

The Caspian Sea Monster

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In the 1960s a group of agents from the Central Intelligence Agency in the United States noticed something interesting while they were looking over satellite imagery. The photos they were looking over were of a large soviet naval base in Kaspiysk, Russia. What was puzzling them was a large vehicle floating in one of the lots, it looked like a massive airplane with short stubby wings. The CIA looked over the photos, noting the Soviet flag on the fuselage and large letters spelling 'KM'. They took to calling this strange vehicle the "Caspian Monster" or as it would be more affectionally named the Caspian Sea Monster!

Alexeyev's Dream

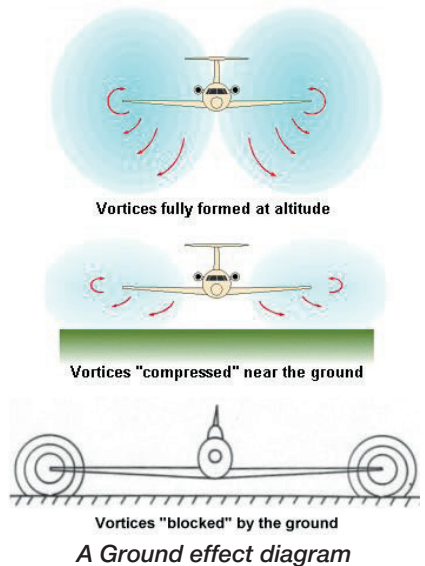
The machine the CIA found was not an airplane but what is known as a ground effect vehicle. These family of vehicles was the brainchild of Rostislav Alexeyev, an intuitive hydrofoil engineer in Soviet Russia. He is credited with producing the first mass-produced hydrofoil within Russia, the Raketa and was known as the pioneer of these technologies during the Soviets reign. However, Alexeyev, like many hydrofoil designers at the time, noticed something about hydrofoils, they have one major drawback.

You see, because of a phenomenon known as cavitation or the creation of small vapor-filled bubbles because of the change in pressure. As a hydrofoil lifts out of the water, cavitation occurs, which disturbs the lift created by the wings. Knowing this inherent problem with hydrofoils Alexeyev thought of a radical new idea. How about moving the wings out of the water? With this single idea, designs for the first Ekranoplan were quickly drawn up.



Rostislav Alexeyev

Russian Soviet Director & Chief of Design known for his pioneering work on hydrofoil ships and ground effect vehicles



The vehicle would take advantage of what is known as the ground effect. This is effect is caused by the ground or some surface interfering with the wingtip vortices and the downwash of a plane's wing. Pilots who feel this effect sometimes describe it as "the plane not wanting to land" as the effect creates added lift which pushes the plane upwards. With wings positioned closer to the ground an aircraft could suspend itself about a cushion of air up to 8 meters. After lifting off the plane would only need a limited amount of power to keep it afloat.

For his dream to come true Rostislav

had to get some form of government funding, which meant showcasing the military potential of his Ekranoplans. His vehicles could carry large amounts of weight over the water fast, as the vehicles had almost no drag from the water. It also was more fuel-efficient than large navy ships as it only requires minimum power to keep it in the ground effect. Also, during this period, the Soviet premier Nikita Khrushchev, ever the showman wanted to boast Soviet power to the western world. Rostislav's design caught the eye of the Soviet leader and funding soon flooded in for the project.

The KM: the Caspian Sea Monster

With this added funding Rostislav developing his Ekranoplans, after three successful prototypes, his team developed one of the largest machines ever to exist on this earth: The Korabl Maket or most commonly called the KM.

The KM was first flown on October 16th, 1966 with V. Loginov and Rostislav himself piloting the massive beast. It was unheard of for Soviet designers to test fly their own creations which only added to the mystique of Alexeyev.

meters long! When compared to the Boeing 747, which has a length of about 70 meters, the KM is over 22 meters longer than a modern jetliner. Even with its massive size, the KM was able to fly about 6–10 meters above the water and reach a max speed of over 650 kilometers per hour

To gain that top speed the KM was powered by 10 Dobrynin VD-7 turbojets, each providing over 127.52 kilonewtons of thrust. However, once the KM is flying within the ground effect it only takes the two engines located at the rear of the plane to keep it afloat. Another interesting aspect of the KM was is the large stabilizer located at the back of the vehicle. These were positioned out of the ground effect to provide the KM with much-needed stability as flying within the ground effect can cause instability. Also positioned on each wing was a flat plate that helped reduce the creation of Drag created wingtip vortices.



