

SOLUTIONS TO THERMAL CENTRING - PART TWO

WAYS TO GET THAT FEELING

Tony Cronshaw talks to leading coaches about techniques to help us develop a feel for centring

CENTRING thermals can be a challenge, not just for the newcomer, but for established cross-country pilots if conditions are less than ideal. Tony Cronshaw talks to leading coach G Dale and 11-times world champion Sebastian Kawa about developing a feel for centring

TONY: *What are the key prerequisites in terms of skills and knowledge for successful thermalling?*

G: I say to people that flying solo demands a handling standard about equal to passing your driving test. By comparison, flying cross-country demands a handling standard equal to being a race or rally car driver, ie far higher abilities in how accurately you fly the glider so that you have the chance to pick up the tiny vertical accelerations that you feel as you fly into a core. The clues can be very small accelerations indeed, easily masked by clumsy handling.

TONY: *What's the best way for a newcomer to build up such skills?*

G: I recommend initially learning a simple, reliable

"default" centring technique to help the pilot climb away – most easily from an aerotow – and begin to make sustained local flights. These flights are very enjoyable in themselves, whilst an opportunity to practise centring and handling skills so they become lighter and more instinctive.

TONY: *What handling techniques would you recommend generally when thermalling?*

G: Angles of bank should be tight when we're in the core – my default is 45 degrees. A tight

circle is really important to climb quickly. Reichmann [1] worked it out to be about 40 degrees on average. I use 45 degrees because it is easy to teach – look at the diagonal screws mounting the ASI (figure 1). However, banking steeply doesn't come naturally to the newcomer and will need lots of practice. One rarely needs more than 45 degrees. Only very occasionally do I find it's better to turn flat and slow, depending on the thermal structure.

Secondly, pitch/attitude, not speed, should be constant throughout the circling process. When changing the bank angle, I try to change it quickly because during the process of changing it's much harder to feel the air. I try to "freeze" the attitude as I run out of the sink looking for the core, so I can feel the "going uphill" (surge) sensation.

TONY: *What about the airspeed?*

G: The airspeed should be more or less constant, and just adequate for the higher angles of bank. This means that the glider is close to departure when turning hard, and well away from the stall when the bank is reduced to move the glider around in the thermal. Sebastian Kawa's book [2] explains why: At low angles of bank you can easily fly much slower than the min sink speed for that angle – and therefore generate too much sink, but at high angles of bank the difference between min sink and the stall is tiny. So if at 45 degrees the glider will stall at 50kts, I will fly at 50kts throughout the circle, maybe even faster for good control response.

TONY: *In terms of theory, what's the starting point?*

G: Firstly it's important to define our terminology and understand instrumentation issues: I call "rate of climb" – as shown on the vario – "lift". "Vario lag" has to be understood, of course, and this is variable. "Gusts" on the vario and ASI are shown

