**Lasham Gliding Society**
**Lasham Airfield**
**Alton, Hants**
**Autumn 1984**

# *Memories of Robert Kronfeld*

In the interests of the history of gliding, these memories of the work done by Robert Kronfeld to research the flight characteristics of the tailless aircraft configuration are penned. The aircraft were designed by General Aircraft Ltd. Lasham was the flight test base. It was tragic that one of these machines was the cause of Robert's early death, well before he was able to make his contributions to gliding in the post war era. – BARRIE MACGOWAN, RICS OBSERVER.

This machine was the GAL 56/01. Capt. Eric 'Winkle' Brown, in his recent 'Wings of the Weird and Wonderful', published by Airlife Publishing Ltd., simply calls it 'the worst aircraft I have ever flown'.

My story begins on October 18, 1946. Just hearing the bare facts of the flying that day washes one with the nostalgia of an era which disappeared rapidly after the war. Took off, incredibly as it seems now, from Heston aerodrome, in Mosquito B16, PF606, with the great Tim Wood, General Aircraft's Chief Test Pilot. The log book shows 15 minutes to Lasham, my first introduction to this famous location.

GAL was just starting on the flight testing of the Mosquito TT39. The contract was for a reasonable production run. The TT39 was a conversion from the B16. It had a redesigned nose for observation, and a winch, a turret, and an operators station behind the wing. Our flight that day in PF489, the first prototype, was for general handling and to take some preliminary longitudinal stability measurements. This beginning of my Test Flight Observing at Lasham, which was to last until October 1948, was a long 45 minutes.

Back into PF606 to complete the delivery to GAL by flying back and landing at Hanworth Air Park, would you believe? This was the location of GAL's factory at Feltham – now EMI. And, on the way up, just for a further measure of nostalgia, let me tell you that we passed and waggled our wings at another GAL pilot in the little all-metal GAL Cygnet. What a day to look back on as an introduction to two years of test flying at Lasham!

Now, how does Robert Kronfeld enter this Merlin 76 and 77 powered scene?

As you read the following, remember one thing. As a young man, I had no interest in gliding at all. The sport had been interrupted by the war, and was thus only represented by Hotspurs, Horsas and Hadrians, and Hamilcars. I was a power man, and therefore really wasted this opportunity to get to know Robert and learn about his experiences. Thus this narrative will leave many things unanswered for the enthusiast.

### Tailless Gliders

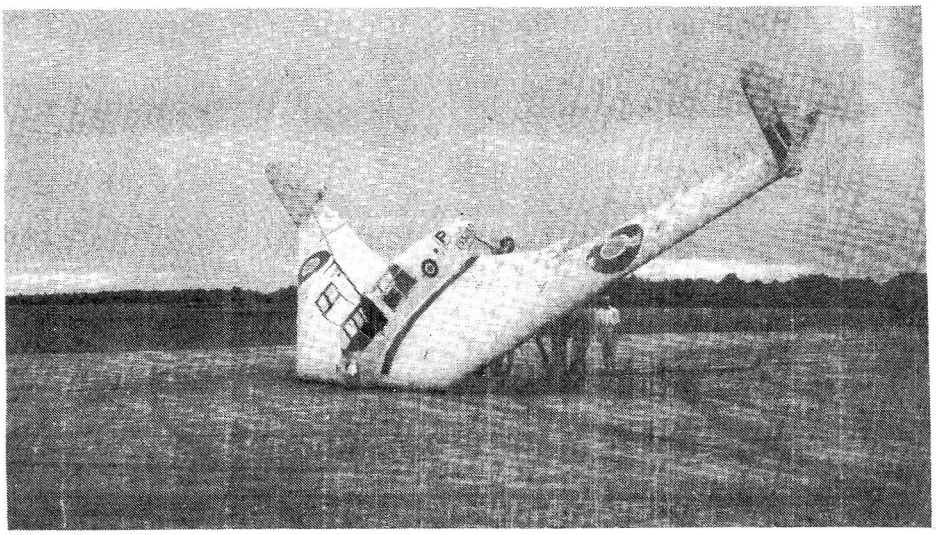
GAL had a contract to design and build, in wood, as befitted the constructors of the Hotspur and Hamilcar, 4 tailless aircraft for research into the characteristics of the 'flying wing'. This configuration was of considerable interest to designers in the 1940s, and little practical experience was available in UK.

