meter).

These operational advantages allow to claim that **this type of boat may be successfully applied for the various transport tasks** that require high speed marine vessels: passenger and cargo transportation; search and rescue on water; control and patrolling of water areas.