Southern Hang Gliding Club

WINDSOCK

January 2019

"NEVER LET YOUR WING TAKE YOU SOMEWHERE YOUR BRAIN DIDN'T GET TO FIVE MINUTES EARLIER"

01 Introduction

Welcome to the January 2019 edition of the SHGC Windsock.

The team here at Windsock HQ want to help foster better pilot skills within the SHGC to compliment the initiatives led by the Club's excellent safety team comprising Steve Purdie, Hugh Miller, and Luke Nicol, together with the Coaching team under the guidance of John Turczak, and, of course, the Red Ribbon Club [otherwise known as the "what the f&ck do I do now section" - and please don't snigger, we have ALL been there], which is under the leadership and guidance of the inimitable Phil Ettinger.

Accordingly, we plan to include in Windsock a number of features and articles that have at their heart, the advancement of pilot skills. On a point of admin we have included the GDPR Privacy Notice for your attention and reflection.

We are trialling a new format for this newsletter courtesy of **Laurent Boninfante** at ParaWaiting.eu who has kindly offered to edit and format this month's edition. All feedback on this new format is welcome!

In this bumper **January edition** we have the first of a three part series on thermaling, a section on air stability, and, given the onset of winter, an article on how to paraglide in skis. The diary section has been updated to include a number of events in 2019. [Please add more!] Never think that the team at Windsock HQ don't have your best interests at heart!

We include our regular feature of 'Climbs in Foreign Climes', which in this edition features Kruševo, Macedonia. We have included an article on how birds thermal – it isn't as simple as you may think. One scally wag at Windsock HQ dubbed this section "Oi, you lookin' at my bird?" How we laughed...! Truth is we only tolerate him because he gets the morning coffees from Costa-arm-n-leg.

BTW, all these articles have been culled from various sources so apologies if you have seen some of them before. As Abraham Lincoln once remarked, "the problem with the internet is it's hard to confirm the veracity of the information you find". We hope that you will find this information both informative and accurate [gulp!].

All Clubs' survive by the willing help of volunteers, and the SHGC is no different. Anyone reading this edition whom would like to help with contributions relating to coaching, pilot skills, social or by joining the Windsock editorial team, would be warmly welcomed. Please get in touch. In particular, we would welcome any/ all contributions large or small, comments and feedback for inclusion in future editions.

So please don't be shy and e-mail me @ sbnicholls1@gmail.com

So strap in, helmet on, reserve stowed correctly, instruments charged, beeping, glowing, and we're off....

02 Free flying has come a long, long way

Thank Goodness!

Just to prove that nostalgia's not what it used to be, here are two photos from the archives to inspire admiration and respect to the pilots who actually flew these contraptions (AKA death traps) and by trial, error, and good fortitude, lived long enough to develop better, safer, gliders.

We all owe them all an immense amount of gratitude for their tenacity, perseverance, and more than just a hint of recklessness.

03 SHGC'S GDPR Privacy Notice

A Reminder to All...!

From May 2018, General Data Protection Regulation (GDPR) became the new legal framework for strengthening and unifying data protection in the European Union, giving people more say over what businesses and other entities (e.g. Clubs and Associations) can do with their data. These regulations will continue post Brexit.

Whilst the SHGC is a small entity, it does, however, process individuals' personal data and, as such, is captured under the provisions of the GDPR. GDPR documents are all held on the SHGC website.

PLEASE NOTE IT IS YOUR RESPONSIBILITY TO KEEP YOUR PERSONAL DATA ACCURATE.

The Southern Hang Gliding Club ['SHGC'] is committed to protecting and respecting your privacy. Any personal data you provide, for the purposes of your membership, will be stored in a fair, lawful, secure, and transparent way.

The personal data we hold for you
The personal data we hold for you arises solely as a function of you being a member of the Southern Hang Gliding Club. On joining, you will be assigned a membership number. Your personal data will comprise the information that you have provided to us. This will include:

- Your name, address, telephone number(s) and email address.
- Your joining date and a record of your annual membership payments
- Your British Hang Gliding and Paragliding Association ['BHPA'] membership number.
- Details about your flying experience, [e.g. hours flown, your glider, your flying qualification (e.g. CP, P, AP, Coach, Instructor).
- You may also have provided the name and phone number of a person or persons to be contacted in the event of an emergency, medical or otherwise.
- You may have also provided bank account details in order to receive a payment from the Club. Your bank details will be held for as long as legally necessary as they fulfill the Club's financial reporting obligations.

Who is the Club's nominated Data Protection Officer?
The Club's Secretary is the Club's nominated Data Protection Officer. He can be contacted at secretary@shgc.org.uk

Why we need your personal data
The reason we need your personal data is to administer your membership:

- Processing of membership payments.
- To issue a certificate of membership [helmet stickers]
- To contact person or persons nominated by you as emergency contacts.
- To ensure compliance with the Club's rules and Constitution.
- Coaching and safety management
- For the purposes of the Red-Ribbon, and Aero Tow sections

Direct marketing and profiling
The Club does not use your data for any purposes related to direct marketing by third-party vendors. The personal data you have provided is not used for profiling purposes.

Who has access to your data?
Each member of the SHGC Committee has access to your personal data via their account on the SHGC website using their own logon and unique password.

In the Personal Details section of each members' account on the SHGC Website you may also have provided a telephone number that you would be willing for other Club members to use to contact you. Other members have access to this telephone number.

The lawful basis for processing your data
Our lawful basis for processing your personal data is:

- That we have a **Legitimate Interest** in doing so as part of our obligation to you as a Club Member, to ensure safety, and adherence to the Club's rules.
- The Club also has a **Legal Obligation** to provide data in accordance with any investigation relating to airmanship events involving members such as would be required after an incident or accident (fatal or otherwise), AIRPROX, and CAA investigations into Airspace infringements etc.

With whom do we share your personal data?
We have a duty to share your personal data with the BHPA for the purposes of ensuring that all SHGC members also members of the BHPA and, therefore, in possession of third-party liability insurance as required by the Club's rules and constitution.

How long we hold your personal data
We will hold your personal data as long as you are a member of the Club. If you leave the SHGC by a) informing us directly of your decision to leave or b) by failing to renew your membership (after reminders have been sent) or c) or your membership is terminated, we will delete your personal data at the end of the following membership year unless the retention of your personal data is required for the Club to fulfill its legal obligations.

Your rights regarding your personal data
You have the right at any time to access your account on the SHGC website and erase personal data. Since your membership of the SHGC requires the processing of your personal data (for the reasons given) complete erasure of your data will mean the simultaneous termination of your membership. You may complain to the Information Commissioners Office at any time.

Accuracy of your personal information
The personal data we hold on you will comprise the personal information that you have provided to us. It is your responsibility to ensure that the information provided is accurate and you should check as appropriate. This includes contact information you have provided for use in an emergency. Where you have named a person, and provided their contact details, it is your responsibility to gain their authorization and to delete their information if and when circumstances change.

Security
The personal information you have provided will be stored on the SHGC website and access to this site is password protected. On joining the Club you would have been given access to the website and you will have chosen a unique password. It is essential that you maintain the security of the SHGC website by keeping your password secure.

The SHGC website is hosted on servers owned by a web-hosting company. These servers are located in the United States. The Web hosting company is contracted by the SHGC to host the Club's website only and are not contracted to perform in any data processing functions on behalf of the Club.

04 Birds, Thermals, and Soaring Flight

Feature One

Why do flocks of birds fly in a circle over the same place over and over again? As we know, thermal is an updraft of warm air that rises from the ground into the sky. By flying a spiraling circular path within these columns of rising air, birds are able to "ride" the air currents and climb to higher altitudes while expending very little energy in the process. But how, exactly do they do this?

