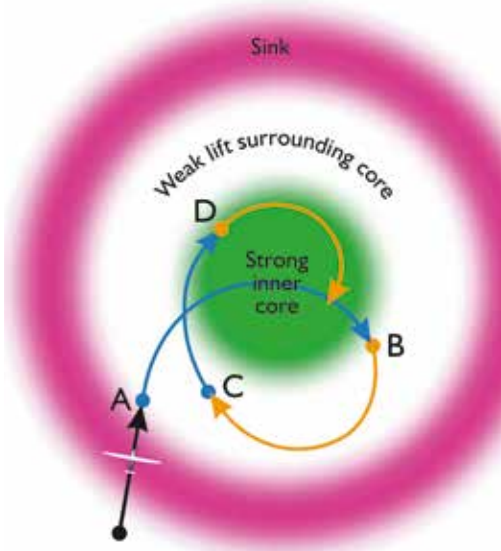


## SOLUTIONS TO THERMAL CENTRING - PART THREE

# WHY OPEN OUT IN THE SURGE?

Tony Cronshaw talks to leading coaches about how to use opposite logic to centre thermals



Above, figure 1:

A-B Turning into lift

B-C Steep angle of bank due to weakening lift

C-D Shallow angle of bank due to increasing lift

D Maintain constant angle of bank while in steady lift

(Illustrations enhanced by Steve Longland)

**M**ANY pilots centre thermals using the 'open-out-in-the-surge' method, a rule that is perplexingly opposite to the 'dig-into-the-surge' rule. Tony Cronshaw talks to leading coaches Bernard Eckey and Kevin Atkinson to find out more.

**TONY:** *In our first Ask the Coach article [1] two methods of centring thermals were mentioned: The dig-into-the-surge method which we discussed recently in S&G [2], [3] and the open-out-in-the-surge method. How come two apparently opposite methods can succeed in centring?*

**BERNARD:** That is a very valid question and one that I get asked quite frequently. Of course, there are many different ways of centring thermals and the more pilots we talk to, the more answers we get.

We have to keep in mind that the characteristics of thermals not only vary from one day to another, but they can also change as the day progresses. The height at which we enter a thermal also plays an important role. Down low it almost always

pays to stand the glider on the wingtip when we encounter a strong core, but at altitude it usually pays to delay the banking of the glider a little and open out in the surge. In other words, we constantly need to adapt our centring method if we want to get into the core of the thermal quickly and if we want to milk it efficiently. I know that's easier said than done!

More advanced and highly experienced pilots read the sky and FEEL the air to work out where the core is located. Then they promptly adjust the angle of bank to stay in the strongest part of the lift where they

extract the maximum rate of climb.

**TONY:** *The inexperienced pilot unfortunately lacks those skills, so how would a newcomer use the open-out-in-the-surge method?*

**BERNARD:** In *Advanced Soaring Made Easy* I summarise it as follows: INCREASE THE ANGLE OF BANK AS THE LIFT DECREASES, AND DECREASE THE ANGLE OF BANK AS THE LIFT INCREASES.

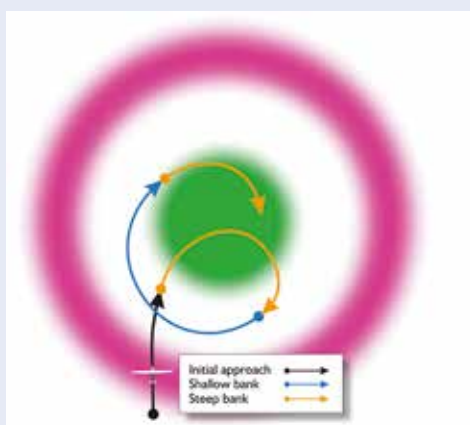
However, it helps when the pilot has got a vague mental picture of the thermal and a rough idea where the thermal is located in relation to his or her current position.

**TONY:** *Can I rephrase that as: Step 1: On feeling the surge (or on encountering increasing lift) use shallow bank; Step 2: If the vario readings decay again, tighten up to get back to the core quickly?*

**BERNARD:** Yes, that's 100 per cent right! Each time we change the bank angle, the path of the circling glider is nudged towards the core. FEELING THE SURGE is the key to success because there is always a delay of 2-3 seconds before a mechanical vario can register the lift. So the best moment to open out is immediately when the surge is felt. If you miss the surge, then open out as soon as the vario shows a trend of better lift. Never wait for a peak vario reading: That would be too late. Figure 1 (left) from my book explains the method.

