The technology explained
WIG is the creation and exploitation of the dense cushion of air on the surface of the water and the wing. It is not unknown in nature. Ornithologists point to birds cruising slightly above the water surface with little or no effort as an example of WIG in the animal kingdom. The WIG lift is created by the acceleration of air over the upper surface curves that alters the pressure. On a WIG the airflow around and behind the wing is distorted by the presence of the surface. This causes greater pressure below the wing and reduces the capability of the natural vortices to form. Graham Taylor of Hypercraft Associates explained, "The effect is to spread the wing out wider than it really is. As a result, lift is increased dramatically and drag is reduced. Indeed a WIG can have a lift/drag ratio that is not achievable in a conventional aircraft." In terms of design, the aerodynamics of WIG mean that platforms using this technology can, said Taylor, "be a robust vehicle with short stubby wings and still offer very good load carrying utility." In essence a WIG platform is a ship not a plane and is designated as such by the United States Coast Guard amongst others. Whereas an aircraft is dependent upon airflow for its lift in order to fly, the WIG uses the ground effect to fly low, typically at a height of 1-30 metres above the surface. This is something an aircraft cannot do for any length of time.

It is the sheer size of many of the Ekranoplans that has captured many people's imagination. Taylor explained that the science behind WIG does not prove that size is a limitation on the technology. "In terms of a 'glass ceiling' the research shows that the technology improves in efficiency and stability as it gets bigger. The main problem for WIG is getting really large craft to take off in the first instance. In the Hoverwing HW-20 this is overcome by using simple retractable skirts to produce a hovercraft-type air cushion between the hulls, which enables a seamless, power efficient take-off into 'ground-effect' cruising. I do not believe that this is a serious 'glass ceiling' issue, although there have been many advocates for really large craft, or 'Wingships' as they are sometimes called."

Research published in the Russian press believes a 5,000 tonne vehicle - with a range of 20,000km, a speed of 400km/h and a 1,500 ton capacity - is possible.

Commercial plans for WIG are much less ambitious. Taylor said: "Hoverwing has plans for an 80-seat passenger ferry/transporter. In 1997 Fischer Flugmechanik built a two-seat scale replica of the 80-seat project for evaluation and demonstration. We believe in taking an incremental approach to development. We are armed with the data and knowledge that has been gathered from trials to date, and we are sure that the 80-seat craft is achievable. We also have the benefit of learning from the Russian work, which puts us in a good position to evaluate the possibilities of larger vehicles when the right time comes."

It is, however, the perception of WIG technology - rather than scientific fact - that influences its success or otherwise. "Regarding to really large craft, the issue is about technical and commercial/economic risk. In order to obtain funding, one must first show that there is minimal technical and economic risk. The best way to do this is to start small. Few nations have blank cheques to give away as the Russians did in 1960s. In other words, the issue is not about the cost of the individual large craft, but about the cost and commercial/economic risk in getting to that point."

History
In the early 1960s the Soviet Union, ever eager to obtain fast seaborne vessels, directed the Central Hydrofoil Design Bureau (CHDB) to develop WIG vessels. The first such vessels were built in 1961 and large and small scale manned and unmanned platforms using WIG proliferated, although none formally entered military service. The last large scale offering WIG was built in 1987: the 400 ton Lun-class vessel equipped with six anti-shipping missiles. In the mid-1980s the CHDB began work on smaller platforms and received an order (which subsequently collapsed) for its Volga 2 from the state energy company Gazprom. Some designers also left the CHDB and set up their own company (Technologies and Transport) which markets similar vessels to the Volga 2 worldwide, including the US where it is known as the Xtreme Explorer.

In the US the emigre German engineer Alexander Lippisch developed a small single