AIRFIELD CIRCUITS

The BGA Safety Team discusses how adherence to well thought-through circuit patterns can reduce the chance of a mid-air collision

In January this year, a regional jet airliner and a military helicopter collided over the Potomac River near Reagan National Airport in Washington, DC [1]. All of the 67 passengers and crew aboard the two aircraft perished. The disaster was the worst US air accident for 15 years, and it prompted an immediate change to the pattern of air corridors around the airport circuit.

While commercial procedures, circuit patterns and aircraft systems are usually quite different from those at gliding sites, the situation in Washington in many ways bears comparison. The TCAS system that normally keeps an automatic guard against collisions between commercial aircraft provided little help, as audible warnings and instructions are inhibited at the height of the collision; the aircraft were using different radio frequencies and thus unable to hear each other's calls; and the helicopter pilot had elected to keep clear visually without assistance from air traffic control. Just as in gliding, safety relied upon manual piloting skills, situational awareness and visual lookout – in this case, to fly beneath an airliner that was barely higher than a glider turning finals.

The causes of the Potomac accident have yet to be determined, but several aspects seem clear. The airliner was manoeuvring to use a different runway from that in general use that day; it was turning when the collision occurred, so the helicopter may have been hidden from view; its path would have passed clear of the helicopter until it turned in front of it; and there were other airliners nearby with which it could have been mistaken. In a complex, dynamic and potentially unusual situation, situational awareness is difficult.

GLIDER-GLIDER COLLISIONS

Not surprisingly, most mid-air collisions occur when aircraft fly close together. For light aircraft that's near an airfield; for military fast jets, it's pair-flying. Half of UK glider-glider collisions are in thermals, which is why it's crucial to follow the Soaring Protocol [2]: fly

defensively, keep other gliders in sight, and ensure that you're always visible to other pilots too [3]. A tenth have occurred while ridge soaring, despite long-established rules for turning, overtaking and giving way [4]. A further fifth of glider-glider collisions occur in or around the airfield circuit – and, at circuit height, as on the ridge, it's usually too low to use a parachute.

AIRFIELD CIRCUITS

The first reason for flying a circuit before landing is that it helps in positioning the glider in the right place for a stable, controlled approach to the intended landing point, and gives an opportunity to assess the ground and weather conditions in advance. The downwind leg gives a good view of the landing area, allowing the pilot to note any obstacles and check the windsock, as well as carry out any remaining pre-landing checks, while keeping a good lookout and adjusting the track and height to arrive at the right position for the diagonal leg. From there on, the pilot will usually be concentrating on speed control, lookout and positioning for the final turn. Even if there were no other aircraft in the sky, the circuit would be a busy time.

The second reason, when other aircraft are around, is to achieve an orderly flow of aircraft that minimises the likelihood of collision. Circuits are areas of high traffic density and, with so much to do to fly and position the aircraft, pilots' capacity for lookout can be reduced. A vigilant lookout is still important, inside and outside the circuit, resisting undue focus on the landing area and manoeuvring to monitor blind spots; but the circuit pattern means that pilots know where to expect other aircraft to be, and reduces the closing speed so that relative positions change more slowly.

CIRCUIT PATTERNS

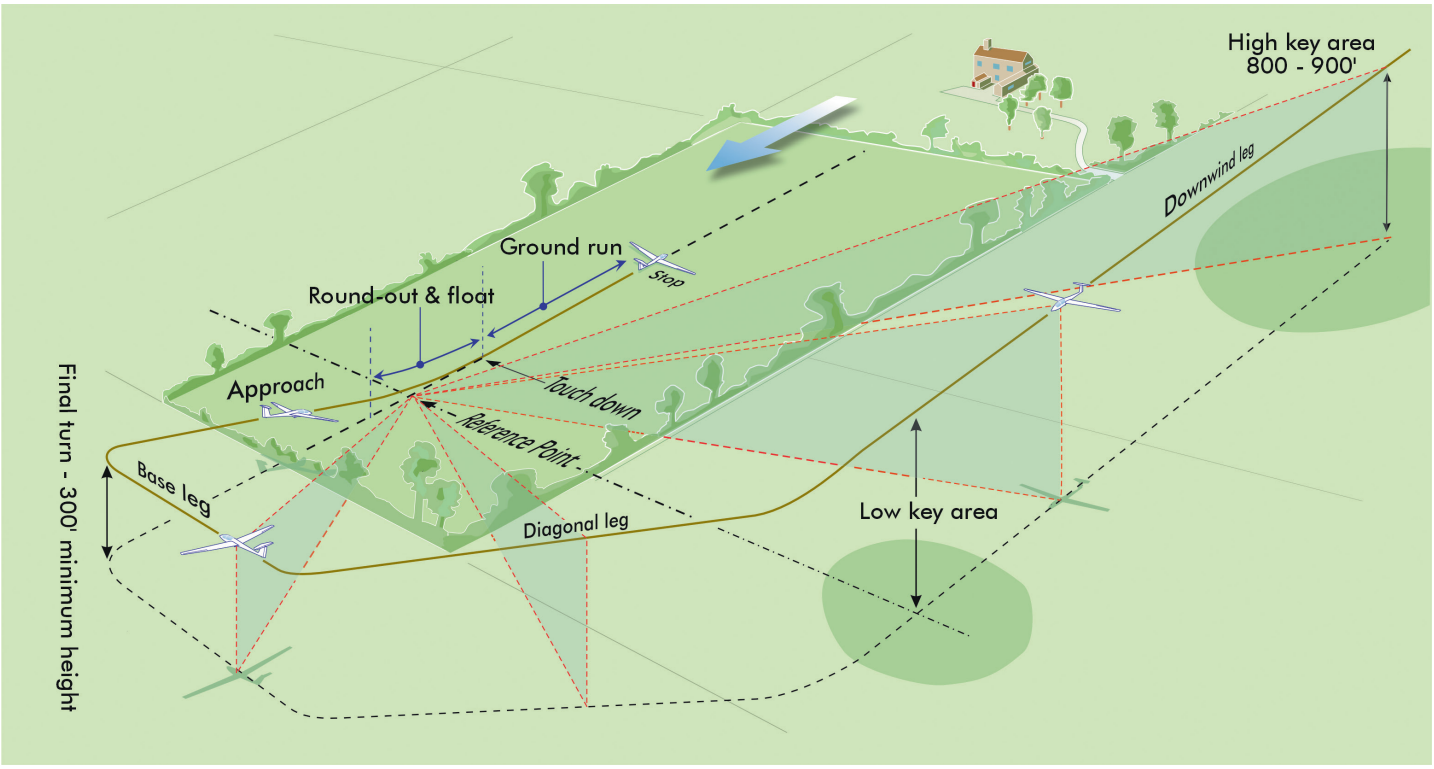
At large, flat airfields, the normal circuit pattern will generally resemble that shown in the BGA Instructor Manual [5], but individual airfield shapes and surroundings may require local variations. The most common difference is to allow both left and right hand circuits, with an obvious collision risk if the approach paths overlap or intersect. Opposing circuits should, if possible, lead to separate landing areas; pilots should avoid crossing the centre line between them, and look out on base leg for opposing and intersecting traffic.

