The Spanish Pyrenees from KA

From the Chairman

When I wrote this piece for the last Newsletter I commented on the great weather we were having. How things do change! We seem to have had a constant stream of wet and windy conditions which have severely limited the flying we have been able to achieve at the Mynd. I know that forecasts are unreliable but the long range predictions suggest that we have a lot more rain to come so it is vital that you get to fly on the good days. The club always does its best to make flying possible as often as it can but you need to be there to take advantage, especially when good days are so infrequent. One way to keep up to speed is to go on an early season expedition to someplace where you can more or less guarantee good flying weather. Our club expedition to the Spanish Pyrenees has just returned and enjoyed some really good conditions over a period of three weeks. More about that later!

I'm pleased to report that the committee is almost up to full strength this year: Apart from myself the committee consists of:

William Brewis, Vice Chairman
James Moore, Treasurer
Tim Mason, Secretary
Mark Hollings, Airfield and Grounds
Simon Adlard, Fleet
Nick Le Gras, Buildings
Steve Male, Chief Flying Instructor
Bob Sharman, Radios, Comms and Trailers

Mike Greenwood was Safety Officer but unfortunately has had to stand down due to ill health. We need someone to take his place. This is vital role in making sure we operate safely and within the law. If there is anyone with any experience within the club membership willing to volunteer please get in touch with me or the Secretary as soon as possible.

Another new role has become a necessity for the club and for the wider movement, that of Airspace Officer. It is vital that we monitor and are aware of any potential threats to our freedom to enjoy the relatively unhindered spaces in which we fly. I am anxious that we find someone to fill this role as soon as possible. Again, please contact me or Simon Adlard, as soon as possible if you think you can help. While on that subject a reminder that the CAA and others do monitor the BGA National Ladder to get an idea of when and where we fly. For that reason alone I ask you to put all your cross country flights, no matter how short, on the club ladder. Its not just about winning trophies at the end of the year, it is about educating those decision makers about what we do and what we need in terms of the space to carry on doing it.

A big thank you to Chris Ellis for volunteering to take on the role of Press Officer, sending frequent press releases to the local media. We have already had several pieces in the local press. If you are aware of anything that might make a local interest story; first flights, first solos, special achievements, do please let Chris know and send him some photos. The adage is: what, where, why, how and when.

The committee has been looking hard at how we advertise our offers, especially aware that social media platforms now represent one of the most important ways of reaching out to potential members and customers. By paying special attention to Facebook, Twitter and Google Ads we have successfully and significantly increased the number of course days and trial lessons sold this year, vital to supporting our revenue streams and providing the facilities we all enjoy. Most of the course days were sold very early this year and we are already receiving inquiries for dates for next year, so it is likely that we will increase the number of course run in 2020. It is important to remember that residential courses are the reason we enjoy seven day a

week opening, professional instructors and a professional winch driver.

I hope you are all making use of the club calendar, available in the members' section of the website www.midlandgliding.club/club-duty-rota . This calendar looks ahead at the courses and events coming up as well as weekend duty rotas and room bookings. Please note the following key dates:

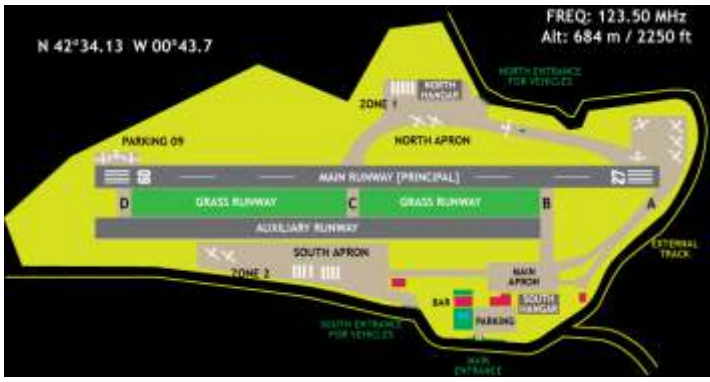
24 to 28 June	Residential Course No 6
1 to 5 July	Shrewsbury School Summer Camp
8 to 12 July	Residential Course No 7
13 and 14 July	Rockpolishers Round Three, Talgarth
13 to 21 July	Mynd Wood Week
22 to 26 July	Residential Course No 8
3 to 9 August	Simon's Soaring Course
12 to 16 August	Residential Course No 9
17 to 25 August	Mynd Task Week
27 to 30 August	Residential Course No 10
9 to 13 September	Residential Course No 11
23 to 27 September	Residential Course No 12

The Jaca Expedition

Jon Hall

Pilots from the Mynd have been travelling out to the Spanish Pyrenees for the best part of twenty years. Although there are a few small gliding clubs at the foot of the mountains the main two gliding centres are La Cerdanya and Santa Cilia de Jaca. The club expeditions have been to both sites. Originally they went out there in February or March to fly in the often spectacular wave off the mountains but over the years the dates have crept forward in search of reliably good warmer weather until this year the chosen time was the last two weeks in May and the first week in June at Santa Cilia.

Santa Cilia de Jaca is a small village just a few miles west of Jaca, a large town that benefits from the ski trade in the winter. The airfield is 1.5kms north of the village with two hard runways. The main is 850m x 18m and the alternative 650m x 15m with a grass strip between, all running east-west. It is predominantly used for gliding though power traffic flies in often to make use of the refuelling and restaurant facilities. It has a club hangar on the south side and another large hanger on the north side used mainly for visiting gliders, a total of 2000 sqm. It operates three Robin DR400/180 tugs, an ASK21, two Twin Astirs, a DG1000S, a Duo Discus, three Astirs (Jeans, CS and Standard) and a 17m DG202, all of which are available for hire. There is an English inspector and repairer on site. It has a very good restaurant and bar, with a second bar open in the evenings only. It also has a swimming pool which opens in June and wifi in the buildings.