Solitary birds like eagles and hawks often take advantage of thermals to extend their flight time as they search for food. Social birds that fly in large flocks also use thermals to gain altitude and extend their range during migration. The sight of dozens or hundreds of birds riding a thermal has been said to resemble the water boiling in a kettle, so the terms kettle or boil are sometimes used as a nickname for a flock of birds circling in a thermal updraft.

Biologists have used mathematical models to show how birds soar sand have used mathematical models to demonstrate birds use ‘torque and vertical wind’ to help them pick the most efficient soaring path through thermals.

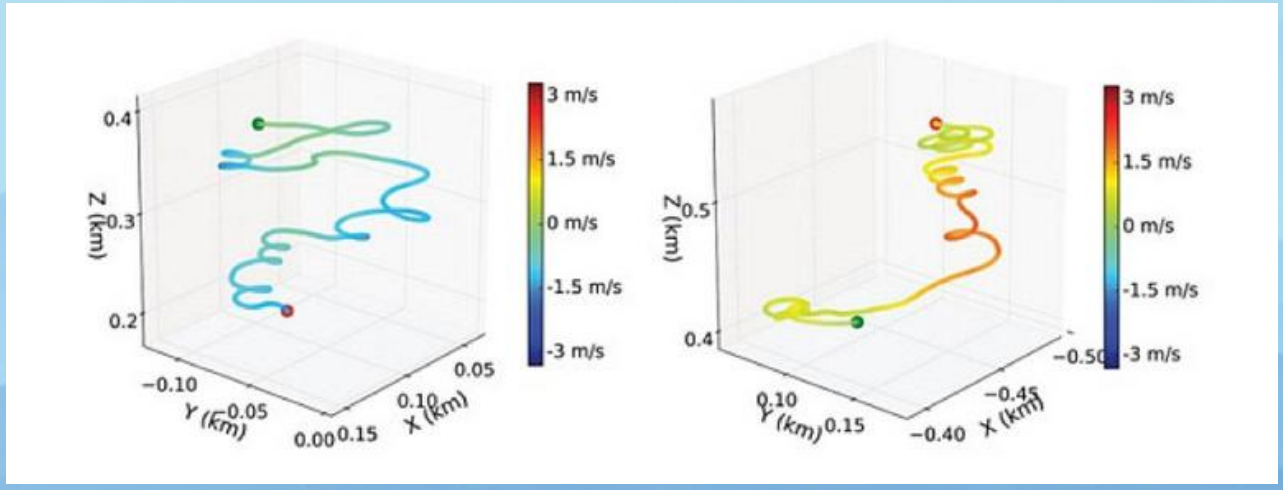
Migratory birds use these warm, rising currents of air to gain height using little energy to fly over long distances. Most migrating birds fly between 656 and 3,937 feet (200 to 1,200 meters) above sea level. When the wind is against them, they stay closer to the ground where obstacles like trees slow the wind down. When they have a tailwind, they fly up high to where it will whisk them along faster.

Bar-headed geese, native to central Asia regularly cross the Himalayas – the world's highest mountains – by reaching heights of 59,055 feet (18,000 meters). Many large birds of prey, herons and storks migrate by day to make use of thermals, and use thermals to gain height without using up precious energy by flapping. Songbirds such as warblers, thrushes and starlings, migrate mostly at night when the air is calmer and cooler.

Scientists have long known that thermal soaring requires complex decision making within the turbulent environment of a rising column of warm air from the Earth. However, relatively little is known about the navigation strategies used by birds to cope with these challenging conditions, mainly because past computational research examined soaring in unrealistically simplified situations.'

The research combined numerical simulations of atmospheric flow with reinforcement learning algorithms - equations originally developed to model the behaviour and improved performance of animals learning a new task.

The algorithms were developed in a manner that trained a glider to navigate complex turbulent environments based on feedback on the glider's soaring performance.



These graphs show how an untrained glider (left) takes random decisions and descends, while the trained glider (right) learns to use spiraling patterns in regions of strong ascending currents, as observed in the thermal soaring of birds and gliders. The colours indicate the vertical wind velocity"

The scientists analyzed the bank angle and the angle of attack of the glider's wings as well as how the temperature variations within the thermal impacted vertical velocity.

By sensing two environmental cues - vertical wind acceleration and torque - the glider is able to climb and stay within the thermal core, where the lift is typically the largest, resulting in improved soaring performance, even in the presence of strong turbulent fluctuations.

As turbulent levels rise, the glider can avoid losing height by adopting increasingly conservative, risk-averse flight strategies, such as continuing along the same path rather than turning.

The scientists showed that an untrained glider taking random decisions gradually falls, while a trained glider learns to make use of characteristic spiraling patterns in regions of upward gusts of wind. It is believed that this is the technique used by migratory birds.

The scientists wrote in their study, published in the journal Proceedings of the National Academy of Sciences: 'torque and vertical accelerations' appear to be the cues that most effectively guide the most efficient soaring path of birds through thermals, rather than differences in temperature. Temperature was specifically shown to yield minor gains.'

One of the scientists, Professor Vergassola said: 'Our findings shed light on the decision-making processes that birds might use to successfully navigate thermals in turbulent environments. This information could guide the design of simple mechanical instrumentation that would allow autonomous gliders to travel long distances with minimal energy consumption.'

Frigate birds flying a spiral pattern within a thermal

05 Understanding Thermals. Part 1

Pilot Skills

The Crux of XC flying is correctly answering the question, "where is the next thermal?" Answering this question, correctly, more often than not, would radically change a pilots flying experience. This is part one of a three-part series (two and three to follow in future editions) written by Will Gadd. These are the thoughts and opinions of the author.

I think it's key for every XC pilot to develop his or her own system for understanding thermals, and then continuously refine it. Only in this way will the pilot actually learn something with each "success" or "failure. That's goal is to have a simple, clear system that you can refine each season to produce better results. I broadly split my thermal-prediction model into two parts: ground-based thermal prediction ideas, and sky-based thermal clues. This article is my attempt to explain to myself and anyone who finds it interesting how thermals form on the ground and how to find them efficiently, Part two will deal with the sky. Part three with focus on thermaling technique.

Collectors

I call potential thermal generating areas, "collectors" because they collect the sun's energy and release it as warm air or thermals, a process any successful XC pilot should be very interested in. I think the air in collectors tends to warm up as the sun heats the ground, first releasing relatively slowly and steadily (early morning mountain thermals are the best example of this), followed later in the day by more violent "sets" or cycles in much the same way waves hit a beach. Imagine small waves coming in continually, then a big set ripping through, followed by small waves again. If you find a good collector, you can often maintain in a zero over it and wait for a good set to go through; if you're low, this may be your only chance.

Collectors are all about sun. If there's no sun, then there's probably not much air leaving the ground (cold fronts and other very unstable air masses are exceptions). When looking at any potential thermal collector, I first ask, "How long and at what angle has the sun been shining on the collector?" A perfect collector would be at right angles to the sun for hours. I first learned this lesson flying in the '96 US nationals when all the top pilots flew to the sunny but lee side of the ridge and I went to the windward side where the sun was just starting to hit. I sunk out, they didn't. At the time I thought this experience was bad luck; luck had nothing to do with it, the slopes simply hadn't been in the sun long enough.

The next factor that determines how much the air heats up is the surface the sun is striking. For an excellent analysis of surface thermal theory, read Reichmann's Cross-Country Soaring. Basically, dry surfaces with a lot of trapped or sheltered air will produce the best thermals. Late-season cereal (wheat, oats, etc.) crops are dry, hold a lot of still air, and consequently release some of the best thermals. Dry shrubbery also works well; rocky terrain with a lot of dead airspace between the rocks works well, but takes longer to heat up. Moist ground cover absorbs the sun's energy and uses it to evaporate water, a cooling process that kills thermals.

