



# Newsletter

No.16: April 2021

# Ekranoplan for Beginners by Neil Grayson

*(Article suggested by Douglas Fulton)*

Here is a challenging scale model project for the very experienced model builder. A flying boat hull, 8 Kuznetsov NK-87 turbofan jet engines and a fearsome armament. A ground-effect vehicle (GEV), also called a wing-in-ground-effect (WIG), ground-effect craft, wing ship, flare craft or Ekranoplan from the Russian meaning Screen glider. It would look great on Loch Leven!



With their combination of speed and stealth -- their proximity to the surface while flying makes them difficult to detect by radar – the Ekranoplan got the attention of the Soviet military, which experimented with several variants of the concept during the Cold War. The Lun-class was the last of the Ekranoplan designs to come out of the Soviet ground effect programme. Two Lun-class



vessels were planned but only one was ever built, entering service in 1987. Trials were conducted in the Caspian Sea and it became nicknamed the “Caspian Sea Monster.”

The Lun-class Ekranoplan was longer than an Airbus A380 and almost as tall. It could reach speeds of 550 kilometres per hour (340 mph) due to its eight powerful turbofans located on its short wings. It could take off and land in stormy conditions with a sea state of up to two and a half metres. The intended purpose of this formidable craft was to destroy large ships using swift sea-borne attacks with six anti-ship missiles.

Luckily for the West, some people would say, with the collapse of the Soviet Union the whole programme was cancelled. The operational Lun was left to rust away at Kaspiysk naval base in Russia’s Daghestan region. The second Lun-class Ekranoplan was partially built in the late 1980s but was redesigned as a mobile field hospital for rapid deployment and was named the Spasatel (Rescuer). As of 2020 the Spasatel is still stored in Nizhny Novgorod.

In July 2020 the completed Lun-class Ekranoplan was towed to Derbent, Dagestan a distance of approximately 100 Km across the Caspian Sea. Unfortunately, the vessel got stuck on the sand south of Derbent and was left there for the next 5 months and became a local attraction. Finally, in December 2020 the plane was moved 20-30m from the sea.



The Ekranoplan will be the star of Derbent's planned Patriot Park, a military museum and theme park that will display different sorts of Soviet and Russian military equipment. Construction of the park is expected to start later in 2020.

The citadel and historic centre of Derbent have been designated by UNESCO as World Heritage Sites.

Please let Neil and Douglas know if anyone decides to build a model of this scary plane. You may be able to visit Derbent before the end of the year to get more details depending on how the Covid restrictions go.

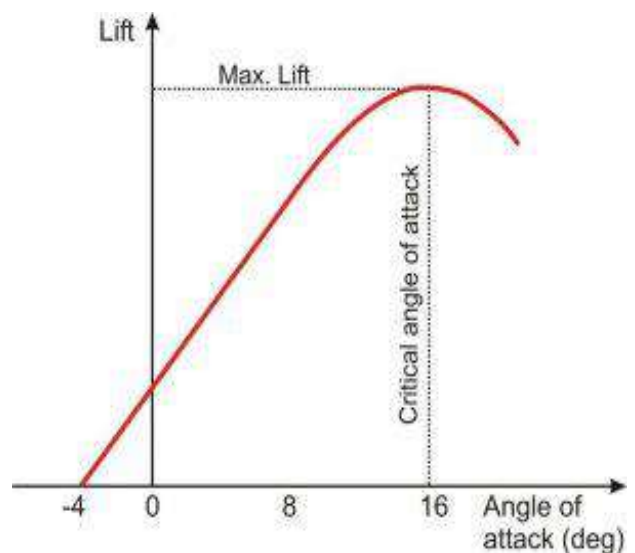
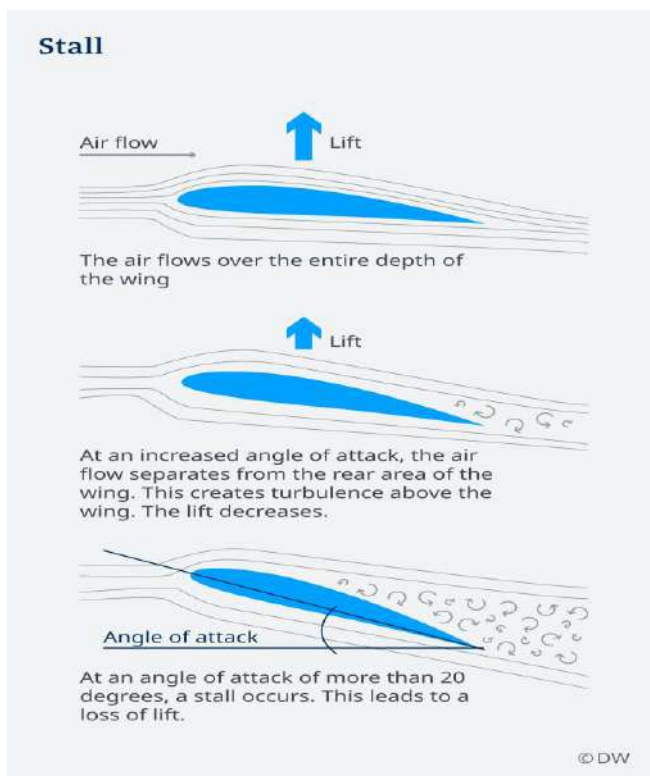
# Understanding the Stall (Part 1) *by Douglas Gilmour*