The aerodrome of Santa Cilia is at an altitude of 684m above sea level. It is located in the Jacetania Area, which has a dry, continental climate with low levels of humidity. Cool nights and sunny days lead to long soarable days with many hours of good thermals. The high season for gliding is from March to September, with very little rainfall and fog.

The airfield is 20km south of the main slopes of the Spanish Pyrenees, which rise to altitudes of between 2000m and 3500m. These mountains receive the influence of the Bay of Biscay, giving them the humidity required to create high cumulus. As a result of the convergence of north-easterly winds from France and south-westerly winds from Spain, along the 300km of mountain ridges, the first thermals start mid-morning and last all day.

In order to be able to reach the high Pyrenees with thermals or wave, it is necessary to progress in steps along two rows of parallel foothills. The first is 5 km from the aerodrome (1200m peaks) and the second is 10km from the aerodrome (1500m peaks). This allows a step-by-step progression to the higher mountains.

The Guara mountain range lies south of the aerodrome. It is a row of middle-range mountains which blocks hot and damp air masses from the Mediterranean and Africa. This range generates southern wave when there is a strong southerly wind, although the best mountain wave is the one generated by the Pyrenees with strong northerly winds (more than 10 knots). The latter provides excellent conditions for climbing to over 5000m and crossing the Pyrenees. It has in the past been possible to fly at altitudes of more than 8000m.

The aerodrome is located in the middle of a broad, agricultural, river valley, 50km long by 15km wide. It is possible to land, if necessary, in one of the many corn fields

almost without obstacles.

The southern slopes of the Pyrenees are very dry and warm up quickly, creating very strong thermals. In spite of this, the mountain peaks remain snow-covered throughout winter and well into spring due to their altitude.

There are no big cities in close proximity to the aerodrome. The air space is not controlled. There are few restricted areas and little air traffic in the Pyrenees.

To fly out of Santa Cilia as PIC you will require a Glider Pilot License, an EASA Medical Certificate (LAPL, Class 1 or 11) and an updated logbook for licenses that do not require renewal. Up to now they have allowed those flying under a BGA license and a driving license as a medical to fly P2 but who knows how long that will last. You can take out temporary membership for 83€ for a month or 25€ a day. They do a Mountain Flying Course which includes two hours of theory lessons and a minimum of 9 hours of flying in three flights. They use an advanced glider (Duo Discus or DG1000) and you will fly with an experienced instructor. The course is ideal for pilots who have a valid licence and wish to improve on mountain flying skills.

Flying in the Pyrenees is not like flying in the Alps. It is much less busy and there are relatively easy escape routes into the flat valleys most of the time until you start to go well out to the east towards La Cerdanya. For much of the time we were there this year, apart from a few local club members, we were almost the only ones flying in the mountains. Of course this is a matter of when other people decide to go but I have never seen it really busy. The scenery is spectacular and the variety of conditions is enough to keep anyone interested for a very long time.

Apart from learning to fly in the mountains, which incidentally can significantly improve your ability to fly in the flat lands too, or in the Welsh hills or Snowdonia, a trip to the Jaca can give you a very good start to the season in the UK. I was there for three weeks this year and did almost 50 hours flying, even though we lost a few days from bad weather.

Of course MGC organises expeditions to other sites including Aboyne, Llanbedr, Denbigh, Eden and Millfield. More of that in future issues.

Low Cost Instruments

Julian Ravest

We are lucky that the area round the Mynd and for some distance beyond is free from airspace restrictions, at least for thermal soaring, the situation in local wave is more complicated, but for Silver Distance and local triangles you are very lucky not to have to worry.

Once you go beyond that, or maybe if you fly from other sites, life gets a lot more difficult. Just look at the half mill chart and consider any of the 300k "milk runs" from the Mynd, and you will see that you need proper awareness of your airspace. Just take a look at the area round Milton Keynes as an example, an often used turnpoint for an out and return 300 from the Mynd. I personally consider that an electronic moving map with an up to date airspace file loaded is a requirement these days, but you certainly do not need to spend the £5000 or so that a big screen LX costs, as fitted to most new gliders these days.

You do need a moving map and a logger of sorts, as well as a good audio vario, and being able to use the electronic map for navigation and final glides also reduces the workload, which usefully leaves spare brain power for finding lift. I am also a fan of FLARM, but there are no low cost solutions for this at present, without a display you are looking at £800. The Oudie can provide a good FLARM display.

So, what do these displays do for you, ranging from the £5000 LX to your own smartphone running Winpilot or XC Soar for nothing? They provide a moving map showing the BGA turnpoints and airspace. They calculate the wind and warn you of airspace you are approaching (whether ahead if you are cruising or above if you are climbing), they show you the direct route to steer and distance from your

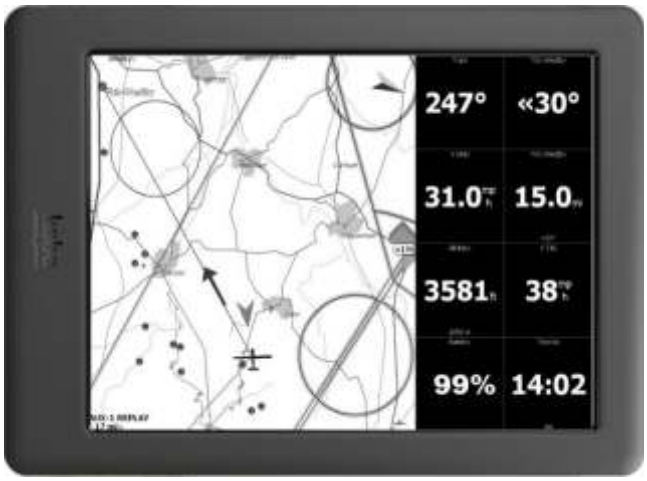
present position to the next turnpoint, they use the wind estimate to calculate an accurate final glide (even if that involves gliding round another turnpoint first) and if coupled to a FLARM they warn you of other aircraft in the vicinity which might pose a threat. They can display your achieved task speed so far, and more or less any info you might need. They will not show you where the next lift is but they can often show you where you were gaining or losing in the glide by colouring the trace.