Wind tends to destroy thermals by continuously mixing the air in potential collectors, preventing it from either reaching the temperature at which it will leave the ground or turning what could have been a decent thermal into a ragged mess, especially close to the ground. A large line of hedges or trees around a very dry but bushy field will often hold a nice still "pocket" of air. You can experience thermals on the ground by just walking around; sunny, dry spots protected from the wind will be warmer. As odd as it might sound, I've learned a lot by simply walking in the mountains and feeling the cool air in the pines, contrasted with the warm air on avalanche slopes or other treeless areas. The more protected and sunny a collection area is, the warmer it will be and the better chance you, as a pilot will have of going up. This means that the best thermals are often found in sunny lee areas; this is no problem if you're high and fly above them, but you have to make your own decisions about how much rotor you want to play with if you're lower. This isn't an article about safety.

Many pilots believe black pavement such as that found in big parking lots or roads will be a good thermal source; although pavement is black and absorbs tremendous amounts of energy, it often doesn't work very well because there is nothing to "hold" the air in place; if you watch birds soaring above a parking lot or freeway, they will almost always be turning very small circles and not gaining much altitude. The thermals are frequent, sort of like grease popping off a skillet, but frequently unusable. Interestingly, a parking lot filled with cars generally works better than one without cars because the cars hold dead air nicely. A road can be good "wick," but more on that below.

The aspect angle of the terrain is critical. For example, dry ploughed fields almost always work better than dry flat fields. I think this is because the sides of the furrows tend to face into the sun like little solar collectors, while the actual furrows protect the warm pockets of from the wind and allow them to develop. If you're mountain flying, then look for the slopes that have been at right angles to the sun the longest. Lee slopes often work better than windward slopes because the air in the lee is protected, but a windy slope in the sun will beat a shaded slope in the lee every time. Really massive, Southwest-facing slopes in the mountains may offer continual strong thermals from mid-day through early evening, but east and due-west facing slopes will only work in the morning and evening respectively.

The anti-collector is of course a lake. Cool, reflective, moist, and often windy. You will almost never find a thermal that comes from a lake. That is not to say you won't find thermals over lakes, but they aren't coming from the lake itself very often. One exception may be very late in the day when the relatively warm water releases heat, but I've very seldom seen this happen in a strong enough manner to produce usable thermals. Long glides over lakes in the evening are often quite buoyant, but don't count on "magic" air too often or you may be swimming.

Passive triggers, and wicks

I believe thermals have some form of surface tension, and tend to track along the ground before releasing, sort of like oil up a wick. I call the point at which the thermal leaves the wick a Passive Trigger. The most PT is the top of a sharp peak; there will often be a cloud over it from 9:00 in the morning until sunset, even as the sun rotates from east to west. First the east facing slopes warm, wick up the hill and release, then the south-east facing slopes, then the south slopes, followed by the west-facing slopes at the end of the day. However, the thermal comes up the wick to the same passive trigger. Think about the "House thermals" at your local site; what's really happening with each one as the sun rotates?

If you're high then you can fly straight to the wicking top of the peak, but if you're low then you need to fly to the sunny side of the peak and then climb out. Ridges often work the same way, with convergences happening if both sides of the ridge release at the same time.
When mountain flying I look for PTs where I think bubbles might break their tension and lift off; ridges above protected slopes in the sun and places where a ridge forms a mini-summit for thermals to break off at (like water running down your arm and falling off at the elbow) seem to work best. Two or more ridges coming together are better than one; each ridge increases the chance that you've picked the right wick. If you're bored, take a spoon and stick it into a glass pot of boiling water some time, it nicely illustrates how all this works.
Passive triggers can be very, very small when flatland flying. For example, a road on the downwind edge of a large, dry ploughed field will often have a small ditch between the road and the field; this is a passive trigger for sure. Just the edge of a dry field against a more vegetated field may be enough to lift the air off; I almost invariably find my best thermals in downwind corners of large, dry fields, places with maybe a hedge or even simply grass instead of ploughed dirt. A group of houses in the middle of a barren section or even a lone oil well breaking the monotony of flat ground will often wick thermals skyward. Some people believe strongly in power lines as passive triggers, but I think the thermals found above power lines generally have more to do with the terrain. The exception is that really big high-tension towers are wicking thermals skyward, but this is suspect. Thermaling over power lines does impose a bonus hazard as well.
Large rocks are often good wicks and passive triggers, as they tend to pierce the surface tension and also release "bullet-style" thermals, allowing larger pockets of air to also leave the ground.
Finally, contrasts in surface temperature may affect lapse rates and also act as triggers. I often find thermals at the junction of two disparate surface types; miles of dry fields leading up to a large lake will often have a reliable thermal at the boundary between the two (if the wind is coming from the fields, this thermal will slope out over the lake). However, wet fields or lakes will often shut down all activity in their immediate area, especially on the downwind side. These surface temperature differences can be quite small, but thousands of examples have taught me that they matter.

Active Triggers
Active Triggers are triggers that move. For example, a tractor harvesting dry wheat field will almost invariably be a thermal source. Cars driving back and forth on a road next to a big dry field will also act as triggers. Any type of motion, be it from people, farm equipment, cars, even other glider pilots landing, will often cause a collector to release. How many times have you landed in a likely field only to watch someone climb out above you?
I am starting to believe that cloud shadows will often act as active triggers also; I have flown enough sites now where the forward edge of a cloud shadow will produce dust devils as the shadow advances across the ground, something like a mini cold front lifting the warm air up. It's a theory, but it does seem to work some of the time.

How to apply all of this

On any given day thermals reach a certain height before stopping, a distance between the ground and cloud base and the top of the usable climbs. I call anything below half this distance "low," and anything above it "high." For example, if cloud base is 6,000 feet above ground level, then I think I'm high over 3,000 agl and low below this point. This article deals with making decisions while in the "low" zone. If you're low, head for collectors that are in the sun and have been for a long time. Be very careful flying into cloud shadows; if you're low, it's very rare to climb up out of a cloud shadow. Connect the collectors with the potential wicks and triggers; sunny meadows below a sunny ridge in a light lee with puffy clouds directly above are perfect. If you're on the shady side of a ridge then you're in the wrong place and need to find some sun in a hurry.

A big brown field with a small knoll on the downwind edge could be good, or a big dry grassy field that meets a busy Interstate. I try to fly over as many potential collector/wick/trigger combinations as possible. If I get even a consistent "zero" on my vario while low, I'll stop and circle until a thermal "set" comes through. Of course, if you see a hawk going up like mad or a big dust devil spinning off the back of a tractor, well then things get simpler. I won't mess with weak thermals if I've just topped out a climb and am starting a glide, there's no point, as they will probably end soon anyhow. I will stop for anything solid once I get into my "low" zone.

It's important to understand that the lift and sink generally balance each other out, especially in relatively small areas. If your climb rate is 1,000 fpm, expect at least 1000fpm+ sinking air when leaving the thermal. If the thermals are large, expect big areas of sink. If you're in an area of violent sink, then somewhere close by is probably a violent thermal. You should ask, "where's the collector, where's the wick, where's the trigger, attack!" Collectors also tend to draw air into them as they release; you will often notice an increase in your ground speed as you're near a thermal. Your glider will also often pitch ahead by a few degrees as the air accelerates toward the thermal, and your heavier body lags. Older gliders will generally fall slightly behind you as they hit a strong thermal but be very pressurized (you can feel this in the brakes). Wind gusts or turbulence may cause a glider to fall back behind you as well, but the pressure will not be as high in the glider. This is a great way to tell if you're entering a thermal or have just found a wind gust. If the glider is pressurized harder, then you've found a thermal. No pressure, no thermal. Newer (1999 and on) or higher performance gliders usually surge forward into a thermal, no matter how strong it is, but the feeling of increasing brake/glider pressure is the same.