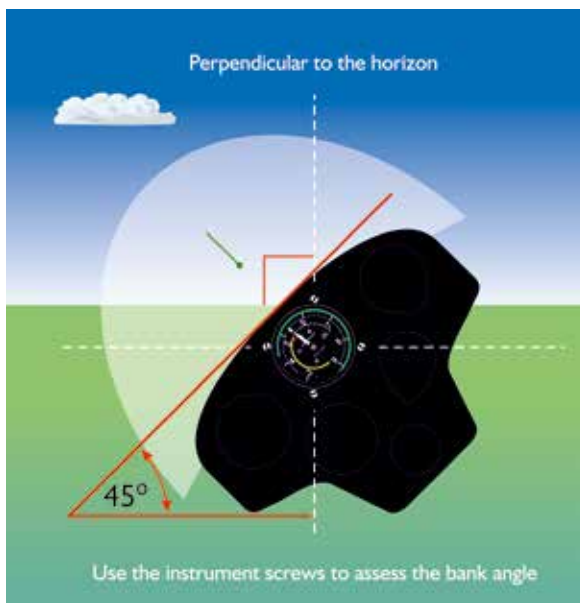


Figure 1

I RECOMMEND INITIALLY LEARNING A SIMPLE, RELIABLE 'DEFAULT' CENTRING TECHNIQUE TO HELP THE PILOT CLIMB AWAY

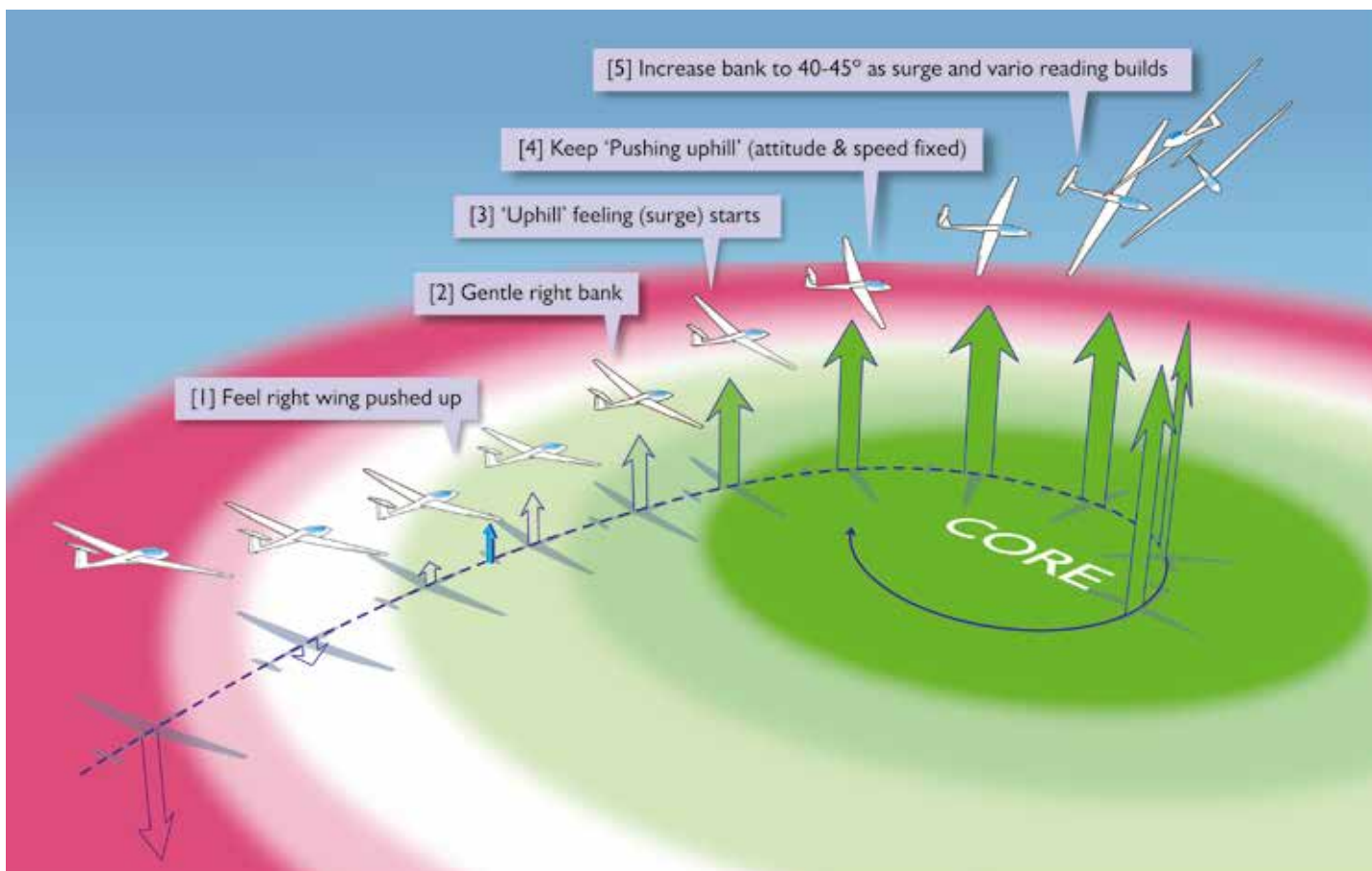


Figure 2
(Illustrations by Steve Longland)

clearly and quickly, but a changing rate of climb is shown slowly and is often hidden by the other noise on the vario signal. One may get the impression that one has a fast vario, but this is not true. And it's not possible to remove vario lag when it is responding to a changing rate of climb.

Secondly, I call the sense of vertical acceleration/surge "going uphill" (figure 2) because that's what it feels like and it's the sensation that triggers us to know that better "lift" (a higher rate of climb) is coming.

TONY: *For the centring technique itself, what method do you recommend as a reliable default?*

G: My default is the method given in BGA Instructor Manual together with a specific training process. This is straightforward to learn and requires minimal situational awareness of the surrounding thermal structure. It's not the fastest way to get centred, but more sophisticated methods can come later. The method requires the pilot to react promptly to changes in the vario, plus feeling the "going-uphill" which precedes the vario rise, to know when to add bank – and conversely when the vario starts to fall,

to reduce bank. These changes in the bank angle are all that's required to move the circle progressively towards the core. This was described with diagrams recently in S&G [3].