So, starting at the bottom end what are the options? Sadly, whilst you can use low cost (£100) "GPS only" personal loggers for club tasks as well as Silver and Gold flights they are not acceptable for competitions, which immediately ramps up the ante unless your aspirations are limited to the above. Proper loggers start at around £500 but you can combine them with other things, for instance an IGC Oudie 2, which has an 8 hour internal battery is around £800 and will cover logging, navigation, airspace and final glide as well as providing a surprisingly accurate estimate of wind most of the time.

If you are not bothered about competitions you could use a personal logger and a basic Oudie 2, which is £500 if you want to use SeeYou Mobile, or £300 if you are happy to use free software like XC Soar. The no 2 version of the Oudie has a very bright screen which is easily sunlight readable, see comparison below with iPhone 6 screen in max brightness setting. The Oudie 2 will require an outside source of power to drive the screen backlight, the internal battery is small, unlike the Oudie IGC which has a large battery.

Oudie 2 running SeeYou, showing a comp start at Aboyne, with Aberdeen airspace close by on the E side. The D with the glider symbol is the start zone. The blue line is the task, setting off WSW, returning to the quadrant with Lumphanan in it, then setting off SW (to Lochnagar) and finally returning from Breamar to finish at Aboyne. The box on the right shows the total altitude required to finish the task is 12,463ft, which reduces as you fly.

Note the previous Oudie (1) had a useless dim display, and upgrading it is almost as expensive as buying a new one. A slightly cheaper option is based on a Kobo Clara HD E reader. This has an excellent black and white screen and uses almost no power so it is able to last all day on it's internal battery. The snag is only that it is black and white so airspace restrictions are not a clear as they could be on a colour screen. You can buy it for £255 complete (involving some clever soldering to incorporate a Bluefly GPS/barometer card) or you can do it yourself for a few quid less, from [www.gethighstayhigh.co.uk.](http://www.gethighstayhigh.co.uk)



Kobo Clara HD showing clear b&w screen.

Even cheaper (and in colour) is to use your existing smartphone. You will need an external source of power as continuous use of the GPS uses a lot of power as you may have found using Google Maps to navigate on the road? Clip on battery packs are not expensive (under £20) and should give a day's use. There are numerous software options, one I like is iGlide, which is produced by the same outfit as the Air Avionics (formerly Butterfly) vario. It is available in a number of versions, the cheapest does not allow you to input a task, only a single leg, but would be worth paying around £35 for to try it out. The Advanced version which allows tasks to be input is around £120. Sadly iGlide only works on iPhones or iPads. The display is very clear and it is easy to use. It is proper gliding software with wind (in the Advanced version) and final glide calculation.

Iglide on iPhone 6 showing a task from my house to Sleap, short of 2948ft to complete and asking for a 67 degree turn to the left.

A cheaper alternative, again for iPhone/iPad only, is Winpilot which can cost as little as £35 for a year's subscription. You can download it for free and pay only to activate the GPS mode, or you can pay for just a month (£6) to try it out in the air. It looks to be an interesting choice which again is proper gliding software, with all the bells and whistles. It occurs to me as I write this that even if you don't use an iPhone it could be worth buying a cheap used one just to run iGlide or Winpilot. The iPhone 6 is Apple's first "big" screen unit, and good used ones are

available for less than £150, if you choose a small (16Gb) memory version, with a 4.7" display. The 6 Plus version with an 5.5" display is no more expensive and is probably better for gliding and is still far cheaper than any new Oudie 2, which has a 5" display.

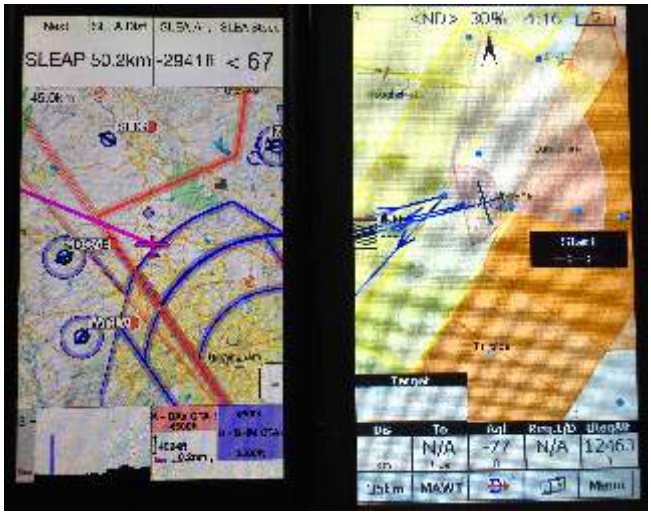
Winpilot on iPhone 6, showing a task from Mynd to Shobdon

Another interesting app is Runway HD, which works on iPhones and Android. It comes free with a clear vector map but you have to pay to make it into a moving map (the GPS navigation option) and pay more to show the half million CAA chart, which is a perfect facsimile of the original but it is a moving map and is fully zoomable using the usual finger pinch. It is designed for power flying but you can input tasks and it can also show the BGA Turnpoint database. It does not show wind or final glides, but it is nice to have the familiar chart on your phone. In its basic form with a vector map including navigation it is from around £50.