When I was teaching qualified pilots to fly aerobatics, I was struck by how poorly some of them understood the basic facts about stalling. We are of course talking about stalling of the wing or perhaps the propellor blade or control surface but *not* the engine stopping!

While most of you are probably familiar with much of what stalling is all about, there may be some aspects which have escaped your notice. While some of the points I will make are not particularly relevant to model flying, I hope they may still be of some interest.

## What causes stalling?

The first important point is that stalling of a wing (or any aero foil section) is caused by one thing only, namely that the angle of attack has increased beyond the critical angle at which the airflow over the top surface of the wing becomes disrupted and turbulent, resulting in a substantial loss of lift. This is independent of the airspeed or the attitude of the aircraft. Remember the angle of attack is the angle between the chord line of the wing and the relative airflow. For most wings this critical angle is about 15 degrees but can vary between about 11-20 degrees depending on the shape of the wing and its aero foil section (see diagrams). So, it follows that the wing can be stalled at (almost) any airspeed or attitude. This point is critical when considering aerobatic flight as we shall see later.





## Stalling Speed

The airspeed at which a wing stalls depends on several factors. Any aircraft's Operating Manual will quote a basic stalling speed which is based on level flight in a clean configuration at maximum all up weight (MAUW). There may also be figures for flaps at various settings and for powered flight or glide.

For the mathematically minded, here is the basic lift equation from which we can infer what factors might affect stalling speed:

### LIFT EQUATION

$$L = C_L \times d \times \frac{V^2}{2} \times A$$

L = Lift                      d = Density of Air  
C<sub>L</sub> = Lift Coefficient      V = Velocity of Air  
A = Wing Area

The lift coefficient is derived experimentally and depends on a number of factors such as the shape and airfoil section of the wing and crucially, the angle of attack.

For an aircraft in level flight the lift must equal the weight of the aircraft, so we can say:

Weight of a/c =  $C_L \times d \times V^2 \times A \times 1/2$  (for straight and level flight)

We can't change A or d, so if we reduce V by flying slower, we must increase C<sub>L</sub> in order to maintain level flight. We can increase C<sub>L</sub> by increasing the angle of attack which of course we do by pulling back progressively on the elevator stick until eventually we reach the critical angle of attack and stall.

### **What Factors affect straight and level stalling speed?**

The following is not an exhaustive list but covers the most important factors.

Aircraft Weight: The heavier the aircraft, the greater is the lift required for straight and level (S & L) flight, so assuming no change in configuration or weather conditions, V, the airspeed, must be increased. Mathematically, the change in airspeed is proportional to the square root of the weight. Thus, if you double the weight of the aircraft, the S & L stalling speed will increase by a factor of 1.41, the square root of 2.