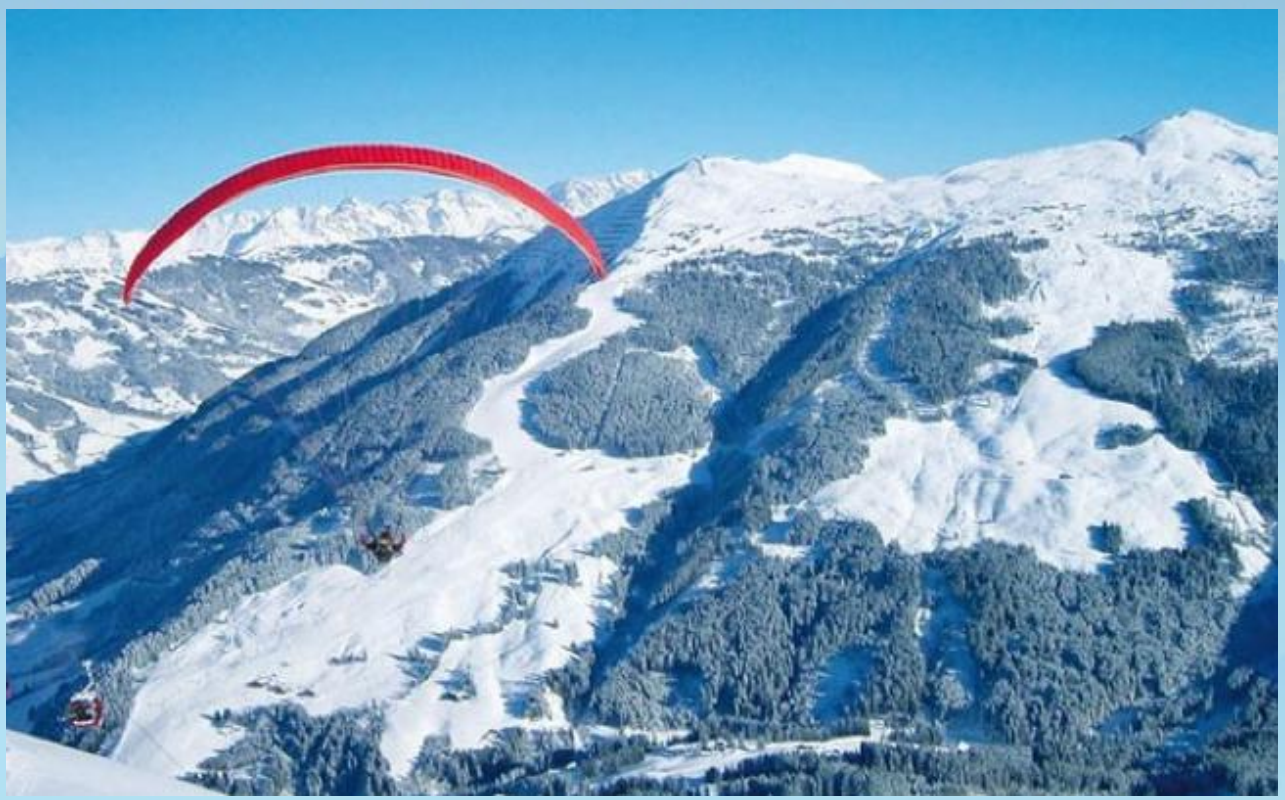
Finally, remember that the wind slopes thermals; if you're relatively low and coming into a collector then it won't matter much, but the higher you are the more downwind of their source you'll need to be to intercept the column.

The system above may be largely wrong, but it's the best one I've developed yet. Each year it seems to get a bit better, and each year I look back and think, "Oops, was I ever wrong about that!" I try to honestly look at each flight and think, "What worked? What didn't?" Why did I sink out and someone else succeeds? Good pilots create their own thermal luck remarkably consistently. So good luck developing your own system, that's the one that matters!

06 Flying a paraglider whilst on Skis

Feature Two

The ski season is upon us, hooray! Our sport is constantly evolving and today one of the greatest things about the paraglider is its portability. There is now such a wide selection of paragliders and harnesses made from the lightest materials and most compact sizes.



After a great day's skiing, and when the slopes have gone quiet, there is nothing more satisfying than flying a top to bottom into the sunset

Today, many of the alpine resorts cater for paragliding throughout the winter season providing designated launch areas for tandem or solo pilots away from the busy slopes, making launching with or without skis stress-free.

These official launch areas often have a groomed flat surface facing a steep-ish slope, and a large area behind where you can prepare and lay out your glider, then continue with your preparations as if you were at any 'normal' launch site.

What to look for when choosing your launch area

Look for any bail out options just in case of a problem. A steep slope will help you take off but if you get it wrong you may end up rolling down the hill 'gift-wrapped' in your glider, or find yourself face to face with hazards such as trees, rocks, cliffs and chair-lift cables, with little or no options.

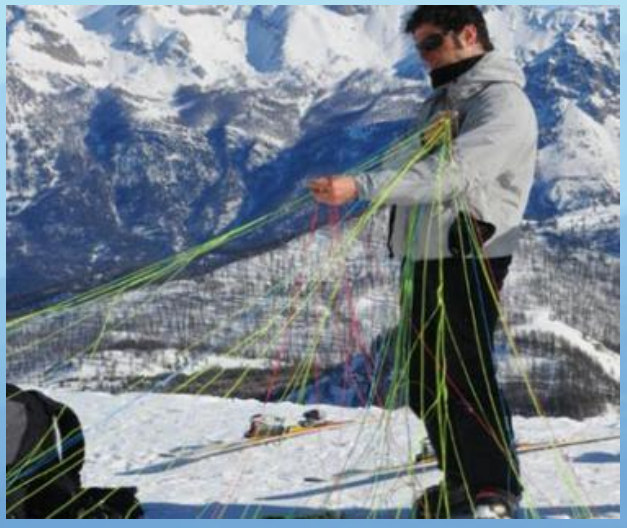
Consider the conditions
Always check the weather. Although the skies may look blue with a light wind, Alpine weather can sometimes be deceiving, with sheer levels of compressed meteo wind as well as valley breezes. Weather is always available at the Tourist Office and you can ask the local pilots or flying school as well before making your own decision as to whether the conditions are suitable for you.

In the mountains during the skiing season you can expect anything from gentle smooth air which are perfect for end of day top to bottoms, to some meaty thermal activity particularly in Spring, when climbs can be as generous as 6m/s and more, towards April. Generally speaking, because the sun is lower at this time of year the end of day conditions are much smoother and mellow.

Be nice!
As is often the case, we the visitors are the guests therefore some etiquette needs to be observed when flying in a ski resort. The majority of resorts don't allow you to take off and land just anywhere on the slopes and whilst this may be tempting to "wow" the crowds with your close-proximity skills, it is disrespectful as well as reckless and could result in you being fined by the local police, or worse, being wrapped over a low cable or dangling from a tree, so be cool, polite and careful.

Almost every resort has its own local flying school and commercial tandem operation. Some launches are for their use only and some are public, and although it is useful for tandem pilots to have other pilots in the air, it will ruffle their feathers if visiting pilots mess up the launch areas.