Runway HD on iPhone 6 showing a task from my house to Sleap on the CAA ½ Million chart

You can run XC Soar for free on your Android phone, which is the cheapest option of all, and it generally works well if you are fairly computer literate. Quite a few MGC members know their way around it and like it, but others have given up and converted to See You Mobile..

Runway HD on iPhone compared to See You on Oudie 2, the Oudie is brighter, but the iPhone (on max brightness) is still useable in sunlight.



iGlide on iPhone 6 (on max brightness) showing a route from my house to Sleap, compared to the Oudie 2 showing a comp task from Aboyne.

So you need at least a £100 personal logger, a smartphone with power supply and some form of mount, and an app. It is sad that there is no IGC logger app for smartphones (they have everything required, including a sensitive microphone for engine detection, a good GPS, an accurate barometric sensor and plenty of memory, so there are no issues apart from security (of the trace) but surely some clever geek could sort that out?

If you want a proper logger for competition I suggest the all in one Oudie IGC covers all the bases apart from FLARM, and if you want a FLARM there is a full IGC logging version of it for an extra £100 or so. Note these days virtually all comp pilots carry two loggers as it is amazing how often you get some glitch or other with your primary trace.

I do not pretend that this short summary covers all the options, maybe you can add to the discussion?

Circling Below Min Sink

Geoff Dailey

Early last year, Kevin Atkinson asserted that one should thermal slower than min sink speed, but did not prove it. I heard responses from pilots more experienced than me ranging from "I knew it works, but not why" to "rubbish, that could never work".

Later in the year, Simon Adlard recommended that an LS4-A (dry) should circle at about 40 kt, 42 deg bank. This is within the stall speed range quoted in the manual for that bank angle (at max cockpit weight), thus well below min sink speed. It is based on his experience of what works best, not on any theories, which makes it particularly valuable.

One current and one former national coach both recommending the same thing, superficially against common sense!

One rainy afternoon I did some sums. Simon and Kevin appear to be right, as usual, and the sums show why. NB Simon had recommended getting a copy of "Fundamentals of sailplane design" by Prof. Fred Thomas, translated Judah Milgram. It looks good and is on my Christmas list, but what follows is just what I put together while on hols – no checking. I might be wrong, so feel free to correct me!

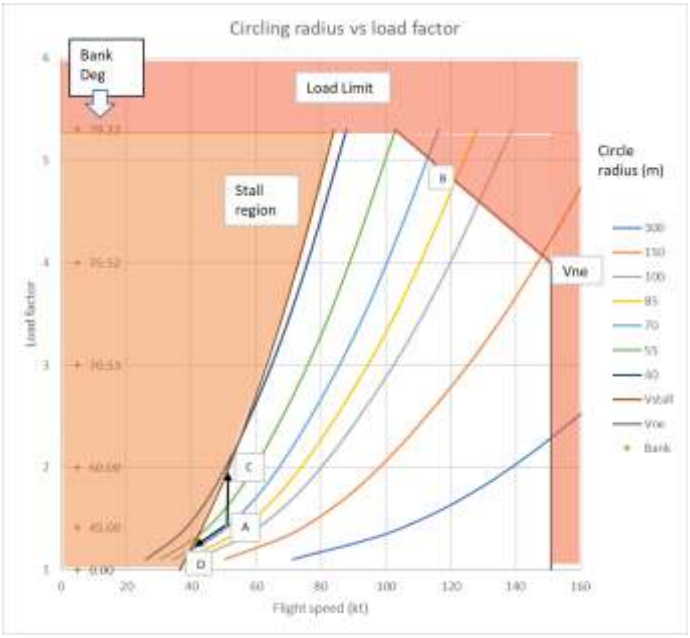
I've kept this article largely equation-free for a general audience, but there is a link to a more detailed report later.

The calculations are for steady flight in still air. I haven't tried to show whether you should fly a tight or a wide circle for best climb – that depends on the structure of the thermal and many other things. I have considered only how best to achieve minimum sink speed in still air at your chosen circle radius. The sums implicitly assume that your thermal is a simple rising column of air (or the middle of a toroidal bubble) and you are just interested in balancing increased sink rate against increased vertical speed of the thermal as you reduce circle radius.

If the inflow or outflow to or from your thermal is significant compared to the vertical speed, (bottom or top of a bubble thermal), the sums get a bit more complicated. More importantly, it gets more difficult to explain and this article is long enough already. I can't tell whether I'm in a vertical, inflow or outflow region when I'm flying, so I left out the complication. I can add it in a follow-up article if there's any demand. It leads on to the explanation for interesting behaviours including dynamic soaring and gust soaring.

The stall boundaries etc on the next chart are for an LS4-A, but are fairly typical. The curves apply to every aircraft. Usually we need to turn fairly tightly to get into the core of a thermal. 45deg bank, 51.5kt would be fairly usual, giving a 70m circle radius. At this condition we would be pulling 1.4g (Load Factor = 1.4), and the drag and sink rate would have risen as a result of the extra lift.

The graph shows how things change if we choose a speed and circle radius.



Load factor is lift required divided by weight of aircraft. LF = 1 for straight, steady, level flight, LF = 1.414 for 45deg turn, LF = 2 for 60 deg turn.

