Soaring, radio, airspace and collision avoidance

The following is an attempt to explain and explore these subjects as seen through the eyes of solo cross country soaring pilots; a segment of aviation where the paradigms that apply can differ significantly from those of other aviators, controllers and regulators. The following is not meant to be condescending in any way, but it is inevitably aimed at those unfamiliar with current soaring activities.

Basics

At a basic level, flying a glider is just like flying any other light aircraft, albeit with the power control locked somewhere near idling speed. The flying controls are fundamentally the same. With high-performance, low-drag, wings gliders can fly for several minutes and go a long way before proximity to the ground becomes an urgent problem, but sooner or later gravity will dictate a landing unless rising air is found – see "Soaring" below.

Soaring

The unpowered pilot can achieve a lot. Different individual flights in the UK have been made above 38,000ft, covering more than 1,500 km in a day, exceeding average speeds of 100kts, and exceeding 12hrs in duration.

Modern efficient gliders have helped, but even the very best glider can only achieve useful performance if it spends time flying in air which is rising faster than its natural descent rate. Laymen and power pilots seldom realise just how much vertical movement there is in the atmosphere, it is not something that can be seen directly – but a practised eye can read much from obsessively studying clouds and by thinking about weather systems and how air flows over the surface of the earth.

The soaring pilot operates in what others might best understand as a permanent state of engine failure. Second only to the basic needs of flying the aircraft the soaring pilot's priority is to find rising air and use it to gain or maintain height to prolong the flight (or alternatively assess and select a suitable site and then execute an out-landing).

Over and above simply flying the glider, the pilot's workload is thus to continually assess: -

- How high am I and over what sort of terrain?
- If I can't find rising air where can I land safely?
- If I have enough height to reach land-able terrain further on how fast should I fly (faster gets further quicker but fast means more drag so have to find rising air sooner and spend more time in it)
- Just where is (the best) rising air – looking at clouds, birds, other gliders circling ahead, is there wind blowing onto an upslope?
- How much is it worth deviating from the straight line track to use a more promising thermal? It is often faster to deviate by up to 30 degrees if better climb rates can be found. And if conditions are weak it will be worthwhile to deviate by any amount just to stay airborne.

By its very nature all of this activity requires almost total concentration on looking outside the glider. It also means that gliders will tend to aim for the best rising air. Joining a glider (or a whole gaggle of gliders) already circling in good lift is often easier than finding and then centring rising air by

yourself. So gliders aren't distributed randomly though all available airspace – they tend to congregate in the best (rising) air. More than in any other form of aviation the future success of a flight depends directly on what can be seen outside the cockpit; and at an early stage in training soaring pilots become skilled and accustomed to circling close to other gliders while still avoiding contact with each other. Nonetheless the process of joining a thermal and then circling closely but safely with other gliders deserves the full concentration of every pilot, no matter how experienced they may be.

Radio

Those more used to commercial and IFR aviation have come to understand that a centralised air traffic controller is often best placed to separate aircraft from each other – for example a congested approach lane to a busy commercial airport would be difficult to manage any other way.

It is, however, inconceivable that a central controlling individual could possibly give instructions that would successfully keep a gaggle of circling gliders apart. In fact, a single distraction to even one pilot, by for example a radio call or by having to look down at the radio to select a frequency, would not enhance safety – it would unquestionably reduce it.

A recent straw poll of opinions of highly experienced soaring pilots gave illuminating results. Most would not ever consider setting a soaring task which required the use of radio to request access to controlled airspace; the sole exception being a two seat glider where both seats were occupied by commercial airline captains who could divide and share the soaring and communication duties. One highly experienced commercial pilot noted that his soaring abilities reduced measurably (by 100 feet per minute average climb rate) when required to use the radio (even if only to give information).

It is interesting to note that the reduction in road safety while using even an approved car telephone is well understood by the public and acknowledged by the Department for Transport, but is for some reason seldom acknowledged in aviation. The apparently subconscious skills of car drivers suffer badly when they communicate externally; piloting an aircraft can hardly be different. The old maxim "aviate, navigate, communicate" is today as critically important an order of priorities as ever.

Airspace

In addition to staying airborne and attempting to achieve cross country flight it is of course essential to avoid infringing controlled airspace. The prevalence and complexity of UK Airspace means that simply looking at a map would demand far too much head-in-cockpit time. So UK gliders invariably carry GPS driven moving maps with clearly delineated CAS boundaries and audible alarms set to warn some minutes before reaching CAS. All competitive glider flying requires scoring by the submission of secure data-logger flight information. These are scrutinised and draconian penalties applied to any infringement, even if only by a few metres or for a few seconds duration.

This approach means that glider infringements are few; it also means that controllers may be un-nerved by gliders racing up to CAS and turning away at the last moment or routing just outside CAS with the benefit of instant accurate mapping.

While it is possible for gliders to request permission to enter Class D airspace this rarely happens. Crossing any significant distance cannot be guaranteed in a straight line; it might be necessary to deviate or to regain height by circling in a thermal. A controller might at the outset request an orbit or ninety degree turn for the purposes of identification, which could precipitate a loss of height before the requested track was authorised.

The probability of permission not being granted may not be great, but the consequences would ruin an entire soaring flight. When this is added to the issues of radio use mentioned earlier the result is the overwhelming avoidance of CAS – its existence is therefore seen as an impenetrable barrier to cross country soaring flight.

Collision Avoidance

The risks to glider pilots are well known and extensive statistical records allow us to identify and manage them. For example, recent work on winch-launching has seen a dramatic reduction in those accidents. Other significant risks include low level stalling\spinning and out-landing accidents. Further down the statistical list of accidents comes mid-air collision.

The nature of airspace and the necessary seeking-out of rising air means that, once away from the home airfield, the dominant mid-air collision risk is glider to glider. We understand that a similar theme exists for light powered aircraft.

In the European Alps, where snowy backgrounds made the visual acquisition of white gliders more difficult, a simple GPS device was designed to warn individual gliders of the presence of other equipped gliders. This device has proved extremely popular and has been voluntarily fitted by the vast majority of cross-country flying glider pilots in the UK. Because the device gives pilots direct, immediate and pertinent information they value it and justify its purchase as a significant aid to visual look-out. The comparative experience of talking to well-meaning ATC who may call up a busy pilot trying to soar away from low levels with information about a new QNH or a powered aircraft a mile away is not a good one.

An upgraded device “Powerflarm” is also now being fitted to light powered aircraft; it could easily and cheaply also be fitted to commercial aircraft and would show flarm equipped gliders on a simple display.

A further development is that live tracking of glider flarm data is freely available on the internet. Any interested airfield can therefore monitor local gliding activity at the touch of a button.

No doubt further developments, limited only by users’ imagination, will become available in future.

Conclusions

Soaring is arguably the purest form of flight. It is a demanding, exciting and incredibly rewarding sport where engineless flights are regularly made in ways which outsiders could hardly imagine.

Soaring aircraft share the air with others who operate with different philosophies and beliefs. The regulation of our air and our sport is often done by those who may only have experience of those differing philosophies. These few paragraphs are simply an attempt to give a little background to those who might wish to better understand soaring, and its airspace needs.

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