

BGA initiative for acquiring and improving soaring and cross-country skills



#3 FEEL THE WAY TO THE CORE

Tony Cronshaw talks to Aim Higher lead coach Kevin Atkinson about the skill of feeling the air when locating and centring a thermal

vario volume too loud so that the pilot suffers sensory domination by the audio that detracts from the sense of feel.

KEVIN: Absolutely. But it is not just the vertical gusts. We can feel and see the horizontal gusts through the ASI and deflections on the yaw string, indicating we are on the edge of the thermal, ie the boundary between rising and falling air. In this position, we are being blown away from the core and have to correct our flightpath.

We need to develop the skill of sensing these subtle air movements from the glider as a whole or through the controls. Hence avoid a tight grip on the stick, or playing or leaning on the rudder, which would mask our ability to feel and see what the air is telling us.

Remember also that, when we are learning, we need to slow down quite a bit to feel the air. A block speed suitable for thermal to thermal transit is likely to be too fast. Not only is it more difficult to feel the air, but we are likely to shoot through the good air and out the other side. Note also that some glider types give much more feedback than others, something that can make the glider easier and more pleasurable to fly.

TONY: *Perhaps one of the problems with acquiring this skill is knowing when to slow down, and how to interpret the various (tiny) sensory clues presented to the pilot transiting into the edge of a thermal.*

KEVIN: It's really important to have good understanding of the structure of thermals [3]. Although thermals are invisible, there are numerous clues to indicate where we are in relation to the thermal bubble structure. In fact, as a training exercise, I show students these clues by flying straight through the centre, or slicing through the side of the thermal so that the student can match these clues to pre-flight briefings and ground school theory.

TONY: *Figure 1 (left) shows the toroidal vortex structure of the thermal bubble.*

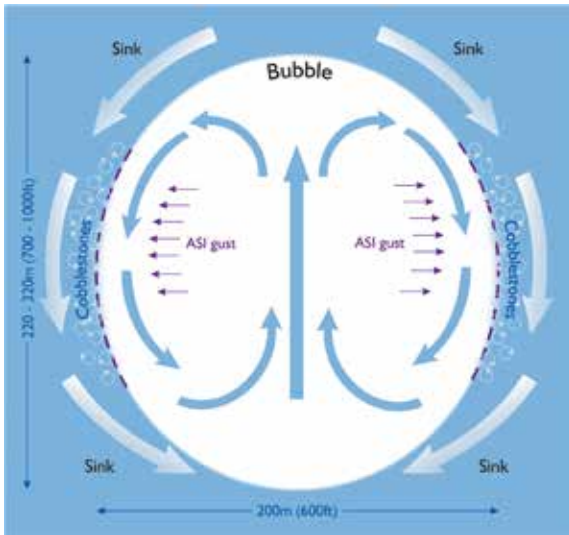
VISUAL clues are often an excellent bet when searching for thermals, especially if the sky has a classic distribution of cu [1]. But how do we locate and core the lift when the sky ahead is blue (and devoid of clues) or a sprawling cloud pattern that's very difficult to read?

TONY: *Experienced pilots demonstrate time and time again an amazing ability to locate and centre thermals despite a lack of obvious visual clues. What's the starting point in acquiring these skills?*

KEVIN: We could, of course, discuss how it's possible to read the ground to visualise where thermals might originate, but often the climbs we ride up in are not generated simply from the ground, or may be completely detached from their original ground source. So, rather than focusing on that, can I suggest we discuss something even more important, namely how to read the sky we are in by feeling the air? This is a key skill, enabling the pilot to manoeuvre towards better air and away from sink. It is a skill that we can use in a wide variety of soaring situations to consciously (or subconsciously)

map out the flows within the air. It's valuable not only when we lack visual clues, but equally when we have followed visual clues to find better air and our goal is then working out how to position our glider in exactly the right place, eg to find the core of a thermal and stay within it.