Practicalities
Snow conditions can dictate whether to foot launch or ski launch and some take-off areas will only be suitable for either one or the other. A launch covered with fresh powder could become extremely difficult to walk on; similarly a wind-blown launch can be icy and slippery.



Some lifts will not allow you on them without skis, but in most cases, lifts servicing a launch area will allow you up either with or without skis and you can decide once at the top whether to leave your skis with the liftman or take off with them on foot.

If you are going to fly with skis, it is better to opt for your regular ones rather than the mini 'Bigfoot' skis, which may dig into the slope at the tips. Also, think about your ski poles. If you are Backcountry skiing you will need them, so opting for telescopic or folding poles is a must.

If you are using a commercial launch it's always a good idea to check it out beforehand just as you would when visiting any other new flying site. See what the surface is like, have a look at what the local pilots have on their feet and ask about out the landing area too.

What are the main differences when taking off on skis?

The forward launch technique is mostly used for ski launches. Reverse launching is possible if you're a confident skier and there is a bit of a breeze and you are nifty on your feel, but it is fairly tricky. With a steep enough slope you can forward launch in any reasonable breeze with or without skis. Things will feel different if you've never flown with ski boots, skis and thick ski gloves before. You'll need to factor in the extra weight as the additional winter equipment can add on as much as five extra kilos. Your glider will feel slightly different in the air too and your ability to weight shift may be inhibited slightly by the bulky clothing and heavy boots, so anticipate any movements of the glider and be prepared to use more weight shift as well as being sensitive on the controls through a thick pair of gloves. Your glider will also fly a little faster because of the extra weight.

If you are launching without skis and the snow is soft, you may sink about a foot through the upper layer of snow due to the extra weight and walking around is a little clumsy. Likewise when the snow is icy or hard, it may be slippery, so just beware of your footholds when moving around preparing your glider and also during the launch itself.

Preparation

You will realise straight away that things are different when preparing your glider because the wing will tend to slide across the snow. This can be overcome by placing a few lumps of snow on the leading edge just below the cell openings, but be careful not to place them so that when the glider inflates, they fall into the cells.

Some mountain and lightweight gliders have small loops on the upper surface near the leading edge, which have been designed to attach string for pegs to the ground and hold it in place on steep slope. As soon as you inflate the glider, the pegs pop out of the ground, which helps your wing to rise symmetrically.

Meticulously check the routing of all the suspension lines and then check them again. Lay out the wing with the centre section considerably higher than the tips to ensure that it inflates first before the wing tips. This helps to avoid one tip inflating before the other and the wing turning over or 'horse-shoeing'. If the snow has a hard crust, be careful not to catch the lines on the broken edges as they can easily get snagged. Once the wing is organised, place the skis into the flat area or dug-out and lightly wedge the backs into the rear of the launch pad or under a thin layer of snow, then put your harness on.

Next, step into your skis carefully making sure that any snow is removed from the soles; free-falling ski from height is extremely dangerous and can have fatal consequences. Make a final check to ensure you have no suspension lines caught on your bindings or skis. This occurs more often than not so it is imperative to check and check again just before you shuffle forward to the edge of the launch area.

Launching

Wind direction is important, the hardest direction being a slight crosswind. Crosswinds pose problems because of the way the glider will turn when it inflates. You will be inflating it down the fall line and won't be able to make the necessary sideways movements to compensate, as if you were on foot. A light tailwind is fine as long as you can gain sufficient airspeed and your runway slope is long enough. One of the major differences of ski launching is when the glider tensions against you, you can't offer resistance against it other than with your body weight.

When you are at the edge of the ledge or dug-out, lean as far forward as you can through the risers to keep the tips of the skis weighted and to avoid being jerked backwards and pulled off balance. You may prefer to have a bit of slack in the lines to enable you to gather some speed before the lines tension, however if you are on a really steep slope you may prefer to start with the lines slightly tensioned so things are a little slower and possibly more controlled.

As the lines tension you may almost stop in your tracks so at this point feeling the wing through the risers and pressuring the glider using the controls and your body weight is key to keeping it symmetrical. The glider may have a tendency to overshoot if the take-off is steep but a good positive damping with the brakes will keep it in check. If everything looks and feels good you can speed the wing up as you feel your skis start to accelerate down the slope.

Fly the glider at maximum trim speed, keeping a straight course and enjoy the ride as you take-off. Do not let the glider overtake you but do let it fly fast – keep the wing pressured through the brakes so the lines stay tensioned even if you ski over little bumps. If at full speed you still not airborne, apply a touch more brake and you will have 'lift-off'.

In-flight

In flight you will notice the cumbersome skis and heavy boots so try and keep your skis together and pointing forwards instead of allowing them to trail under your harness.

If the conditions are spring-like you can expect some thermic activity and movement in the canopy. If it is very thermic it is not a great idea to fly with skis, as they will cause your body to sway increasing the inertia.

Yawing can also lead to increased pressure on the ski bindings, which, if the air is turbulent, may lead to your boot popping out of the binding, causing you to losing a ski somewhere irretrievable. You will also notice an increased sink rate because of the extra weight of your equipment and your glide ratio will also be slightly poorer because of drag from the skis. Trying big wingovers or spiral dive manoeuvres is not recommended when flying with skis. For the avoidance of doubt, not recommended means DON'T!

Landing

Land on snow wherever possible. Whilst landing on grass or mud wielding a pair of skis is possible, it is uncomfortable and requires a precise target landing with little or zero ground speed to avoid an embarrassing face-plant or a knee injury from suddenly falling forwards. Cruciate ligaments and all that! Landing on snow at full speed and skiing out some energy before flaring is really fun. Make sure that the wing drops behind you otherwise you will be skiing over the lines and slicing them with your edges. If you want a more gentle halt, flare your glider a few metres from full speed and as the glider drops down behind you or to the side, raise your arms to help keep the lines tensioned and off the ground, preventing you from skiing on them as you may be pulled slightly backwards before coming to a complete stop.

Any pilot will tell you that flying above snow-capped mountains is one of the purest most exhilarating sensations of free flight, and like a surprise gift, it will procure the same unleashed excitement again and again. The silence, the breath-taking scenery, the peaceful solitude of flying through the crisp, icy air towards the setting sun... followed by sharing a revival of the flight with friends over an après-ski drink at the bar – What a perfect way to end a great day in the mountains.

07 Flying Abroad -The IPPI Card

(From the BHPA)

Since we are featuring articles about flying abroad, better make sure that, in addition to everything else, the paperwork is in order.

The International Pilot Proficiency Information Card provides a standard reference by which all national rating programs may be compared. When you travel abroad this card, together with your BHPA membership/rating card, gives flying site managers, instructors and others responsible for hang gliding and/or paragliding flight operations an easy way of verifying your pilot experience level prior to approval of flight activities.

The IPPI system works by converting your BHPA pilot rating into the equivalent Safe Pro and/or Para Pro rating (training systems developed by a Norwegian but not widely used). Note that Safe Pro is for hang gliding and Para Pro is for paragliding.
The tables below set out the Safe Pro and/or Para Pro stage that will be shown on your IPPI card.