As a practical example, the power off S & L stalling speed of the Super Decathlon aircraft I used to fly was 50mph at MAUW (1950 lbs.). The related final approach speed was 70mph. If I was flying solo with fuel tanks only 1/4 full, the weight was about 1600 lbs. and the equivalent S & L stall speed would be  $50 \times \text{the square root of } 1600/1950 = 45.3\text{mph}$ , a significant difference! The equivalent approach speed would be about 63.5mph so if I approached at the "book" speed of 70mph, I would go bouncing down the runway; very embarrassing!

Flaps: Flaps deployed at angles up to about 30° increase the coefficient of lift, thus reducing the stall speed. Some (e.g., Fowler flaps) also increase the wing area which further reduces the stall speed. Beyond 30° the main effect is to increase drag with very little or no increase in lift.

Air density: Higher air density, such as found on cold high-pressure days in winter, increases lift and has a beneficial effect on aircraft and piston engine performance including lower stall speeds. This is particularly noticeable in relatively low performance light aircraft but commercial jets also have to allow for substantially longer take-off and landing runs when operating at high altitude airports in hot countries due to higher stall speeds consequent on lower air density.

Airframe Icing: Icing on the wings and other parts of the airframe not only increase the weight, but also disrupts the flow of air over the wings and other control surfaces which, if severe, can make the aircraft unflyable. Even light icing can cause a substantial increase in stall speed, requiring a higher landing speed with the problems that brings.

Centre of Gravity (C of G): If the C of G is too far forward (nose heavy), level flight will require some downward force on the tailplane (horizontal stabiliser) in order to keep the nose up. This increases the effective total weight of the aircraft which increases the lift required for S & L flight and the stalling speed. A further consequence of a forward C of G is that for any given airspeed, the higher angle of attack required to produce the extra lift, results in extra induced drag (another topic altogether) which means more power and higher fuel consumption. This is why commercial jets adjust the distribution of fuel in their various tanks to keep the C of G as near to the rear limit as possible.

Load Factor (g): This is particularly relevant to steep turns and aerobatics and I will go into this in some depth next month.

To be continued.....

## An Ordinary Flyer Explains *by Alan Veitch*

A great many books have been written about flying by experts, but why has the ordinary flyer never had the privilege of print extended to him? In these days of autobiographies and personal confessions this seems a most extraordinary state of affairs. I'm going to rectify it now. Here goes.

My name is Alan Veitch. I am 5ft 9-in tall, I am a typical curmudgeon, who suffers regularly from diplopia when looking into the sky. (To put it into understandable English, a crusty irascible cantankerous old person full of stubborn ideas, that sees double when stressed). Mine is a chronic case.

Since 1995, for 25 years, I have been watching planes fly, but never actually flying myself. After moving to Scotland my son decided I was going to learn how to fly. Since then, I have actually learnt how to take off, fly around, and even sometimes land. Some of you I think may agree that I know what I am talking about. I do. Well, I did say curmudgeon.

I awake to a fine morning. Flying? why not? I ring up Douglas and he agrees 10:00am will do nicely. 5 minutes later I begin to feel nervous. I wish I had decided to spend the day in my garden.

On the way to the field my muscles start to become a very stiff. A feeling of nausea envelops me. My heart is palpitating wildly. I fervently hope there won't be a big crowd at the field. Douglas is there before me. He is standing looking at his planes, he greets me nonchalantly, just as if flying was a trivial matter. "The runway was firmer yesterday," he says. As if the state of the runway matters.

My engine takes a while to start. I begin to shake all over. I suppose it is the proximity of others. I sit down near Neil, but my feet beat such a noisy tattoo on the ground I find it necessary to get up and walk about. Neil eyes me suspiciously. I cannot help it. I go and have a talk to the crowd standing by the mower. My tongue is quite parched.