The Korabl Maket in flight (date unknown)

Regardless of the initial test of the KM was a success and its creation would lead to other Ekranoplans being developed later. The KM had a max take-off weight of over 494 tons (494,000 kilograms) with a wingspan of 37.6 meters, in comparison, a Boeing 747 has a wingspan of 59.6 meters, the reason for the short wingspan is to enhance the lift created by the ground effect. However, the KM is over 92



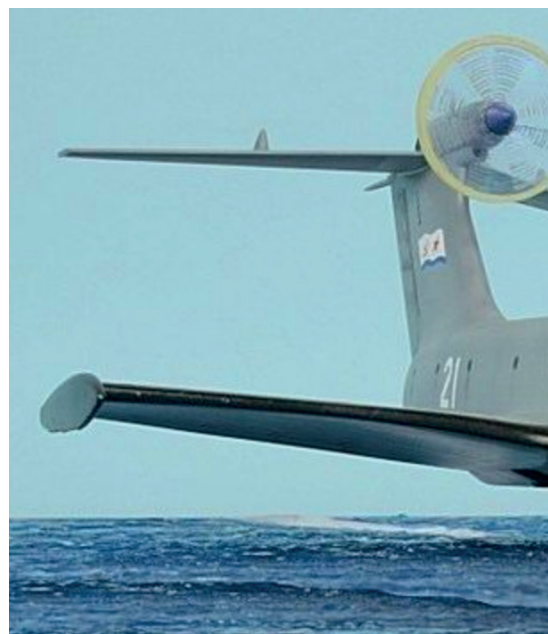
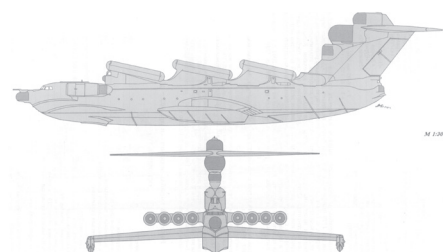
However, the KM was not without flaws, even during its initial testing the KM had shown signs of being a difficult bird to pilot. The 10 Dobrynin turbojets were at constant risk of objects and saltwater flying into the fans, this would lead to KM being very demanding of maintenance. Also flying within the ground effect was a draining experience and pilots were often strained, just trying to fly safely. The KM also needed large distances to turn as too quick of a turn might cause the plane to lose lift, this meant that spotter ships had to be positioned ahead of the KM to give warnings about oncoming ships. Another issue is that the KM was extremely limited in its operating environment. As taking off in rough sea was almost impossible, this ruled out oceans like the Atlantic and regulated the KM to inland seas like the Caspian.

Then Ekranoplans were a completely new mode of transportation so these issues were to be expected. But Rostislav and his team could not expect the drastic changes the Soviet government would go through and its eventual demise. As the premiers changed so did the budget for the Ekranoplans and even though the engineers had proven with the KM that this technology can work they would have to adjust their designs to be more 'feasible'. But the KM did its job, it was a proof of concept and it would continue testing until the 1980s when it would crash because of pilot error. Nobody died in the incident and the KM would slowly sink to the bottom of the Caspian.

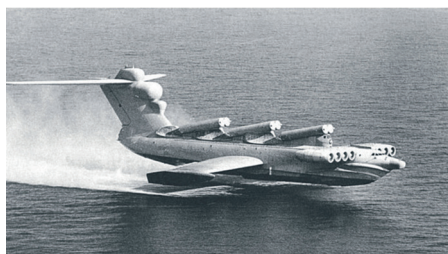
Final Designs and Downfall

With the early success of the KM, the Soviet government's decrease of funding and changing political climate, the team began development on a more practical Ekranoplan. The new vehicle was the A-90 also known as Orlyonok or Eaglet, it could carry 150 personnel, land on beaches, and fly out of the ground effect. The vehicle also had the most powerful turboprop engine in the world, the Kuznetsov NK-12, which propelled the A-90 to a max speed of 400 kilometers per hour. The vehicle also had two turbofan jet engines housed in the nose to help the A-90 lift off. However, with most of the Soviet leadership not believing the Ekranoplan development, only 3 ever entered service with the Soviet Navy.

The last Ekranoplan that Rostislav would develop would be Lun-class and it was by far the most refined out of all his designs. The Lun is similar in appearance to the KM, except for six missile tubes located on top of the fuselage! It was also powered only by 8 Kuznetsov NK-87 turbojet engines, creating 127.4 kN of thrust, with this, the plane could go up to 550 kilometers per hour. The Lun also featured a large deflector plate to help the vehicle with takeoff. Giving the Lun "steps" assisting it in getting out of water. It also had radar and advanced sensors hidden in the nose of the craft which helped guide the six P-270 anti-ship missiles. However, even with all these advances, only one of the Lun-class was built and remained in service until the 1990s.



A-90 O



*Lun-class
launching
a P-270, a
photo of it in
the present
day, and in
flight*



Orlyonok in flight

However, with decreasing governmental funding and Rostislav butting heads with Soviet leadership, the Ekranoplan program began to fall apart. Then with the fall of the Soviet and Rostislav's death in the 80s, the whole program was completely discontinued, putting an end to over 40 years of development. With the Ekranoplan program was officially dead, some within the modern Russian government are attempting to revive the technology. Company's in South Korea and around the world have expressed interest in creating ground-effect vehicles. So, the technology isn't totally lost, but no countries have expressed interest in building any to the size of the KM.

Unfortunately, the Soviet Ekranoplans will remain a relic of the cold war struggle between the United States and the Soviet Union.