Some gliding sites allow opposite 'mirror' circuits to the same runway or landing area. Serious mitigations, such as mandatory radio calls, are necessary for this to be acceptable. Vertical separation can be achieved by displacing landing areas so that some traffic lands further into the field. Our records show that, since 1974, collisions between aircraft on 'mirror' circuits at UK gliding clubs have killed four pilots and seriously injured a fifth.

CIRCUIT VARIATIONS

There are several circumstances in which the normal circuit may not be the best way of avoiding conflict with other circuit traffic. Powered aircraft such as tugs commonly have a faster approach speed, poorer glide performance, and the option of orbiting or going around under power. At many gliding sites, tugs therefore fly a different circuit that keeps them clear of glider traffic. The visibility constraints of low- and high-wing tugs may affect the solution chosen.

Glider pilots may also find themselves in situations in which a different circuit may be wise. Many K-13 or K-8 pilots will have found themselves behind a slightly higher modern glider likely to fly a wider circuit to a nearly coincident landing. A safe option in such



At large, flat airfields, the normal circuit pattern will generally resemble that shown in the BGA Instructor Manual (Graphic: Steve Longland)

cases can be to open the airbrakes, turn early and land long, inside the normal circuit. The pilot of a sleek aerodynamic glider, finding themselves behind and lower than a glider of lower performance, is in a similar situation, with a similar option. If sink or circumstances cause a glider to join circuit below the normal height, the pilot may again choose to turn early and land long.

Some clubs permit different circuits at the end of the day to allow gliders to return to the hangars or trailer park. There is great scope for conflict with normal circuit traffic and with gliders heading to other parts of the airfield. Well thought-through procedures are crucial: a good rule is always to land parallel to the normal run, but local geography may dictate other arrangements.

CIRCUIT DESIGN AND ADHERENCE

For an orderly, predictable flow of circuit traffic that minimises the risk of collision, three things are necessary: circuits and procedures must be well designed; pilots must be aware of and understand them; and then they have to be followed.

The first job is, therefore, for clubs or airfield operators to design and document the procedures for their airfield. These should address the range of wind conditions and both glider and power traffic, and provide options for obstructed landing areas, low or conflicting arrivals and hangar landings if permitted, as well as whether soaring is allowed in the circuit area. If radio calls are used to aid situational awareness [6], they too should be defined – but, being vulnerable to misinterpretation, interference and electrical failure, not relied upon alone.

Pilots must then be made aware of the procedures, and the requirement to follow them when it's possible to do so safely.

Finally, pilots need to show discipline and a degree of accuracy in following the circuit procedures. The reward will be not having to face a confusing, dynamic situation like that over the Potomac, when the positions and intentions of other aircraft aren't as you expect.

Tim Freegarde and the BGA safety team

[1] **NTSB Aviation Investigation Preliminary Report DCA25MA108 (2025)**
https:// tinyurl.com/flyright2526

[2] **BGA Soaring Protocol**
https://tinyurl.com/flyright2527

[3] ***Keeping safe in thermals, S&G*** **(June/July 2019)** *https://tinyurl.com/flyright2528*

[4] **BGA, Managing Flying Risk – hill, ridge and mountain soaring**
https://tinyurl.com/flyright2529

[5] **BGA Instructor Manual section 3-14 (2011)**
https://tinyurl.com/flyright2530

[6] **BGA, Collision avoidance**
https://tinyurl.com/flyright2531

■ All previous 'Fly Right' articles are available from the *S&G* website.
See: *www.sailplaneandgliding.co.uk/safety-articles* which may be accessed using the QR link right.