



features

Derek's Favourite Gliders

By Derek Piggott
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Derek, who each month is featuring a sailplane which has given him some interesting flying, writes about the Janus C. He says that despite its shortcomings as a basic trainer it was a lovely glider to fly.



The Janus A was an 18 metre span, all glass-fibre machine with an all moving stabiliser. Apart from the very light elevator forces common to almost all the gliders using an all moving stabiliser, it had excellent handling with a good rate of roll and effective rudder.

Later production models and the Janus C had a normal fixed stabiliser and elevator to improve the longitudinal stability and increase the stick forces. With the object of providing a significant improvement in the performance, the wingspan for the Janus C was increase from 18 to 20 metres. In addition, the wings and the tailplane were further lightened and stiffened by using carbon fibre construction.

As is often the case with "stretched" gliders, the Janus C showed signs of being short of fin and rudder, but this did not seem too much of a price to pay for the greatly improved performance. It had performance flaps with the ailerons moving in harmony to vary the wing camber proportionally over the complete span to keep close to the ideal elliptical lift distribution at both high and low speeds.



The Schempp-Hirth type airbrakes were on the top surface of the wing only to minimise loses through air leakage between the raise pressure air below the wing and the reduce pressure above it. When used in conjunction with the flaps for landing they were reasonably effective and, although fitted, the tail parachute was seldom needed.

All in all this was a very up to date machine and fitted our requirement for an advanced, cross-country trainer for club use and as a stepping stone for a pilot moving on to a flapped single-seater for the first time.

The Janus C taken by Neil Lawson of the White Planes Picture Company.

I will always remember my first impressions of the Janus. It was by far the best performing two-seater I had ever flown and at the time, very competitive with many of the Open Class machines. It is only now after nearly 20 years or more that significantly better performing two-seaters are in production.

I was to make very many interesting cross-country flights in the Lasham Janus and flew it a number of times in local contests. However, the handling demanded a little more respect than most other gliders and it was not an easy machine for an

inexperienced pilot to manage.

My first introduction to its foibles was while checking out one of my experienced instructors. Playing it safe, as he thought, by coming on to the base leg with several hundred feet to spare, he lowered the landing flap, opened the airbrakes and then, realising he would land rather far down the landing area, said to me, "Oh well I'll just need to use a sideslip". I was unconcerned as he applied the bank and full opposite rudder in the approved manner.

To my surprise, after the initial yaw, the nose dropped about 40 degrees and we were facing the ground in a steep yawing dive. This was totally unexpected. The rudder had over-balanced and was locked on and the elevator was totally ineffective until we both pushed hard on the opposite rudder and got rid of the yaw. Phew! That was a close one. A few seconds more and we would have been an accident which might have been difficult to explain.

I was amazed that I had not discovered this characteristic before, as I always explore the sideslipping of every glider carefully on one of the first few flights. But, whereas in my testing I had applied the full rudder smoothly and established the full sideslip without any problems, when I applied the rudder quickly the glider yawed much further and almost always dropped the nose violently with a loss of several hundred feet. If you try this, have plenty of height and don't be surprised at the phenomenal angle of yaw. You get the impression that the glider wants to yaw round and fly backwards!

This kind of characteristic is not unique to the Jauns C and on some machines a rapid sideslip entry, or a quick change from a sideslipping one way into a full sideslip the other, results in some kind of airflow separation on the stabiliser causing this violent pitching. The recovery is always to correct the yaw as quickly as possible.

You are in real danger of losing your tail

Over-balance of the rudder is a fairly common feature in glider designs, whereas it is totally unacceptable in powered aircraft. It happens at any time that a large angle of yaw occurs, such as sideslipping or skidding, and also during spinning. Unfortunately it can occur at high speeds and as our gliders and other aircraft are only stressed for the use of full control at manoeuvring speed V_a (usually 2.3 times the normal stalling speed), and for most machines this will be 80 to 90kts, you are in real danger of losing your tail if the rudder over-balances at these speeds. Moreover, as the speeds increase the force required on the rudder pedal to overcome this over-balance may become too much for the strength of the pilot.

This was the case in WW2 with the Halifax bombers which were lost in numbers before they discovered that the twin rudders were over-balancing during evasive action and that either they were breaking up, or the pilots did not have the strength to overcome the over-balance and they spun down.

I had one or two nerve wracking moments with pilots who insisted in trying to spin the Janus. It would invariably unstall itself and spiral with the speed increasing rapidly and with the rudder still locked hard over in the direction of the spin. Trying to apply some opposite rudder to stop the yaw then involved almost all my strength and it proved quite easy to go from one full lock to the other. Since by this time the speed was at or over V_a , I was put off by this and discouraged our pilots and instructors from doing any more intentional spins in that machine.