But can I just emphasise LISTENING to the vario, and NOT LOOKING AT IT ALL THE BLOODY TIME!!!!!! Keeping our heads out of the cockpit is important for controlling the attitude and bank. And for safety, it's vital to look out for traffic.

TONY: *Can you talk through your training process?*

G: The first step is a ground school session. My approach is to use a lot of humour, fun diagrams and questions, and my students really enjoy learning like this. I put a big "W" on the white board and ask what it is, adding a hint about the Average White Band's album covers for those of that vintage. It takes a while before someone twigs "it's your arse!" and the whole discussion about feeling the going-uphill sensation becomes entertainingly memorable.

Once we're in the air, I remind students of Sebastian's and Bernard Eckey's advice [4] about flying away from sink – this is vital. If you spend much of your circle in sink ↘

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Tony Cronshaw is an Ass Cat instructor at Cambridge Gliding Centre with over 1,000 hours gliding. His enthusiasm for helping the next generation of pilots includes running courses for visitors and members, and supporting CGC's recruitment and retention sub-committee



Gerrard (G to his friends) Dale has been gliding since the age of 20 and first trained at Dorset GC. Inspired by BGA coach John Williamson and later mentored by another coach, Chris Rollins, he went on to become a racing pilot and professional instructor. With about 7,000 hours gliding in Europe, the USA, Australia and New Zealand, G coaches for Glide Omarama in NZ each winter, and is one of Lasham's DCFIs in the summer. G's tutorial *The Soaring Engine, volume one*, was first published in 2015 and *volume two* is now also available

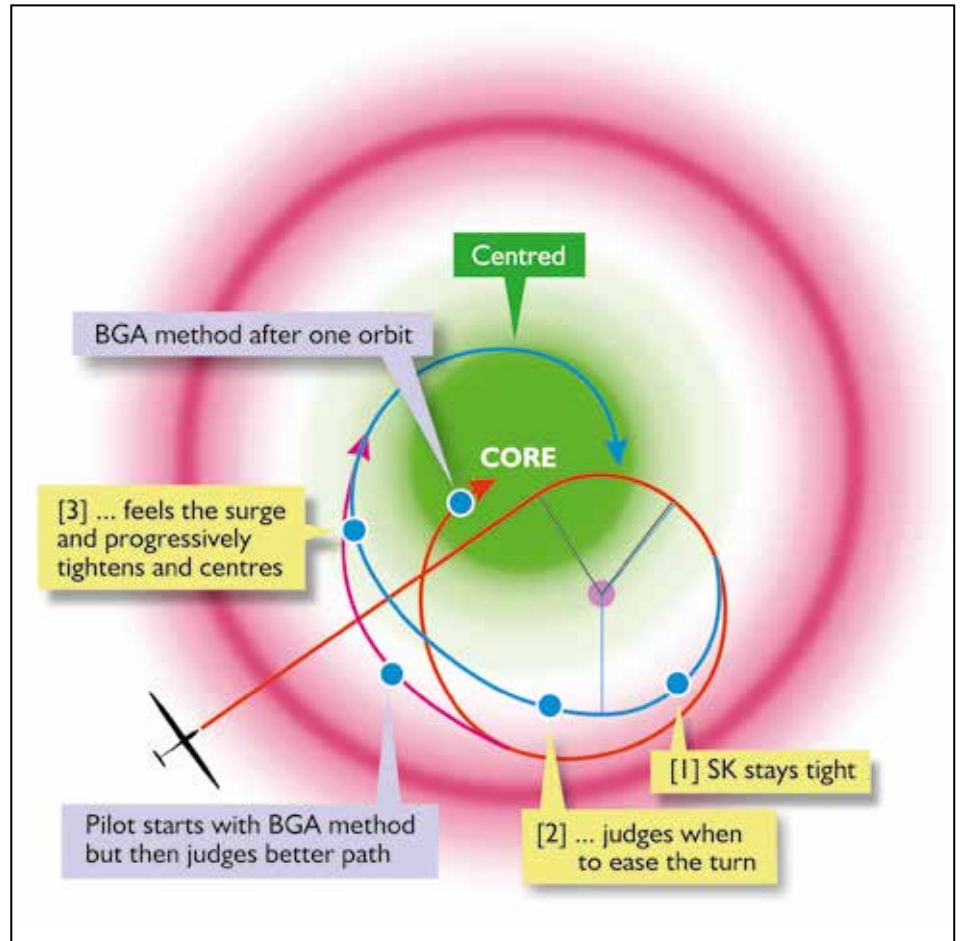


Figure 3 (Illustrations by Steve Longland)

☞ you are in the wrong place to get any sort of decent climb – I will always make a big move away from it. Sebastian taught me to do this and it was incredibly helpful, both for my own flying and for my students.