Paragliding:		
Elementary	=	Para Pro Stage 2
Club (Novice) Pilot	=	Para Pro Stage 3
Pilot	=	Para Pro Stage 4
Pilot**	=	Para Pro Stage 5
Advanced Pilot	=	Para Pro Stage 5

Para Pro Stage 5 **: *To obtain a paragliding IPPI 5 rating with only a Pilot rating, applicants must submit a statement from a Club Chairman/Club Chief Coach/CFI confirming that they have checked the pilot's logbooks and are satisfied that he or she has a total of at least 50 flying hours on paragliders and has completed at least 5 cross-country flights in various types of lift (flights conducted solely in ridge lift or along the same ridge do not count).*

Hang gliding:		
Elementary	=	Safe Pro Stage 1
Club (Novice) Pilot	=	Safe Pro Stage 2
Pilot	=	Safe Pro Stage 4
Pilot*	=	Safe Pro Stage 5
Advanced Pilot	=	Safe Pro Stage 5

Safe Pro Stage 5 *: *To obtain a hang gliding IPPI 5 rating with only a Pilot rating, applicants must submit a statement from a Club Chairman/Club Chief Coach/CFI confirming that they have checked the pilot's logbooks and are satisfied that he or she has a total of at least 50 flying hours on hang gliders and has completed at least 5 cross-country flights in various types of lift (flights conducted solely in ridge lift or along the same ridge do not count).*

Obtaining an IPPI Card
Download an IPPI Application Form and return the completed form to the BHPA office. The current fee for issuing an IPPI card is £11.

Please note: The IPPI scheme only applies to hill pilots. IPPI cards cannot be issued to tow pilots unless they hold the appropriate "hill" endorsement.

One more thing...
Talking of paperwork, and, perhaps, somewhat tangentially, when flying abroad put your passport, insurance documents, life insurance polices, and any other 'stuff' such as a recent gas bill, and photos of your pet dog, in a robust waterproof bag. These need to be carried at all times [OK, maybe not the picture of your dog or the gas bill but hey, who knows, it could be a great chat up line in the bar in some countries where the language is, ahem, difficult! And you want to prove you are not a psychopath in spite of the fact that you are standing in clothes unwashed for at least three days and smell of dried sweat. [Yuck!]

Why at all times? Well, they're called accidents for a reason, right! If you were get caught out in rain, try that lake or river landing, or find yourself a remote bar in Neverfu&%ingbeenherebeforeikstan [Trip Advisor Rating: Unknown] you may find them useful. More so in the event of water landings where evidence suggests that afterwards there is neither a dry spot on the pilot or the equipment. Jus' sayin'!

08 Club Coach Revalidation (BHPA)

Coaching Corner

In recent years the BHPA has made several major improvements to the way it ensures that Instructors and certain other licence holders are fully current.

One of these improvements is the introduction of a coach revalidation system to ensure that all licensed Club Coaches and Senior Coaches are fully current and active. This should minimise the chances of any accidents occurring during coaching activity, and it should also help minimise the legal exposure of any coach if the worst came to the worst.

The BHPA coach revalidation system simply requires all Club Coaches and Senior Coaches to have a declaration of support signed by the Club's Chief Coach at membership renewal time. Coaches should re-attend the Coach Course at least every five years to ensure that nothing gets forgotten and that they are fully up-to-date with current thinking.

09 Guide to Kruševo, Macedonia

Climbs in foreign Climes

Cross Country

This regular feature focuses on flying sites and trips taken abroad. The editorial team would encourage and welcome any first hand experiences [ideally in the same format as below] with a focus on practical matters and information that would help, inform, and may encourage Club members to plan similar visits.

Source - XC Travel Magazine [& amended]

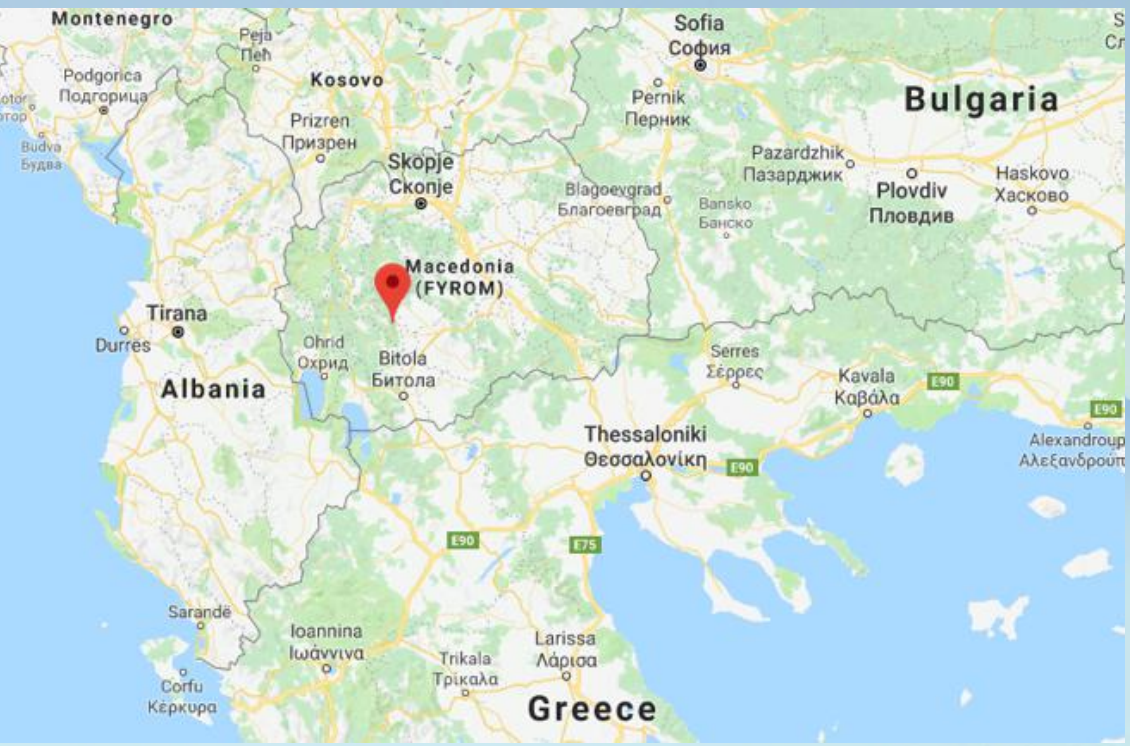
Cloud-surfing above the city of Kruševo. Photo: Marcus King