**TONY:** *Your diagram interestingly includes a third step: Once the circle is completely in the core, the glider is shown turning tightly. This is where the vario is showing strong/steady lift compared with previous passes through the thermal where the lift was not steady. Can I call this step 3: If vario shows steady lift, turn tightly in the core?*

**BERNARD:** Spot on, Tony! When the vario screams evenly, it usually coincides with



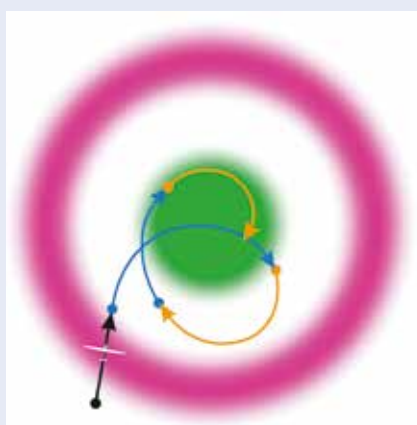
**Method:** Dig the wing into the surge/lift

**Basic steps:**

1. On feeling the surge (or increasing lift\*) tighten up. If in steady lift, keep turning tightly in the core. If vario decays, go to step 2.
  2. Reduce bank for a wider circle back to the core. Go to step 1.
- \* Don't wait for vario to peak.

**Variants:**

- BGA [5] – As above.
- Kevin Atkinson's "conventional centring" [6] – as step 1. Instead of step 2 see vario min method.
- G Dale [7] – "Push up hill" (don't slow down in the surge).
- Don Puttock [8] – At step 2, continue with steep bank until vario shows minimum then reduce bank.
- Sebastian Kawa [3] – At step 2, continue with steep bank then judge when/where to open out into shallow turn back to the core.
- Reichmann's "method 3" [10] – At step 2, bank even more steeply for a half a turn, then as lift starts to improve again, bank gently for a half a turn, then go to step 1.



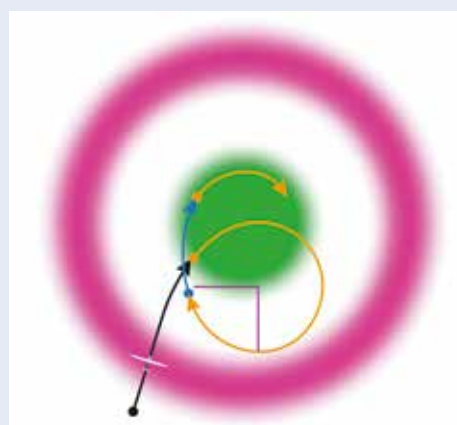
**Method:** Open out in the surge/lift

**Basic steps:**

1. On feeling the surge (or increasing lift\*) use shallow bank. Go to step 2 or 3.
  2. If the vario readings decay again, tighten up to get back to the core quickly. Go to step 1.
  3. If vario shows steady lift, turn tightly in the core.
- \* Don't wait for vario to peak.

**Variants:**

- Bernard Eckey [11] – As above.
- Welch/Irving's "surge method" [9] – step 1: Start to straighten up immediately on the surge. Step 2: As soon as glider is straight, recommence the turn.
- Ken Stewart [12] – Step 1: When feel surge/lift, open out (eg 30° bank) or even straighten up if just been through sink. Step 2: 1-2 secs later, increase bank to thermalling angle (eg 40-45°), then go to step 1.



**Method:** Vario minimum

**Basic steps:**

1. If passing in and out of the core, straighten up momentarily about 90° after vario\*\* shows minimum. Go to step 2.
  2. As soon as the wings are level, recommence a tight turn. If not in steady lift all the way round, go to step 1.
- \*\* At min vario, inner wing points at core.