TONY: *The importance of 'feel' came up in a previous discussion with G Dale and Sebastian Kawa [2]. G made the point that we are talking about sensing very subtle vertical accelerations (eg a 'going uphill' feeling) which are easily masked by clumsy handling.*



Above: Figure 1

■ **Aim Higher courses are held at clubs by arrangement, run either by Kevin or by club coaches briefed on the training materials and S&G articles developed by Kevin and Tony (jointly awarded Royal Aero Club Certificates of Merit in May 2018).**

Please contact kratkinson@yahoo.com if you, or your club, would like to participate in future Aim Higher courses.

What is the sequence of clues we might expect as we approach and enter the bubble?

KEVIN: Before we enter the bubble, the first clue is likely to be sink, often quite strong if the bubble ahead is rising strongly. But note that sink on its own might simply be downwash from a spent cloud, wave sink or subsidence from a dissipating light shower cloud (the rain above having evaporated, ie virga). However, if we shortly afterwards experience a gust on the ASI, this would indicate we are indeed entering a thermal. We might also hear the gust depending on the cockpit/canopy sealing/design.

TONY: *Assuming these clues are positive, what's the next step in the sequence?*

KEVIN: Having crossed the sink, we must slow down and very often we'll feel the 'cobblestones', ie the turbulent layer on the edge of the bubble. We may find the outflow from the thermal (the ASI gust) is symmetrical on the nose, or asymmetrical and trying to bank the glider away from the good air, in which case we respond by banking promptly towards the good air.

There is a common belief that the vertical thermal surge lifts one wing to indicate where the core is, but really this depends on the mass of the glider, its lateral design stability and how the glider reacts to side slip. Modern higher mass ships with little dihedral tend to react less than older/lighter, high-wing types.

TONY: *When we bank initially towards the better air, G Dale calls this a 'searching turn' because it's not a thermalling turn: It's a shallow turn, but easily converted into a steeper turn if/when we feel the core.*

KEVIN: Also look for small deflections to the yaw string. The outward flow from the thermal will cause the string to momentarily deflect away from the core. This again tells us which way to bank.

TONY: *Assuming we have banked in the correct direction, the sequence of events should look like figure 2 (right) as we tighten up the turn into the core.*

KEVIN: But be careful of the timing of tightening up: Too

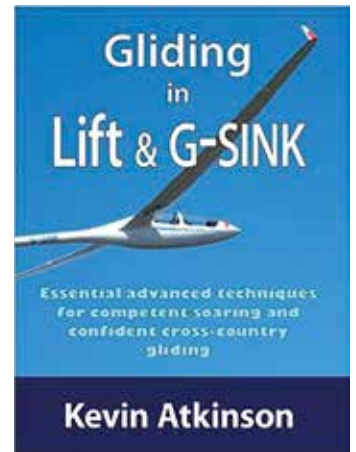
early and we form a circle that passes through the core, but circles back through weak lift. Too late and we circle just beyond the best air, again passing in and out of the core. It's always possible to re-centre in these cases, of course, but with practice we should be able to get the timing right and find ourselves circling in the core first time.

TONY: *What are your tips for getting the timing right?*

KEVIN: Again this is down to feel. There will be an obvious vertical surge as the glider enters the core. This may be under both wings, or asymmetrically under one wing. This is the signal to add bank immediately.

The vario/audio will also show a marked improvement in response to the surge, but don't wait for the vario to peak before banking as it usually lags too much and we turn too late. Add bank quickly, but progressively. Use feel to judge the turn entry to circle where you feel the core is located. And use plenty of bank if it feels like a strong core [3].

■ Scan this QR code to read the full article *Ways to get that feeling from S&G* April/May 2017, or visit www.sailplaneandgliding.co.uk/current-issue



■ Kevin's book *Gliding in Lift and G-SINK* is available at www.bgashop.co.uk or direct from kratkinson@yahoo.com

[1] *Read cu and find the best climbs*, S&G Oct/Nov 2018, pp8-9

[2] *Ways to get that feeling*, S&G April/May 2017, pp8-11

[3] *Banking on a fast climb*, S&G August/Sept 2018 pp10-11

Below: Figure 2
(Illustrations by Steve Longland)