Two things stand out – the load factor becomes much more sensitive to speed as the circle radius becomes smaller, and the constant radius line stays fairly close to the stall line at the smallest turn radius

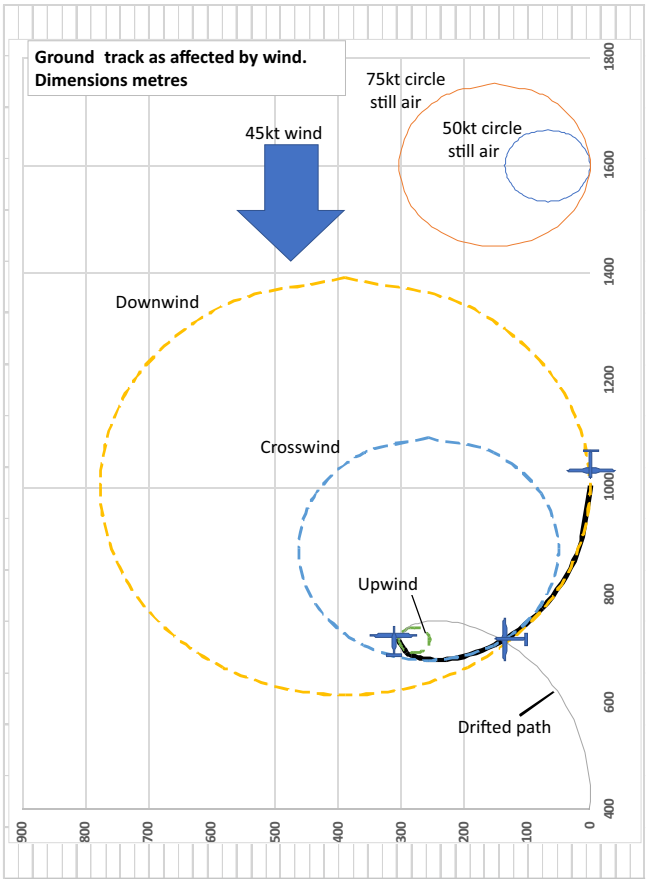
- A-B We could fly our 70m circle at up to 115kt at the structural limit, but why bother?
- A-C We could keep our speed and tighten the turn to about 40m radius before stalling if the thermal is very small, but can't get much tighter whatever we do.
- A-D We could fly our 70m circle (blue line) down to about 40kt before stalling, reducing the bank and g load in the process. The reduced lift required may offset the steeper glide near the stall – we can't tell from this chart.

The chart also shows why it's important to get the speed off quickly if we encounter a thermal at cruise speed – just banking steeply won't get us a small enough circle to stay in contact, unless we go very steep indeed, and then we get high sink.

As an aside, if we use groundspeed instead of airspeed, the same chart shows us the huge difference in turning radius over the ground caused by the wind.

With 30 kt on the windsock, 45kt wind at the height of the downwind leg and our flight speed increased from 50 to 75kt ias, we have a groundspeed of 120kt. The 45 deg banked turn now gives us an initial radius of nearly 400m over the ground (shown dotted), six times the 50kt still air radius, a diameter reaching from the gully to the knoll! It remains this large almost to the cross-wind position
Flying crosswind in the same conditions gives 30 deg of drift, 90 kt groundspeed and a more reasonable 200m turn radius, which will tighten rapidly towards 25m as we turn into wind and groundspeed drops towards 30kt.
In turning 180 deg to land, we travel 300m downwind - from our road to the back of the landing area. All this time, we're flying a constant 45 deg banked coordinated turn!

Dave Crowson's strong wind approach seems to make good sense when the track is viewed this way:

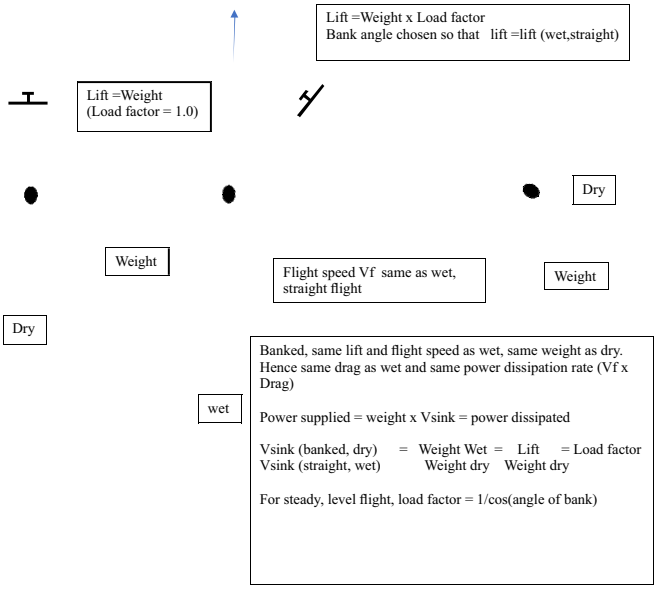


Turn through 90 deg early and fine-tune the drift to form the diagonal leg (not shown in the diagram). The final 90 deg turn into wind doesn't use any significant downwind distance so is easier to judge. No doubt there are other techniques. Any comments from the instructors?

Returning to the question of circling in still air, we saw that we could, for example, choose to fly a tighter circle at the same speed or the same circle at a slower speed and less bank. In both cases we will be flying below min sink speed (corrected for G load). Is either (or both) a better choice? In flight, energy is dissipated at the rate of flight speed x drag. If this energy is not replaced, flight speed must decay. For a glider, the energy source is the glider potential energy. The rate of loss of potential energy is the glider weight x sink speed.