**Variants:**

- Welch/Irving's "Worst heading method" [9] – As above.
- Kevin Atkinson [6] – To "re-centre", wait 4-5 seconds after worst vario, briefly reduce bank then return to steep bank.
- Derek Piggott [13] – Note area of best area of lift whilst circling, then reduce bank for 5 seconds next time approaching this area, then resume steep bank.
- B Eckey, G Dale, K Atkinson, K Stewart, S Kawa, etc – If circle passes through sink then use this method to make a bigger move away from the sink, eg straighten up for 3 seconds before recommencing the turn.

greatly reduced turbulence – a clear sign that we are nicely centred within the core. Now, more than ever, we need to fly accurately. By that I mean we maintain not only a steep 40-45° bank angle, but also an optimum airspeed. The best way of doing just that is to maintain a constant attitude, and keep the nose of the glider in the same position in relation to the horizon all the time. Trying to maintain airspeed by reference to the ASI is a very bad habit. It means that we are forever chasing the right speed, which makes efficient thermalling almost impossible. Worst of all, it prevents us from conducting a proper look-out.

**TONY:** *By the way, how did you find out about this method when you were originally learning to soar?*

**BERNARD:** Like a lot of people, my training – in Germany at that time – was all about becoming a safe 'circuit pilot'. However, being a new K-8 pilot at a busy airfield allowed me to pick the brains of the hot-shot pilots around me. Talking to them and copying their successful techniques soon gave me a good idea in terms of dealing with thermals.

I really wish gliding would be taught in a slightly different way. We all too often turn our students into instrument watchers by exposing them to these gadgets before they even get into a glider for the first time. As an advanced coach I seldom deal with real newcomers these days, but I promote the covering of ALL instruments until the student is ready to take the controls during a winch launch or aerotow. By doing so, they

Above: figure 2



**Tony Cronshaw** is an Ass Cat instructor at Cambridge Gliding Centre with over 1,500 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



Kevin Atkinson is the club coach lead for the BGA Aim Higher initiative ([www.gliding.co.uk/bgainfo/aimhigher.htm](http://www.gliding.co.uk/bgainfo/aimhigher.htm)). He started gliding at age 13 at Ouse GC (now York), flying his first solo on his 16th. Kevin has over 4,500 hours gliding, including competing in UK national and regional competitions. He also has more than 7,500 military jet hours (Tiger Moths to Typhoon)

■ Kevin's book *Gliding in Lift and G-SINK* is available at [www.bgashop.co.uk](http://www.bgashop.co.uk) or direct from [kratkinson@yahoo.com](mailto:kratkinson@yahoo.com)

✎ quickly learn to judge speed by attitude, airflow noise and control force and, by the time the instruments are uncovered, they can already fly without constant reference to all these expensive gadgets on the panel. Another big benefit is that their look-out is usually 200 per cent better and that they can already FEEL the air, which allows them to get into the core by using their 'seat of the pants'. That's an interesting topic in itself, one that we could elaborate on at some other time.

**TONY:** *If I can turn to you, Kevin, which methods of centring do you recommend?*

**KEVIN:** I think it's important to be flexible and have a few different methods up our sleeves, though admittedly the toolbox of the inexperienced pilot will always be more limited than the advanced pilot's. However, what I call 'conventional centring' should be in everyone's toolbox. Put simply: IF THE LIFT INCREASES IN THE TURN, KEEP INCREASING THE BANK.

It's a response to the lift increasing dramatically and continuously, and an indication that we are entering the core. So we dig the wing into the turn to stay in the core. This is also the moment when the inner

wing tries to lift (which we then oppose) and the yaw string deflects away from the core – because gusts affecting the yaw string and the ASI are caused by the thermal vortex. These are tell-tales that we are entering the core, so we need prompt action to tighten the turn and hence circle all the way round in the core.

**TONY:** *If we are not fortunate to be in good lift all the way round, what method do you recommend to move the circle towards the core?*

**KEVIN:** To re-centre, a good option is the 'vario minimum' method, namely: 4-5 SECONDS AFTER THE VARIO INDICATES THE WORST CLIMB RATE, REDUCE THE BANK FOR ABOUT 1-2 SECONDS BEFORE RETURNING TO THE ORIGINAL BANK ANGLE.

**TONY:** *The 4-5 seconds equates to about a quarter of a typical thermalling turn, which is therefore similar to Welch/Irving's 'worst heading method' [9] where the pilot momentarily levels the wings 60-90 degrees after the worst (min) vario.*

**KEVIN:** Rather than actually bringing the wings level, it's better to reduce the bank

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for a moment and then re-apply the steeper bank. Straightening up could mean a bigger shift than intended. Here's an analogy: When learning to play golf, we're unlikely to get a hole in one with a big hit – which is more likely to put you in a bunker. It's better to make a smaller, controlled shot each time to get a bit closer. So when we're desperate to hang onto a thermal, a number of small nudges will be better than a riskier big shift.