The GAL 56/01, TS507, the 'worst aircraft I have ever flown', was a straightforward V planform with an average sweepback of 28.4 degrees. Its sister 'V-wing', with 36.4 degrees, was TS513B, the GAL 56/03. The third aircraft we flew was called the 'U-wing' (GAL 56/04, TS510D). Its centre section was unswept and parallel, but the outer sections were swept to give an overall average of 28.4 degrees, thus giving a comparison with the 56/01.

The fourth was never flown. It was the inevitable 'all-wing', i.e with no fuselage, intended for prone pilot and observer. From this you will realise that the other three had a comfortable and capacious fuselage for the crew to sit up in the normal way.

I believe that Robert, who had been development flying at the Airborne Forces Experimental Establishment (AFEE) at Beaulieu, had an involvement in the planning of the programme. He told me that a judgement had to be taken whether quicker results could be

obtained with 4 powered aircraft which were weather independent, or the much simpler glider format. It was decided that the addition of an engine would have contributed the delay of an engine related design and installation development programme. Experience suggested that it would add more time than waiting for the right visibility to run the glider programme. This was planned as a launch from 15,000 feet to give time for an effective test period, and still leave enough time to return to the airfield. Clearly the Airborne Forces Experimental Establishment had the practical experience to give this advice. However, I suspect that it needed a pilot of Robert's skill and familiarity with gliding to make this a feasible proposition in a short time scale.



*FAILED LAUNCH*

*GAL 56/04 tailless glider in an embarrassing attitude after the tow rope had broken. Photo taken at Lasham in 1948, during attempts to restart the programme of testing these demanding machines. Take off and landing were particularly tricky due to large trim changes.*

### Halifax Tug

My involvement began on 26 April. The logbook records commence with the first of a series of personal familiarisation flights in the Halifax tug, which was always flown by Gerry Brownrigg. This was a Mark III, NA295. Robert, with Derek Brade, GAL's chief of Flight Test as his Observer, was doing the 'Contractor's Flight Trials' with the U-Wing, and on the 30th of May, the first flight of the 36 degree V-Wing. The pattern of the trips was a climb to height of 15–17,000 feet, and cast off. The glider times averaged 30 minutes. This implies, and I can't remember, that Robert had to fit the testing into not a lot more than 5 minutes!

It would appear that the 'Beastie' V-Wing had been handed over to RAE some time previously. Concurrently with our Lasham flying, 'Winkle' Brown would have been completing the testing which he describes in his book. He completed his testing, and delivered TS507 to us on August 28th. In April and May, the two other machines were at the preliminary stages of acceptance. Thereafter we continued to fly them in the 'Research Programme' instead of passing them over to the Ministry. This suggests that GAL had accepted the full Research Programme contract, on the assumption that Robert would be the pilot throughout.

Around this time, Geoffrey Chalmers joined us as second observer. This means that what I report to you is incomplete for he mostly flew in the V-Wings, and I in the U.

Until the 12 Feb 1948, which has to be described on its own, I was observer on 19 U-Wing tests, and 5 in the 36.4° V-Wing. This averages out at 4 trips in a month. If Geoff's flights were included, and I have no number for them, we were probably getting not much more than 1 hour's actual test time in the air in a month. Clearly the test pilot needed a high degree of skill to make a success of the programme. There had to be no wasted flying.

Although there seems to have been a period of no flying for me between 21st June and 19th October which I cannot now explain, the small number of flights was generally because of the need to wait for the right visibility and cloud conditions to be sure to get down safely. However, the records show that when the weather was right, we would do 2 or 3 trips in a day. All this contrasted with the later Mosquito testing, in which we once made six flights in one day, and usually 10–15 in a month.