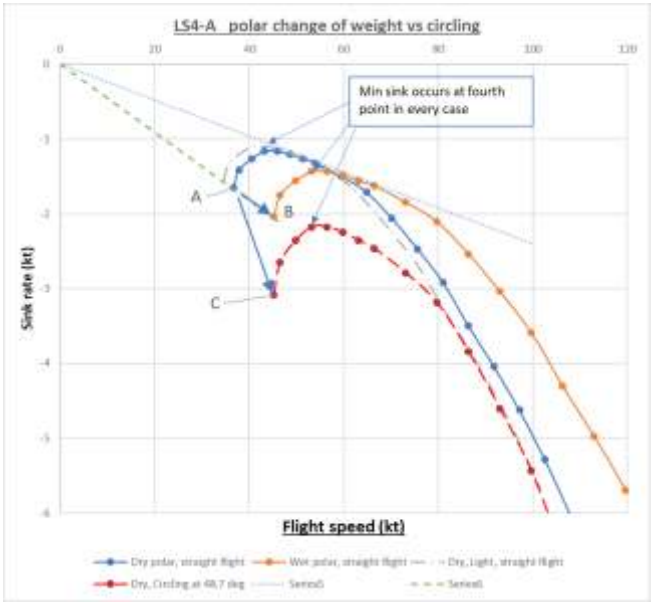
In straight flight, (for any chosen point on the polar so that lift/drag ratio is fixed), a change in weight contributes equally to power dissipated and power supplied, so that the ratio of forward speed to sink speed is unchanged and we get the familiar result that adding water lets us fly faster at the same glide ratio. The G forces in a turn increase the required lift in the same way as an increase in weight. So does the same conclusion apply? No.

The power supplied by the sink speed is still based on the original weight, but the power required increases in proportion to the lift, which is now greater than the weight. As a result, the glider needs to sink faster to supply the required power. Consider the case where we bank the dry aircraft so that it produces the same lift as when wet, and fly it at the same speed as wet.



The examples which follow use the LS4-A polar published in the manufacturer's handbook[1] The numbers calculated are for sea level on an isa day (15C, 1013.2 hPa). At altitude, the values (e.g. turn radius and Vne) will change, but the conclusions will not.

The handbook polar is presented as sink speed vs flight speed, at two different wing loadings (dry and with water). This presentation is convenient for the pilot, but is not usable directly for design or analysis. The manufacturer has scaled the wet curve from the dry, so there is really only one original curve (drag coefficient vs lift coefficient). I have scaled the other curves from the dry curve. Note that, for the LS4 at least, the wet polar is at maximum allowable weight and the dry polar is at maximum cockpit load. Lighter pilots are operating on a different polar (minimum cockpit load shown dotted grey).



The three polars for straight flight show the usual behaviour – as weight increases, points slide along a line through the origin so that the Vflight/Vsink ratio is constant. Adding water moves point A to point B, for example. Vflight/Vsink ratio equals the lift/drag ratio for steady **straight flight** but not for circling.

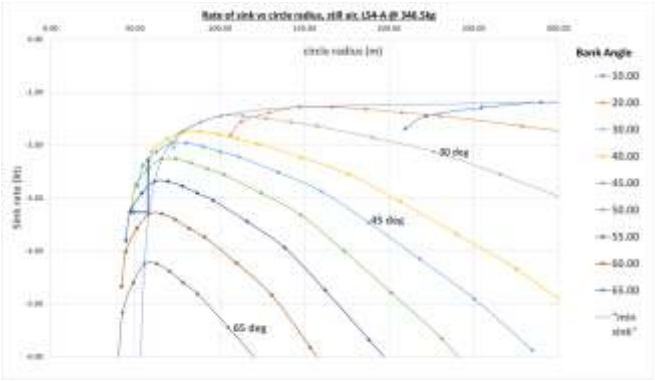
The red curve is for flight at 48.7 deg bank. At this condition, the lift required by the dry aircraft is the same as for straight flight with water, but the rate of sink is much

higher. The aircraft lift/drag ratio is the same at points A,B,C but the ratio of Vflight /Vsink is lower for C, as described earlier.

Notice that, although the curve moves about and changes shape somewhat, the fourth point on the curve remains the min sink point at that bank angle.

The left-most point on the LS4 curve is at, or close to, the stall (checked against stall speed tabulation in the manual). The polar given for your aircraft may not extend all the way to stall.

The advantage of flying slower:
The next plot shows sink rate vs turn radius for various angles of bank. The dotted line connects the min sink speed for each bank angle. To achieve minimum sink at a given radius, you need to be on the left boundary of the set of curves. Up to about 30 deg bank, the dotted line (min sink) runs along the boundary of the set of curves, so it's the right place to be. Once bank angle exceeds about 30 deg, the min sink line lies inside the boundary of the curve set. Moving into the region left of the min sink line (slower) gives either a tighter turn or lower sink or both, as indicated by the arrows.



I haven't spotted flight speed on the graph as it gets too cluttered. In any case, you don't need to know the speed – if you need to bank to 40 deg or more to get to the core of your thermal, you achieve lowest sink (best climb) by slowing to close to stall (probably just above stall buffet, but the information here doesn't prove that). In practice, that probably means the minimum speed that allows you good control. You still have to decide how tight a turn gets the best out of your thermal, but I can't tell you that, it's different every time. You can see that you can't turn much tighter than near stall, 45 deg bank, but you can certainly sink a lot faster.