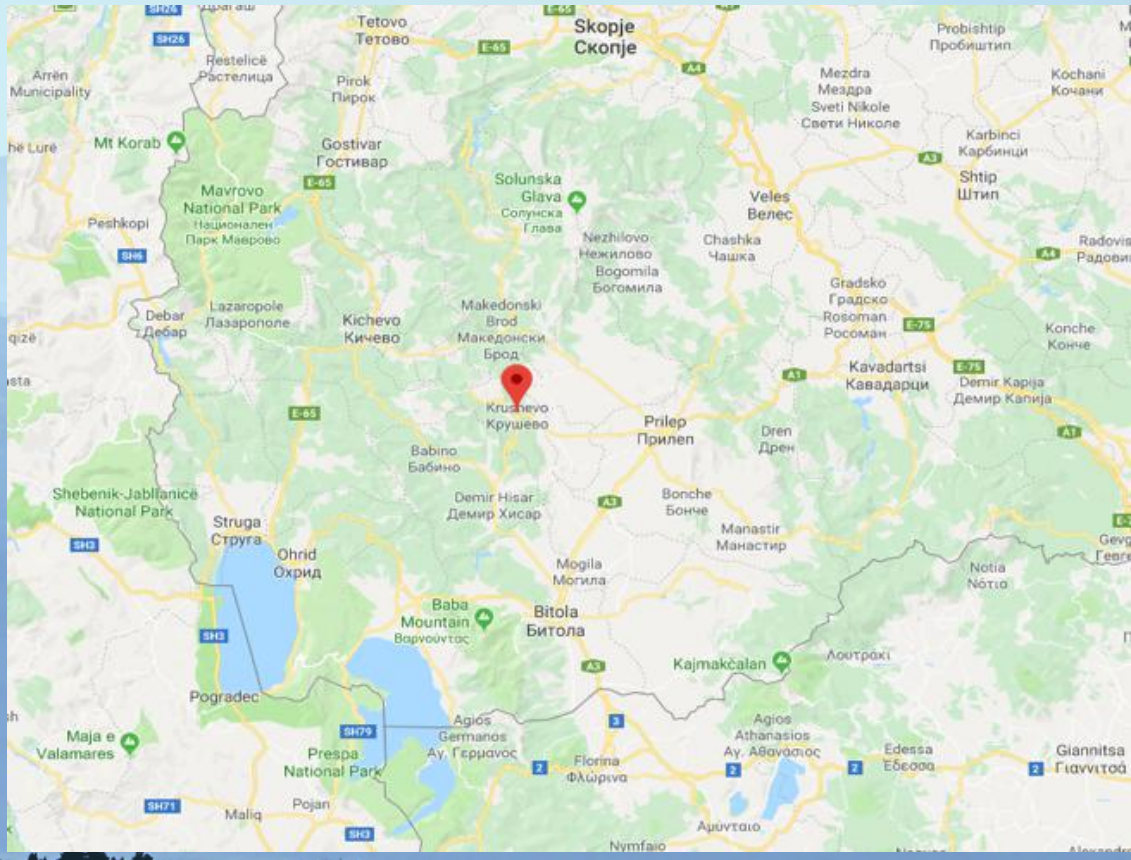
- *Go from April to November*
- *Mountain and flatland cross-country flying*
- *Strong but safe conditions*
- *Host of regular hang gliding and paragliding competitions*

WHY GO?

With its mix of flatland and mountain terrain Kruševo is a great venue for flying cross-country. The area is suitable for all levels of pilot, with wooded hills on the on the west side of the valley creating conditions that aren't too strong, and rocky ridges on the east side create booming thermals for the experienced XC hounds. The flying arena is a natural bowl, making it great for triangles.

WHERE IS IT? [Just in case you are oblivious to the virtues of Google Maps]





WHAT'S IT LIKE?

Kruševo is well known on the competition circuit, having hosted the PWC in the past and playing host to the Europeans for both hang gliding and paragliding in 2016.
Unusually the town sits in a natural bowl on the ridge top so launch is an easy walk from there. The grassy takeoff sits above wooded slopes that drop down to the Pelaginian plain that stretches south to the Greek border.

There is a large landing area at the base of the ridge, and although there is no permanent shuttle back up, hitchhiking works well and taxis are cheap.

The Windsock Team presents a [mostly] true anecdote for your delectation. A senior member of the Windsock editorial team, who has had the opportunity to fly in Kruševo, noted that he once did hitchhike after an out landing in Macedonia. The common language turned out to be German. The conversation went like this...

> Do you speak English? No.
> French? Non,
>Portuguese? Nao.
> German? Ja. (Bugger!)

This revelation presented more of a difficulty to the hitchhiker [who had five years of robust, comprehensive school German learning experience under his belt] than the driver. The hitchhiker seemed [unfortunately, as it turned out] to only remember the following essential phrases from his extensive schooling, paid for by the legacy of Anthony Crosland and Barbara Castle's radical school education policies, these specific phrases were...

> Meine name ist...
> Ein bier bitte..
> Warum pisst dein hund auf mein bein?

In his defense, it was the experience and benefits of a comprehensive education, which just focused on the basics. Well enough of that...

From launch, pilots can easily follow the ridge north or south. Going north you can follow the hills round to the east side of the plains and the town of Prilep, where conditions are often stronger amongst the rocky mountains in this area [at this moment please stop singing Rocky Mountain High – by John Denver, its not clever, it's not funny, and it will do no good and, of course, he died in a terrible flying accident too boot]. There are two launches on this side, accessed by tarmac roads.

For the more adventurous it is possible to leave the immediate area and fly north back towards Skopje. Macedonia is a country of mountains so there are plenty of possible routes.

FLYING CONDITIONS
The best conditions are from June to September. In the beginning of the year there is more moisture and more clouds, but as the year progresses it becomes drier with fewer clouds. Conditions don't generally change very quickly and it is very predictable, making the flying safe. There are no strong valley winds in the area.

WHEN TO GO?
April to October

ALTITUDE
Launch: 1,400m
Landing: 650m
Average cloud base: 2,500-3,000m

HANG GLIDER ACCESS?
There are roads to the launches, so access is easy and there are plenty of big flat landing spaces around the valley, so it's very hang glider friendly.

MUST BE FLOWN
Fly south along the ridge then out into the flats towards the Greek border.
Fly round the north end of the valley or head straight out across the flats to get to the Monastery of Treskavec above Prilep, where the obvious pointed rocky mountain is a great thermal trigger.

Early evening flight in restitution air at the monastery in Prelip

WATCH OUT FOR
There can be some walkouts from the fields in the flatlands and the drainage ditches can make that more complicated! It's best to land by one of the roads or villages.
There are no airspace issues.

ACCOMMODATION
There are plenty of guesthouses in town and the large hotel Montana Palace, which is cheap by European standards. There is no campsite in the area, although unofficial camping close to takeoff is tolerated. There are plenty of cheap places to eat in the town.

TAKE THE FAMILY AND RAINY DAYS
Kruševo was the first republic in the Balkans, and was the site of a major battle between the Turks and the Macedonians. There area has plenty to go and see on rainy days: there are several museums, the Ilinden monument, several monasteries and the ruins of the Roman town of Heraclea Lyncestis in the town of Bitola are not far away.

In the mountains there are good mountain biking trails and Prilep has become known as one of the best bouldering areas in the world.

WEATHER INFO
Get weather forecasts from MeteoBlue and WindGuru. There is also a meteo station on the top.

GETTING THERE
Skopje and Tesaloniki (Greece) are the closest airports. You can arrange transfers with the hotels or get a bus or taxi. There is no real need to hire a car, as the flying site is so close to town.

The Flat Lands

Kruševo launch

10 Understanding Air Stability

Feature four

Cross Country

What is stability?

Lapse rates are the way we describe the change of temperature through altitude. It is the best measure of how well the air mass will allow a bubble of warm air to ascend through it. If the air surrounding the thermal is much colder than the thermal itself then the lapse rate is high and the thermal will rise quickly, but if the air mass is only marginally colder the lapse rate is low and thermal rises slowly, if at all; this is stability.

All over the planet the air is either rising or falling causing high pressure and low-pressure systems. In high pressures the air is descending and, as it hits the surface of the planet, it compresses up against itself making the air denser and heavier. As the air molecules bang against each other they cause friction, which in turn causes a warming effect. This means that at a certain altitude you will find a band of air that is warmer than the air below and above it; this is an inversion.

Why do clouds form at an inversion?

Clouds often form at an inversion for two reasons. Firstly, at an inversion the air mass changes characteristics and this often means the combination of temperature and moisture is right to bring about the dew point.

Secondly, the inversion is the lid on the thermic convection and consequently all the dust particles that are brought up by thermals end up bouncing around there. Clouds require dust particles to form their moisture droplets; if the air was completely pollution free there would never be a cloud, luckily there is enough natural pollution from pollen and dust to mean that we will always get clouds even if we stopped adding our own extra pollution to the equation.

Thermic quality versus stability

Because the air surrounding a thermal has to be colder than the thermal itself in order for it to rise, when a rising thermal meets the warmer layer of an inversion it stops ascending and simply gets absorbed in to the warmer air. When a very stable high pressure with a strong inversion arrives, the air under the inversion gets warmer and warmer due to the heating of the sun and the mixing of the air through convection. The ambient temperature of the air goes up and the lapse rate gets lower until eventually the air under the inversion is almost all the same temperature and thermals can't ascend anymore.