Remember every circle is an opportunity to feel the air and map out where the core and the sink are located. However, if our circle takes us through sink we must move the circle over further, and that's when actually levelling the wings will be the right answer to escape from the sink. Once we've done that we can worry about centring the lift. Remember: "Any lift is good, any sink is bad!"

**TONY:** *Figure 2 (see p17) summarises and compares the three methods we've been discussing with further related methods referenced underneath. The path icons simplify the idea of each method, omitting the typically iterative nature of these methods. The thermal is approached initially the same way in each case: The glider crosses the sink at block speed, slows down to a speed suitable for a steep thermalling turn and starts a gentle turn towards the side where the core is judged to be. The colour coded arcs then show how the different methods use steep and shallow angles of bank to get centred.*

**KEVIN:** When it's set out like that, it's tempting to compare the various methods to try to work out which is best. I suspect answering that question won't be easy! One reason is that a lot depends on how strong the thermal is, the manoeuvrability of your glider at that particular moment, how quickly you respond and how your instruments are set up. We should also remember that some people are better at feeling the surge than others, and some higher mass gliders, especially full of water when the handling changes, transmit less feeling through to the pilot. So choice of method can be affected by that too. In the end, I think it's a matter of finding out what works best for a particular pilot in particular conditions.

**TONY:** *The key point is that the pilot has many choices on how to solve the centring puzzle, including further solutions found in gliding literature not discussed here. With so much choice available, what does this mean*

*for the pilot wanting to acquire new skills?*

**KEVIN:** For the newcomer, the good news is that centring does not have to be a 'black art'. It can be taught as a logical procedure once we have knowledge of the theory and get practical support from an instructor/coach. There is also an opportunity for the intermediate pilot to try different methods when suitable situations present themselves. Having multiple tools in our toolbox will be far better than always using one favourite method. And beyond this, the advanced pilot has the opportunity to blend different methods together, whilst integrating into the equation visual clues and the feel of the air. Solving each situation that presents itself then becomes a source of intellectual challenge and enjoyment.

**TONY:** *That's also the message from John Coutts in his classic S&G article [4] which describes the need to adapt our centring methods to different cloud types/sizes, thermal strengths or blue conditions.*

- [1] *Thermalling secrets of success*, S&G, Oct/Nov 2013, pp8-13
- [2] *Core Basics*, S&G, Feb/Mar 2017, pp8-10
- [3] *Ways to get that feeling*, S&G, Apr/May 2017, pp8-11
- [4] *Getting to the core of clouds* John Coutts, S&G, June/July 2000, pp30-31
- [5] *BGA Instructor Manual*
- [6] *Gliding in Lift & G-SINK* Kevin Atkinson (2015)
- [7] *The Soaring Engine vol. 1* G Dale
- [8] *Dartmoor Gliding Society Student Notes* Don Puttock
- [9] *New Soaring Pilot* Welch and Irving (third edition 1977)
- [10] *Cross Country Soaring* Helmut Reichmann
- [11] *Advanced Soaring Made Easy* Bernard Eckey
- [12] *The Glider Pilot's Manual* Ken Stewart (fourth edition 2003) & *The Soaring Pilot's Manual* Ken Stewart. (2000)
- [13] *Gliding - A handbook on soaring flight* Derek Piggott (4th edition 1976)



Bernard Eckey is a pilot, instructor, record holder and head coach for South Australia. He flies an ASH 30Mi and has 3,500 hours (including multiple 1,000km flights and one 1,116km FAI triangle)

■ A revised and extended fourth version of Bernard's best-seller, *Advanced Soaring Made Easy*, is now available. It costs €54.90 plus P&P. To purchase, contact [eckey@internode.on.net](mailto:eckey@internode.on.net)

## TRYING TO MAINTAIN AIRSPEED BY REFERENCE TO THE ASI IS A VERY BAD HABIT

■ In the next Ask the Coach, Tony talks to Kevin Atkinson and Mike Fox about safety when thermalling and why the right techniques are sometimes counter-intuitive.

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