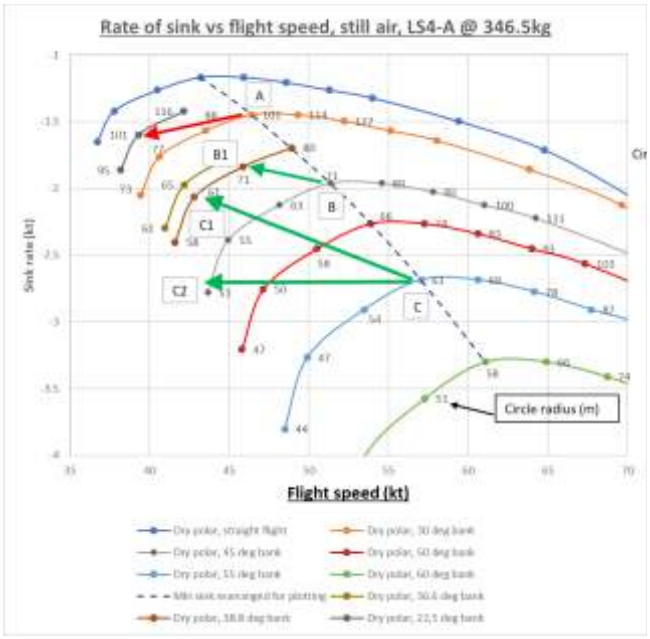
The boundary of the set of curves is the best performance of the glider. On the boundary, there will be one speed for each bank angle. Terminology seems loose – sometimes this curve is called the circling polar, sometimes the whole set of curves is called the circling polar.

The boundary curve can be extracted and used to compare the climb rates of different gliders (or the same glider at different weights) in an assumed thermal profile. If the thermal is assumed to get stronger toward the centre, then climb rate will increase initially as bank is increased and the circle tightened, then fall off as the glider sink rate becomes too high. The best climb bank angle will depend on the glider and its weight, and on the assumed thermal strength and size.

A number of standard thermals have been defined, but I have not used them here.

Here is the same information in a different form – same story but the format may suit you better:

The chart below shows the LS4-A polars recalculated for a range of bank angles.



This diagram is a bit busy, but it shows how you can benefit from slowing down in most cases. It shows the usual sink rate vs flying speed, but for a number of angles of bank. The dotted line represents the minimum sink case for each bank angle. The numbers attached to each point show the circle radius achieved.

If the bank is shallow, and the circle radius is large, then flying at min sink speed gives the best result. For example:

A, flying at 30 deg bank, 47 kt and 101m circle radius, would suffer a penalty in sink rate if he slowed to A1 and flew the same circle radius.
B, flying at 45deg bank, 52kt, 71m circle radius is pulling more g. and would see a modest benefit from flying slower, about 46kt (B1). He would achieve the same turn radius at reduced bank (39 deg) and reduced sink. He could, instead, fly a smaller, slower, circle for the same sink rate.
C, flying at 55 deg bank, 57.5 kt, 61m circle , pulling nearly 2g, has the same range of options as B, but they offer more benefit. They are all better than where he is now, and more comfortable.

- If he slows to C1, 39 deg bank 43 kt, he'll have the same circle radius and only 75% of the sink rate.
- If he's in a tight thermal, he could move to C2, keep his present sink rate, but reduce his circle radius by nearly 20% (from 61m to 51m) by slowing to 44kt at 45deg bank, just above stall.
- The plots shown are for max cockpit weight, so Simon's suggestion of 40kt, 42 deg would lie somewhere between C1 and C2 for a lighter pilot, in a good place to be.

Once the angle of bank reaches about 40 deg, there is always a better result available by flying slower than minimum sink speed for the bank you are using, sometimes at just above stall. The lift/drag ratio gets worse, but the sink rate is reduced because:

- The lower speed reduces the lift required at a given turn radius, and hence (usually) reduces the drag too.
- The lower speed reduces the power dissipated in overcoming the drag, so that power required and hence sink rate can reduce even when the drag has increased.
-

At bank angles much lower than about 30 deg, you're not pulling much g, so you can't reduce the lift very much by slowing down below min sink. If you do slow down, there's little to offset the worsening lift/drag ratio, and you lose.

Try it – it seems to work, but bear in mind what I said at the start – the sums apply to a situation where the air in the thermal is travelling mostly vertically.

Speaking of travelling vertically, this may not be the safest technique when getting low, or when in a crowded thermal!

I'm retired, so I no longer have to do all that tedious checking before publishing. You're my peer reviewers now, so if I've made a mistake, here's your chance to embarrass me and get your name in the next issue as top dog. If you're interested in the detail, the assumptions and equations are available by clicking on this link or copying it into your browser:
http://s000.tinyupload.com/index.php?file_id=66810905906996814978.
If you want to see what the curves look like for your aircraft at your weight, there's a spreadsheet you can use. You just need to enter about 10 pairs of numbers from your flight manual. Download the file by clicking on this link or copying it into your browser:
http://s000.tinyupload.com/index.php?file_id=44196965985577263982

From the CFI

Steve Male

From the Flying Field
Whilst it feels like we have been permanently in the grip of pretty poor flying conditions for months on end now; we have actually done a fair amount of flying, in fact at the end of May we had flown marginally more launches (Year to Date) than we did last year; sounds surprising but it's true. In amongst the flying we have had some people passing significant milestones in their flying careers: - Ricardo Radielli has flown solo and converted to both the K8 and the K23. Congratulations to him.

We also have a number of new instructors coming along: - Congratulations to Dave d'Arcy and Mark Wakem who have both completed BI Ratings and to Mark Jerman who has passed the "C Module" of his Assistant Rating Course. Meanwhile Mark Williams is close to completing a BI Rating. Additionally, Neal Clements, Matthew Cook, William Brewis and Nigel Lasetter have all passed their TMG Rating to fly the Motorglider they just need to build up a few hours on our motorglider at the Mynd and then we can begin the process of training them as BGA SLMG Instructors. Once that is complete we can accelerate the process of fully integrating the Motorglider in to our training activities.

Members Flying Activities
We ran, or rather tried to run, both CFI's get Checked Week and our Cross Country Development Week earlier in the year and I have to say I am very disappointed with the take up rate – admittedly the weather during those weeks wasn't good but very few people booked on the weeks in advance. Just a reminder, to be able to exercise the privileges of your solo gliding qualification at the MGC you MUST: -

- Be within the validity period of your MGC stage AND
- Be within the validity period of your Annual Check.
-

We acknowledge that it's difficult (almost impossible) to complete your Annual check in one day, that's why we introduced the Annual Check Form, so that you can fly different elements on different (suitable) days. Remember you can begin your Annual Check process up to 90 days before the expiry of your current Annual Check period.