I then start teaching how to change the bank angle in response to the vario as we pass in and out of the core. Once a pilot can do this reliably, I try to get the pilot to feel the accelerations and improve the timing of when to add bank.

My tip here is to turn the vario down really quiet for a start, so you can hear it but it doesn't dominate the cockpit. That makes it easier to recognise the subtle seat-of-the-pants sensations. This idea came from Ingo Renner and he knows a thing or two! The advantage of reacting promptly is a much better chance of getting banked tightly in the core.

A delayed or inconsistent reaction can mean the next circle doesn't get any closer and the path becomes a random clover leaf.

TONY: *This reminds me of how Rémy*

Desbenoit teaches mountain soaring. In one exercise he covers the panel and TURNS OFF the audio. Now the student is forced to use head-out-of-the-cockpit judgement to handle the glider – and is completely reliant on vertical sensations to centre the thermal.

G: I agree it's all about getting a feel for centring. Gabrielle Briffe used to do the same thing when teaching mountain soaring out of Omarama – take all the instruments away. I tell students to modify the BGA method by “pushing the glider uphill” whenever they feel the “going uphill” sensation. Push, because we specifically don't want to raise the nose and wash off speed.

TONY: *What's the next step in developing more advanced thermalling skills?*

G: The above is a reactive and mechanistic way of modulating the bank. Beyond this, for the pilot to become much faster at centring we need to be much more observant and proactive, look for clues, get oriented and make intellectual decisions about what to do next.

TONY: Finally, what's your advice on how to enter a thermal?

G: As for entering the thermal, I find that dolphin flying spoils the chances of finding a core. I will pull up in lift if I think it will go on for a long time, or if I am trying to find a core, but I will not follow a speed director. I move the glider around to stay "poised" to snap into the circle in the right place.

Here's an analogy: Imagine Homer Simpson on a squash court waiting to hit the ball. Flat feet, gut out, dumb expression, racquet down. That is what you will be doing if you pull up straight and slow in the core: Just dead in the water. Now imagine someone poised to receive service: Up on their toes, alert, leaning forward a bit, racquet up and ready. So to find the core I come up into the thermal in a gentle curve (figure 2) as even a clumsy two-seater will snap into a tight turn quickly from a shallow one. I've already decided which way to go (another problem) and I fly a constant attitude, very slightly ballistic trajectory to intersect where I think the core will be, "a searching turn" with constant attitude and constant g. If I feel a surge upwards (the going uphill feeling) I turn hard, immediately. If not, I might leave or move around a bit, still going at a reasonable pace.

TONY: If I can turn to you, Sebastian, you mentioned last time [3] that the advanced pilot should be able to get centred in one or two orbits. Can you explain how?

SEBASTIAN: Let's consider the situation where we have passed through the core for

the first time and the vario is now showing that we are starting to leave the core. My technique is to keep the circle tight initially then judge when to open out into a shallow turn back to the core. Figure 3 illustrates the principle, although I actually stay tight for longer than shown. I increase bank again when I feel the surge. Sometimes I anticipate and tighten just before the surge is felt.

Another option for the pilot following the BGA method is to ease the turn (figure 3) so the path joins up with the path I just described. My first technique just means we fly a bit less in the weaker lift. However, both options need good situational awareness of where the core is located and good flying skills/judgement to successfully modify the trajectory. Just one final point, I recommend that all changes in bank are small and the turn is continued smoothly whilst looking for clues and choosing where/when to modify the turn.

[1] *Cross-country Soaring* by Helmut Reichmann (1978)

[2] *Sky Full of Heat* by Sebastian Kawa (2012)

[3] *Thermalling: Core Basics*, S&G Feb/Mar 2017

[4] *Advanced Soaring Made Easy* by Bernard Eckey (4th edition 2016)

■ In the next *Ask the Coach* Tony talks to leading coaches about centring methods based on "open-out-in-the-surge" and optimising how to enter a thermal

MY TECHNIQUE IS TO KEEP THE CIRCLE TIGHT INITIALLY THEN JUDGE WHEN TO OPEN OUT INTO A SHALLOW TURN BACK TO THE CORE



Sebastian Kawa has been gliding in Poland since 1988. He is 11 times World Champion, current World Champion in 15m Class, European Champion in the 18m Class and number one in the FAI world rankings. Sebastian's autobiography and advanced gliding tutorial *Sky Full of Heat* was published in 2012

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