An inferiority complex has got me well in hand. I am suffering from what the medical profession calls prodromata. Subversive influences are at work, in my mind I have already crashed the plane a dozen times. I am in the penultimate stage of exhaustion psychosis.

"Are you going to fly" shouts Douglas. Around the field, so many members are standing. I tread on Bert's foot as I carry my plane to the runway, I apologise profusely, but my apology is not well received. This sends me into the throws of melancholia. My tongue is again quite parched but there is now no time to.....

Douglas has taken off before me, his plane is soaring around the circuit. He has no cares. Ah well perhaps one landing! Nothing more. It is now my turn. I am awash with terror, remorse, alarm, and dismay. I cannot remember one point about the mechanics or the theory of flying.

I rev my engine; it looks like a great big brick standing there. It is surrounded by a halo. Now it is in mist as the smoke pours out.

I lose sight of it.

I grip my transmitter in the manner adopted by computer games geeks, or is it Greeks? I have been told when a flyer waggles his sticks before take-off it is because he wants to get up animal heat. I am full of animal heat as it is. I do not want to get any hotter. I refrain from wagging.

For those who like detail I might add the following: my teeth are embedded in my tongue. It steadies me. My eyes are bloodshot and protruding. My hair the bit left that is, has lost its glossy sheen. My ears are as far back as I can get them. The left slightly higher than the right. I prefer not to discuss my nose.

I am now gritting my teeth hoping for the best. My eyes are scrunched up tight. I push the stick to the left the plane doesn't respond, I waggle the wings in hope of knowing which way it is going. It still doesn't do anything; it just keeps on gliding along. I shall probably never see the plane ever again. I shut my eyes. No matter this has happened before, I am prepared, I have several planes in the car. I now have to decide what to do. I have lost all sense of feeling. Soon I shall obtain much-needed relief. My hat has fallen off. In trying to catch it I drop the transmitter, when trying to pick them up I fall over. Looking across to the runway I see my plane engine stopped exactly where I put it for take-off. "Douglas", I stammer "what has happened?". "Nothing," he replies, "your engine cut and you have been trying to fly a flock of seagulls.

Perhaps I had better stop now. The rest is unprintable.

## Fuel the Debate *by Alan Veitch*

Just a quickie. With us getting back to flying, and the club not holding stocks of fuel, I thought I had better order some fuel for my glow engine planes. My son and many in the club have used "Weston fuels," as suppliers, and I have on many occasions purchased their fuel at the shows in England. I sent off my order on Sunday, paid for it by phone on Monday, and expected it on Tuesday. It didn't arrive and the carrier informed me it would arrive Wednesday. Then late on Wednesday night they informed me that it would arrive on Thursday. On Thursday afternoon this turned up.....



On opening the box one of the bottles had obviously been leaking, yet all of them appeared to be sealed. I even tried shaking the one which was just over half full, but couldn't get it to release any fuel!!!

I immediately got in touch with Weston Fuels, where June informed me that this was not the type of box they sent the fuel out to me in at all.

She has compensated me for the shortfall of my items, and is taking it up with the couriers, who had been paid for next day delivery. The discussions and treatment I have had with June and Alan at Weston Fuels, leave me confident to order from them again. I would recommend them as a possible supplier for fuel, until such time as the club starts to supply fuel again. There is of course also Scoonies in Kirkcaldy, especially if you don't want to be buying 4 gallons at a time.



I just need to start burning this up in the skies around Kinross ✂



# Members' Building Projects

Billy Wilkie has sent in some great pictures of a couple of new planes he has bought. First is a Seagull Edge 540 V2 180 with a 77.5-inch wingspan which was bought as an airframe so is not complete yet. He intends powering it with a DLE 40 as that is what was fitted previously so it will be a direct fit.



The other one is a Hangar 9 Taylor Craft with an 85-inch wingspan and a Zenoah 23cc Engine. This was bought complete so he just needs to set it up.