The poor response to this year's Cross Country Development week was particularly disappointing as "Cross Country Flying in 2 seaters" was the top item on the wish list from last year's member survey.

In the very near future (next month or so) we need to decide our 2020 Flying Activity Programme. Currently we have 3 weeks of members Cross Country Development/Soaring Courses and a CFI's Get Checked Week planned for 2020. If these are not required then we can use them for some other flying activity – it's up to you. Let me know through CFI@midlandgliding.club

Flight Safety
It is the responsibility of the "Pilot in Command" i.e. P1 to ensure that the flight can be safely conducted and the definition of "flight" is from the moment the wheel starts to rotate on the launch ground run until the aircraft comes to a complete halt at the end of the landing run. In this respect the landing "Roll Out" is part of the flight.
We have had reported a very "Near Miss" where a pilot landed one of our club aircraft and tried to taxi to the launch point. Unfortunately the taxi did not go as planned and the pilot was VERY LUCKY not to have hit the retrieve winch or any of the people standing around it. Potentially injuring a group of members and possibly seriously damaging the aircraft and/or winch.

Once you have landed Roll Out in as straight a line as possible (Unless we are operating at the South End and you have been specifically briefed to taxi off 36 Right into the area at the end of Howard's Way).

Rolling Out straight ahead means that your ground run is predictable to anyone following you round the circuit trying to pick a place to land and Roll Out, clear of where they think you will end up.

Bronze Progression Course
One of the requirements that came out of last Autumn's member survey was a significant number of members requesting a more focused approach to gaining their Bronze C. Consequently we organized 3 weekend's of "Bronze Progression Training". We have 6 candidates active on this course.

Unfortunately the weather wasn't flyable on the weekends we have run so far. However we have had some very

interesting ground school discussions. The next planned weekend is 29th – 30th June when hopefully we'll actually be able to fly the exercises we have already briefed.

Damaged Aircraft
Whilst we have not had any accidents since we destroyed the Twin Astir we have continued to damage aircraft.
The port wing of the K21 was damaged sometime during the Llanbedr expedition. It was either dropped on its leading edge or, more likely the leading edge was scraped either putting the glider in the trailer or taking it out again. The resulting damage has caused a delamination of the joint between the top and bottom skins over part of the leading edge. The K21 was also damaged during a Hangar Packing incident a couple of weeks ago. We have also damaged the rudders of the K21 and the Motorglider during Hangar Packing incidents.

I have been asked several times recently what we are planning to do to replace the Twin Astir and/or replace the K21. The situation is:

We (the committee) are trying to build up a Fleet Capital fund for us to be able to replace/refurbish our 2 seat fleet, however the competition for funds for any number of projects is fierce and there's a limited amount of money available.

The Fleet Strategy presented to the members a couple of years ago is initially focused on improving the availability of early solo Glass single seaters. This part of the strategy is now complete, despite the false start we enjoyed when our original K23 was destroyed in an accident. In regard to this, I'm pleased to say that the take up on the Junior is improving, it has already flown more this year than the Discus flew in the whole of last year.

The basic message is :
If we want to buy replacement aircraft for our Glass Two-seater fleet then we must stop spending our "fleet budget" on unplanned repairs to our existing aircraft particularly where the damage preventable.

All Change (Again)
You are of course aware that the BGA changed the order of the Pre-flight checks earlier in the year. I think just about everybody is now up-to-speed with the change. Some time ago the BGA recommended the introduction of a further set of pre-flight checks "A, B, C, D" which are carried out before boarding the aircraft.

A – airframe – check round the aircraft before boarding looking for any damage – this is particularly relevant if you're taking over an aircraft from someone else or if the aircraft has been parked for a length of time.

B – Ballast- check the weight and balanced data on the placard BEFORE you get in – fit any weights you may need, and or check that any weight fitted are secure, alternatively remove any weights you don't need, whichever the case may be.

C- Controls – Check "Full, Free and Correct Movement" of the controls.

D – Dolly – Make sure the tail dolly has been removed.

Personally I also add an "E" for eventualities as it's much easier to evaluate cross winds, the field layout and potential emergency landing areas when you're standing outside the aircraft.

To be compliant with the BGA's current recommendations I would like to adopt these checks as soon as reasonably practicable.

Which brings me to my final point:
EASA have issued a new set of Sailplane regulations. These come in to force on the 9th July THIS YEAR.
I will asking the office to circulate this document, electronically, in the next few days (after this weekend's Instructor Meeting). There are over 200 pages in these regs so realistically I do not expect you to read the whole thing. You should however read the sections on "Pilot Responsibilities".

I am in the process of updating our "Flying Orders Book" to reflect the contents of the new regulations, once the update is complete I will ask the office to circulate it electronically.

I think that's about it for now……
Happy landings,
Cheers
Steve

Post Script

I am very grateful to the contributors for helping to make this second club Newsletter a worthwhile read. If you have comments on anything published this time please send them to me at chairman@midlandgliding.club and maybe next time I can include a 'letter to the editor' column. I will always be looking for articles to include and I know some of you have ideas so please send them to me in time for the next edition. I intend the next one to be out in the autumn, sometime around the beginning of October, so let me have copy for inclusion by the end of September. I would particularly welcome articles on the other places we go to for expeditions, something on the competitions that our pilots attend and more like Geoff's more technical contribution. Please don't let this become populated by the same contributors every time.

I hope we see the weather improve for the rest of the summer.

Happy landings
Jon Hall

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