Perhaps more surprising and yet seldom realised is the problems that this over-balance can cause to an inexperienced pilot or beginner. Any time the rudder is not use correctly the loads reverse. So going into a left turn with even slightly too little rudder will result in the airflow pushing the rudder further to the right and making matters worse. For a beginner the effect is totally confusing and when, because of the slip the nose drops, he genuinely believes he has lost control.

Similarly with any over-ruddering, the rudder takes over and unless prevented from doing so will push on the full rudder, frequently with an accompanying nose drop. Since the instructor is behind him in another cockpit, unless this is explained and demonstrated, the student, feeling the rudder pedal push against his foot, usually assumes that it is the instructor overriding the controls and making these movements.

Fortunately, in most single-seaters and other two-seater trainers the forces involved when the rudder over-balances are very small and even up to manoeuvring speed can be overcome. But it is my experience that very few pilots ever apply the **full opposite** rudder for their spin recoveries. They believe they are doing so but the rudder load is so much higher than normally required and as a result they seldom move it much further than the central position.

A particular competition flight I will never forget

However, in spite of its short comings as a basic trainer, the Janus C is a lovely glider to fly and I must finish with a mention of one particular competition flight which I will never forget.

The task was a 300km triangle and the forecast was for showers to develop to the north, possible blocking off the second turning point. My "other half", Maria, was in the back seat and we launched into good conditions and used the local thermals waiting for the start gate to open. The first leg proved straightforward and we arrived over Bath racecourse and took our turning point photo before working north.

The weather was obviously changing and the nicely spaced, shallow cumulus gave way to heavier and darker clouds. This was going to be a race against the weather. We managed to keep clear of all the gaggles and work independently, but we had obviously started too late, or not gone fast enough, because ahead it became black. It was clear that it would be difficult to reach

and photograph the motorway junction which was to be our turning point.

Fortunately we were able to make one last climb to about 4000ft, some 6-8 miles short of it, and then it had to be a dash through the rain to snatch the photo and out again. We could see a line of storms going south along the next track and that it was quite hopeless to go that way or to attempt getting through them.

So with the task temporarily abandoned, we turned right round and started on our way towards our first turning point again. Soon the tops of the anvil clouds of the cu-nim ahead were cutting off all the heating and ruining the thermals and progress became very slow. The day looked finished and we crept back using anything we could find.

Out ahead was what appeared to be the very last developing cumulus and on arrival we had a 2-3kt climb. It certainly looked unlikely we would get anything more and the prospect of a long retrieve and late evening loomed ahead. It got very quiet in the glider; Maria was beginning to look forward to a landing no matter where. (Usually this would happen when I was down to 4-5000ft, close to a gliding site where we could be sure of a welcome cup of tea. I would be working hard to stay up and she would be praying hard that I would have to land. Perhaps I should mention that this was often after five or six hours of sitting quietly in the back!)

I was not expecting more than a modest gain of height

As we climbed towards the cloudbase, I checked the map for airspace and concluded that I could use the cloud if it was still working. I switched on the turn and slip indicator, got nicely trimmed into the turn, checked our position on the map and called on the radio to let others know we were going to enter cloud. There was no answer and I could only guess that everyone else had landed out.

The cloud appeared to be just a few thousand feet deep so I was not expecting more than a modest gain of height before final gliding into a farmer's field. But this was not to be. As the cloud close in around us, the lift became stronger and soon we were climbing at 4-5kts in the smooth air. There was no difficulty keeping an accurate speed and a high rate of turn to stay in the good core of lift. Every now and then it would drop off and I would shift the circle very slightly away from where the lift seemed worse and up we would go again.

We finally fell out of the good lift at just over 10 000ft and immediately turned on to the compass heading for Lasham. (No GPS in those days.) Ahead and around us there was no sign of any further cloud or thermal activity. Indeed we never felt the slightest ripple of lift all the way down. Our height allowed us to cross above the Brize Norton control area and my faithful John Willy calculator showed that at 60kts we should have a good chance of a straight glide home, with little or no margin of height to spare.

Seldom have I been so pleased, relieved and happy to get home. We arrived to find the finish line closed down and everyone else had landed some hours before. Yes. A few of the top pilots were quick enough to escape the rain at the turning point and they made very fast times back and completed the task. But I had the satisfaction of having made the longest final glide of my career and at least we didn't have the long wait for the trailer to arrive and the tedium of de-rigging that night and having to rig again in the morning. A day to remember!