### Spinning

However, the testing went along well from the start. On the U-Wing there were 5 flights to obtain the Position Error measurements at different C.G. positions and to get our instrumentation set up. This aircraft was the most stable, and easiest to fly of the group. There was never any concern with this planform, even when it went into a spin after the 4th stall of the Research Programme. Robert was very intrigued about this spin, which was the only one we had in any of the three. He had no difficulty in recovering after a couple of turns.

One proposed method of control of tailless aircraft was to use rotating wing tips. This was explored very simply on the U-Wing. The wing tips could be set at fixed angles on the ground, and the effect of this on trim was measured in the air.

The wings were also fitted with wool tufts, so that we could observe the progress of the stall. These flights were in progress in early 1948. Robert also did drag measurements in which we measured the rate of descent at different speeds.

The last flight with Robert in the U-Wing was the 9th of February, three days before the accident, in which he was further exploring the effect of the movable wing tip sealing on flaps up stalls at the mid C.G. position (23 pc.).

### 12 February 1948

Now we arrive at the day of the fatal flight. 'Winkle' Brown says that Robert was only going to use TS507 to repeat some tests in order to get more experience. We all must have been apprehensive about the aircraft, but at the same time a bit excited, because in spite of the concern, I arranged to take over this trip from Geoff Chalmers, who you will remember, normally did the V-Wings. A bit of experience for me, too!

As we climbed up in the pleasant February sunshine, I really thought to myself – 'I'd better have a good look round at England because it might be the last time I see it!' – it's absolutely true.

After release, Robert went straight to flaps down and approached the stall. As you can read in detail in 'Winkle's' story, this aircraft, as did all the others, had a strong nose up pitching moment below 70 mph, which developed into a self stall. In order to control this for accurate test flying, Robert's technique was to approach the stall with elevator trim fully forward. This reduced the amount of forward push required on the stick. He was thus able to some extent to control the rate of stall for best instrument readings.

The stall duly occurred, and was followed by some fairly violent lateral and pitching oscillations. Next the V-Wing settled into a steady stalled condition in which it was sinking on an even keel. Robert reported that there were no combinations of control he could find to get out of the stall, presumably because the stalled airflow left the elevons ineffective. In later years, I came to read about the 'deep stall' condition met in high tailed aircraft, and felt that this must have been similar.

So it was then flaps up, and stick forward. 'Winkle' again reports that the aircraft would nose slowly down until level, and then fall into a steep dive before control could be regained.

**200 Knots**

Things happened very rapidly, and when I resumed my technical interest, I saw that we were now going straight down at 200 knots! At this stage Robert realised that the machine was out of control and decided to abandon ship.

In reconstruction, it appeared that the rapid dive after the stall, with the elevator trimmer at fully forward, resulted in the build up of large forward stick forces which were overpowering. Calculations suggested that Robert was pulling back with up to 80 pounds, yet the aircraft was still accelerating.

The first action to escape was to reach up to jettison the canopy. In so doing he would have lost about 30 pounds pull on the stick. Again, later calculations suggested that would have resulted in an immediate 5G negative. Certainly, the next thing I remembered was my portable oxygen bottle hurtling past my left side, and crashing into the canopy. At that stage we both 'redded-out' in this negative G. Presumably as Robert became unconscious, and released all his grip, more negative G followed.

I am perpetually grateful to GAL's designers that in spite of probably being above VNE, the aircraft remained in one piece and absorbed such a punishment.

**Inverted**

At some later stage, I briefly recovered consciousness. The aircraft was upside down, perfectly stable, and certainly not in a spin. I realised that Robert was also still in the aircraft, not answering, but I could not get to him in the tandem

cockpit arrangement, separated as we were by a substantial structure. I didn't seem to make any conscious attempt to move, and redded out again.

Then some time later, quite automatically, and literally in an unseeing red haze, I found myself jettisoning the canopy, releasing the seat harness, falling straight out of the upside down TS507, pulling the rip cord. The opening jerk of the 'chute cleared my eyes, so that I was able to see to land. The great tragedy of the affair was that Robert must never have recovered consciousness at all. This was later related just to his age. The one consolation to us all is that he certainly was never aware of the descent or crash, and therefore did not suffer any fear or pain.



This has been a very unhappy story.