

THE GROUND EFFECT VEHICLE(GEV)

A ground effect vehicle (GEV) is one that attains level flight near the surface of the Earth, making use of the aerodynamic interaction between the wings and the surface known as ground effect. GEV are also known as a wing-in-ground-effect (WIG) vehicle, flarecraft, sea skimmer, ekranoplan, SkimMachine, or a wing-in-surface-effect ship (WISE).

Design

The basic design principle is that the wing drag decreases as the operating altitude decreases.

The pitch and altitude stability comes from the lift slope difference between a front low wing in ground effect (commonly the main wing) and an aft higher located second wing nearly out of ground effect (generally named a stabilizer).

Once moving at speed, the ekranoplan is no longer in contact with the water, and can move over ice, snow or level land with equal ease, though flight over land would involve extreme risks unless the surface is dependably flat.

Advantages and disadvantages

A ground effect craft may have better fuel efficiency than an equivalent aircraft due to its lower lift-induced drag. There are also safety benefits for the occupants in flying close to the water, as an engine failure will not result in severe ditching. However, this particular configuration is difficult to fly even with computer assistance. Flying at very low altitudes, just above the sea, is dangerous if the craft banks too far to one side while turning, or if a large wave occurs. Unlike an aircraft, a GEV is able to enter a harbour at slow speed into or near a town center. An important issue is the probability of collision with other conventional "slow" boats, in bad visibility conditions on dense traffic routes, due to the difference of speed.

A takeoff must be into the wind, which in the case of a water launch, means into the waves. This creates drag and reduces lift. Two main solutions to this problem have been implemented. The first was used by the Russian Ekranoplan program, which placed engines in front of the wings to provide more lift. A second approach is to adopt a hybrid concept, using some form of an air cushion (see hovercraft) to raise the vehicle out of the water, making takeoff easier. This is used by Hanno Fischer in the Hoverwing (successor to the Airfisch ground effect craft), which uses some of the blowing air coming from the propellers to inflate a skirt under the craft in the style of a sidewall hovercraft.

Using

They can be used for military and also for civilian purposes. For example, GEV can transport people from one point to another, loading and transporting different kinds of stuff. I think that it can be used for regular transportation of people through difficult places and it will be faster and safely.