Neil's Rookie 68" glider is now finished. Lead has been added to the nose and right wingtip so it is now balanced both laterally and horizontally. It will be down the field as soon as the weather improves. Work is still required to make another power pod so that a Cox 0.049 can be used instead of the DC Dart diesel.



Neil's Super Stearman 46 biplane is also ready to go...thanks for the project Billy Dunn! The engine is run in, so once again just waiting for good weather (and the wind coming from the East or West).





Robert Boyd sent in a picture of his latest project. An Eindecker 111. It has an 80" wingspan and is built from a balsa kit from the USA. It is powered with a Laser 80 engine. The undercarriage bracing is still to be fitted as materials for this are not supplied with the kit.



Some interesting facts about the history of the full size Eindecker:

A pursuit pilot Unteroffizier (UFFZ) Schramm flew an Eindecker with a prop spinner fitted. This was not standard equipment on the Eindecker 111.

Experiments were carried out with 'Celon' a transparent material, on an Eindecker in the belief that it would make it invisible in the air. Contrary to expectations the Celon caused strong reflections, often blinding the pilot and making the aircraft visible from a great distance - not a success!

On 31st May 1916 Leutnant Max Immelmann, Max von Mulzer, and another German pilot attacked a formation of seven British aircraft. Immelmann was flying a two-gun Mark IV Eindecker and when he opened fire, the synchronizing gear malfunctioned. A stream of bullets cut off the tip of a propeller blade. The thrashing of the unbalanced air screw nearly shook the aircraft's engine loose from its mounts before he could cut the ignition and glide to a safe dead-stick landing near Courtral (see picture).



Photograph by kind permission of Albatross Publications

# Activity at the Field – March 2021

## Mon 15th March 2021

The flying site was officially opened up again on Friday 12<sup>th</sup> March but with the weather being windy and wet the first day anyone visited was Monday 15<sup>th</sup> March when the working week started with good flying conditions. The committee have once again left us with a field in a good flying condition, following the latest shutdown. Many thanks to Tom and Billy.

Douglas Fulton and Alan Veitch visited the field. Douglas flying his electric Acrowot and Riot, and Alan with his electric Kingfisher and IC Arising Star. Both flyers had some difficulty lining up on the runway, which they are both blaming on the lack of practice, nothing to do with old age. The Riot landed through the fence. Visually it just looked like the damage was a broken prop, and a chunk out of each wingtip, but on dismantling it was discovered it had a broken engine mount.



## Wednesday 17th March 2021

Billy Hatley returned to the club from lockdown to hone his skills with his Dalotel, opening up flying on an active day. Alan Veitch joined him flying his VQ Beaver, but the wind was stronger than forecast and gusting across the runway quite badly. Bert Nicholson arrived and after running his IC engine, got out his electric Arising Star. He had some trouble taking off as it was climbing fast under power. On landing he attempted an approach using the width of the runway due to the crosswind, but it came down on the wrong side of the fence. Everyone watching thought it had cleared the fence so the thud into the mud inches from the wire surprised us all. Fortunately, there was only mud to wash off.



Jim Walsh arrived and flew his Seagull Ugly Stick which gave him a few good flights before lunch. Bill McDiarmid, a new member from Kinross, turned up on his lunch break. He had a plane in the car but after a chat didn't get time to fly. After lunch things stalled, the crosswind gusts, (or Alan attempting to fly without his glasses), ended Alan Veitch's Beavers flying day, as the wheels were removed on landing.

Alan's Beaver (minus undercarriage).



Jim Walsh took off again with his Seagull Ugly Stick powered by an expensive 4 stroke engine. Communications was lost with the plane for some reason and his plane flew away into the distance. Jim and Mike went off to see if they could find it but it was nowhere to be seen. Jim has had some offers from drone flyers at the club to help search for his lost plane. It disappeared directly centre of the runway perhaps  $\frac{1}{4}$  to  $\frac{1}{2}$  a mile distant.