In these conditions the visibility becomes very poor because of all the pollution and moisture that's been lifted off the ground and then trapped under the inversion. Sounds are carried for miles and radios and mobile phones work better as the signals bounce around under the restricting lid of the inversion.

Any thermal that might manage to gain enough warmth to leave the ground will have all but its strongest cores absorbed by the air around it and you'll be left with just the nasty, ragged edged and punchy cores to try and fly. Flying on days like this is often rougher than very unstable days, these are the days when the air is muggy, clammy and feels like soup. Luckily for us this process usually takes a few days to develop once the High has arrived unless the pressure is very strong or the sunshine and subsequent heating is very weak.

But the valley wind still blows!

Just to add to our misery, low down in big mountain ranges where there is still some landscape above the inversion, there can still appear to be enough wind to soar in the valleys. However, this wind is caused by the convection happening above the inversion, which draws a valley wind through the stable air mass in the foothills under the inversion.

However, the wind will be heavy and compression by the weight of the air and horrible to fly in. Because of this compression the valley winds might be even stronger than normal in some places but because of its density and stability it will be loathe to rise up anything to give us soarable dynamic lift, instead it prefers to slide sideways and cross wind off almost every slope. These conditions are nearly always unpleasant and a beer and a barbeque are more appropriate than flying.

Flying in stable conditions

On an inverted and stable day the thermals are normally poorly formed bubbles and when you bump in to them they are hard to fly in and easily lost. You'll often only manage a few 360's before you fall out the bottom of the bubble. Subsequently when you find a bit of lift it's often worth turning really tight to try and stay in the tiny core then when you lose it hunt around in the same area as it's quite likely that the core you have just been flying in came from a thermal that had other cores in it before the weaker bits were dissolved.

If you notice that you keep reaching a certain altitude before you lose the thermal then that is a pretty sure sign that you have reached the inversion and the thermal has dissolved in to the warm layer. At the inversion itself you quite often rough, dirty air that is unpleasant to fly in as the thermals clatter in to the lid of the inversion. You might also suddenly be able to see the thick brown line of the inversion as the angle you are now looking through the dirt and haze from means you are looking through many more particles that when you looked straight up from below.

Break on through to the other side

Occasionally, if you are flying over a very strong thermic source, you may encounter a really strong core that has enough heat to continue climbing through the warmth of the inversion. If you are close to the inversion when you hit one of these moonbeams then hang on tight and try your best to stay in the core as it batters its way through the inversion.

Once above the inversion you often notice a sharp drop in temperature and then the thermal will pick up speed as it climbs up in to the colder air. As you climb away from the inversion the ground might even vanish as you look down on the dirty brown upper surface of the inversion and all the dirt and pollution it's trapped just under it.

These climbs sometimes carry you to magical heights; in the British National Championships in St Andre in 2001 we had struggled along for the first 40 km at under 2,400 m in horribly rough but stable conditions until finally at the back of the Allos valley a group of us hit a boomer that broke through the inversion and catapulted us to 3,900m! Above the air was crisp and clear, the climb smoothed out and we could see both Mt Blanc and the Mediterranean Sea. The return leg of the task was almost a glide home!

Photo: Altocumulus Castalanus Clouds

If an inversion is weak the constant battering of thermals against it might break it up completely and then the mixing with the upper, colder air would dissolve it. However, if the air above the inversion is very unstable then this can lead straight to over-development. Beware stable days when you spot Castalanus clouds forming up high, as this is a definite sign that there is instability in the upper air mass. If the inversion breaks and the convection suddenly reaches those height you can find yourself in dangerous conditions very quickly!

Lager skies versus a belly of soup

Epic flying days are generally when a high pressure has just moved in over a cold, dry and quite unstable air mass. This traps good flyable air with a high lapse rate underneath the inversion which will bring good thermic conditions, but leaves stable air with a low lapse rate above the inversion which stops over development.

The air is dry and light and thermals travel through it easily just like those bubbles of air in your glass of beer. Once the thermal leaves the ground it passes through the air as a well formed bubble and, because the general air mass is much colder than the thermal itself, even the weaker parts of the thermal are able to keep on climbing.

This instability helps the thermal stay together as one solid air mass with faster and slower areas. These are the days when you shouldn't be drinking lager till evening; instead you should set off with a full belly of soup for a big day out.

Soup skies versus a belly of beer

Craps flying days are exactly the opposite: warm moist stable air with a low lapse rate trapped under the inversion. The air is thick and soup like and thermals can't move through it well. The temperature at the top and bottom of the mountain is almost the same and you feel hot and sweaty.

You try to fly but find no lift even on the sunny cliffs that face straight in to the valley wind. Even worse, at 3pm there is suddenly a big enough thermic release to punch a hole in the inversion. Up out of this hole streams the warm moist air that has been trapped under the inversion and goes straight in to the cold unstable air above. Instantly it forms a Cu Nim and rains. Those are the days to ignore the soup sky and drink cold beer in the sun.

Working out exactly what kind of liquid you're flying in that day will help you understand what you can expect from the thermals your going to encounter. If it's a lager day your going to be expecting some ripping climbs and hence you'll be more inclined to race on in search or the next moonbeam to cloud base whilst on a soup day you'll have to stick with anything just to stay in the air.

11 Notices and Events

What is going on?

A. Pilot Lectures. John Turczak has begun the series of pilot lectures held at Glynde that may culminate in you sitting the pilot exam. Look at the SHGC website for details.

- 27th January 2019 @ 19.30 Air Law & Navigation

B. Thames Valley Hang Gliding Club 'Big Fat Repack'
From 9am Sunday 27th January 2019.
Zip wire reserve deployment [in your harness] and repack. Demonstration-talk by Bill Morris, the BHPA's Emergency Parachute Advisor, Repack your own reserve under the direct supervision of a qualified packer. Booking and payment online http://www.bigfatrepack.org/index.html

C. SHGC AGM March / April 2019 in Glynde.

D. Club Coach Course. 2nd - 3rd February 2019.
Dunstable HG / PG Club. Contact Richard Greaves 07776 346 086

E. Competitions 2019

- **Naviter Open** (PG). 5th – 22nd June 2019. Tolmin, Slovenia. http://naviteropen.org
- **Lakes Charity Classic** (PG). 21st June 2019. Grasmere, Cumbria. http://www.cumbriasoaringclub.co.uk
- **BGD Weightless Competition** (PG). 7th – 13th July 2019. St Jean Montclar, France. http://www.bgd-weightless.org
- **Parafest**. 11th – 14th July 2019. Caerwys, North Wales. www.parafest.co.uk
- **British Open PPM Championships.** 23rd – 26th August 2019. Crewe, Cheshire. - http://www.ppgcomps.co.uk

AND FINALLY...

SOUTHERN HANG GLIDING CLUB OFFICERS

Chairman	**Dave Massie**
Membership	**Mariusz Macias**
Treasurer	**Steven Nicholls**
Safety / Press	**Steve Purdie**
XC/Chief Coach	**John Turczak**
Aerotow	**Ozzie Haines**
Sites	**Dave Lewis**
Red Ribbon	**Phil Ettinger**
Windsock	**Windsock Editorial Team**
Social Secretary	**Steven Hope**
Air Space Officer	**Tim Cox**
Secretary	**Chris Aegerter**

This edition was edited and formatted by: **Laurent Boninfante**

Southern Hang Gliding Club

WINDSOCK

January 2019