Neil arrived at the field around 16:15 and had 3 flights with his Apprentice. There was a dodgy first take-off and landing after nearly 4 months away but there was also a tricky cross wind. the second and third take-offs were perfect. He was packing his plane away at 17:20 when Bill McDiarmid arrived. Bill flew his Wots Wot biplane with a four stroke Laser 70 engine. It looked and sounded great in the sky. Loops and stall turns done, he attempted to land. Unfortunately, he landed a bit short of the runway in the mud at the east end

Bill with his Wots Wot biplane (minus undercarriage).





and it took the undercarriage off cleanly. No other damage, so a bit of glue will be all it needs. That's the second time it's lost its undercarriage on the KRMFC runway - 2019 summer open day was last time!

## Friday 19 March 2021

A very light wind was blowing from the East but was due to swing round to the South later in the day. Alan arrived first and flew his Kingfisher. Neil Grayson arrived shortly after 09:30 and flew his Apprentice twice to practise and get used to the controls again. Alan had his Seagull Challenger IC model but wasn't sure how much charge was in the receiver battery. Luckily Neil had got a new charger for Christmas so it was connected to that for 30 minutes and it was ready to go. Alan had



one flight with his Seagull Challenger which took off and landed safely. Charles Malcolm appeared and he flew his Vulcan and Autogyro.

Neil had trouble getting the Tutor 2 engine running smoothly, it would cut out as soon as full throttle was applied. After some adjustments it appeared to be running OK so he took off and did 2 circuits but then the engine started cutting out. The engine cut out but he managed to land at the



East end of the field in the mud. The nosewheel was bent back at almost 90 degrees but no further damage.

## Sunday 21st March 2021

Very light winds from the West but increased as the day wore on. Lovely day with hares running across the field.

Neil Grayson arrived about 09:30 closely followed by Alan Veitch and Bill McDiarmid. Neil tried to start his Dart Diesel which he hopes will power his new glider but cut his finger on the prop so gave up on that. His finger wouldn't stop bleeding despite a plaster donated by Bill. Gloves next time!

Tom Wilson arrived along with David Wilkie. Shortly after Douglas Fulton also turned up to fly his Riot. Tom opened up the club house to make use of the first aid kit and replastered and taped Neil's finger which eventually stopped bleeding.

Tom and David concentrated on flying their helicopters. Neil flew his Tutor 2 three times having finally resolved the issues with the engine cutting out. It appears to have been as simple as a loose glow plug.

Bill was unable to fly his Wots Wot biplane from the damage sustained on the 17<sup>th</sup> as he had trouble re-gluing his undercarriage back on. He flew another model which could have done with some tender loving care as the covering came off the tailplane on the first flight.

Alan flew his large Beaver but had trouble starting the engine. Once it was running however it ran well. He also practiced with his drone and his POV headset. On a subsequent flight with his Beaver, he managed to break the undercarriage again due to a bumpy landing, just a bit of glue to fix.

Once Billy Wilkie had practiced with the helicopter with Tom, he flew his electric Tundra plane, however he came in short on the runway and broke the propeller.

The wind increased later in the day and Mike managed to cartwheel his Ruckus on landing, no damage except to his reputation.

.... The rest of the month was rather unsettled weather wise, so as far as the editor knows there wasn't much more flying done. Hopefully now the flying field is open the weather will improve for April.

All please keep in touch via the members WhatsApp group. If you want to be added to the group contact Alan V.

## Newsletter Feedback and Contributions

Please let Neil or Alan know of anything you would like to see included in the Newsletter. Also, any feedback is much appreciated. When we get back to the field again, if anything happens whilst you are there send us an email (with pictures) for the Activities at the Field section. More articles are always needed. Members are interested in how you got into the hobby, what planes you have owned etc... We aim to publish the Newsletter monthly around the 1st of each month but on occasion it may be delayed for a few days. Email addresses for articles are: [alnvkrmfc@gmail.com](mailto:alnvkrmfc@gmail.com) or [krmfcng@gmail.com](mailto:krmfcng@gmail.com).

Do you have anything you want or have for sale? Send the details including pictures for inclusion in the next Newsletter.

The committee wishes you all good health

STAY WELL

See you all soon