

The Elite Twister

*Will the Extra 300S help Britain win a Gold?
We test the plane and meet the pilots.*

*Story and images by **Nick Bloom** Aerial photos by **Keith Wilson***



The single-seat, low wing variant of the Extra 300 is certainly attractive. In Unlimited aerobatics, it balances ease of mastery and performance.



Twister. G-IIUII was imported from Czechoslovakia by Mark in 1993.

The Extra 300 prototype first flew in 1988. It had, for that time, a hugely powerful 300 hp engine, which gave it a power-to-weight ratio to compete with the Su-26, the Russian design that was then beating all comers. Like the Sukhoi, the Extra had a composite wing mounted in a steel tube fuselage, but, unlike the Russian design, a relatively simple structure and no expensive titanium alloys. The Sukhoi had the edge in performance, but the Extra was easier to fly.

There was another reason why the Extra 300 created such a stir—it had a passenger seat. A second seat seemed completely illogical in an aircraft designed to win the World Aerobatic Championship, but was to prove a shrewd marketing move. Unlimited aerobatic pilots were able to take their girlfriends, and, more importantly, sponsors and sponsors' customers for joyrides in the same aeroplane they flew in contests and displays.

TAKE TWO EXCEPTIONALLY talented aerobatic pilots, provide them with a world-class contest aircraft and trainer, and possibly... just possibly... Britain might finally win a Gold at an international Unlimited Aerobatic Championship. So what? Well, when the French team reached the top a few years back, the resulting publicity in TV and press boosted the number of student pilots and airshow attendance, and provided much-needed positive PR with French government and public.

The pilots are Mark Jefferies and Kester Scrope, their trainer is Alan Cassidy. The sponsor is ExxonMobil Aviation Lubricants, and the aircraft an Extra 300S named The Elite



Because it could take a passenger, the aircraft subsequently sold to customers who weren't interested in contests or display flying, but wanted an Aston Martin of the air—a hot, but practical, tourer. The Extra 300 not only had a fantastic climb and roll rate, it cruised at 190 mph, flew 600 miles without refuelling, sported a full IFR panel and even had a reasonable space for luggage.

The prototype of the 300S was produced in 1992. This model was designed purely for aerobatics contests, so had a single seat. Also, perhaps since the low-wing CAP 232 was doing so well at World Unlimited contests, the 300S had its wing set low in the fuselage, whereas the original design was a mid-wing. A mid-wing is an advantage in an aerobatics contest because the symmetry makes an axial roll look more axial, but in the 300 it utterly blanked off the pilot's forward view when landing, since the pilot sat behind the wing. (In the Extra 230 single-seater, from which the 300 was developed, the pilot sat in the wing and had a better view.)

The 300S, and the two-seat low-winger that followed it a year later, the 300L, were immediate successes; the slight disadvantage of an asymmetrical profile for aerobatic judging was quickly forgotten. To date, 32 of the 300S model have been built and 190 of the 300L, as against

Mark, Kester, and trainer Alan



SO WHO EXACTLY are this talented trio? Kester Scrope, 34, 650 flying hours, married to Marianne in 2000—the couple are expecting their first baby as I write—is hugely likeable, the Andrex puppy of aerobatics. He was educated (“by monks”) at Ampleforth, where alcohol and smoking were permitted. “I played a lot of cricket.” One summer he worked harvesting on a farm to pay for a week’s gliding, including aerobatics. After school he worked on a ranch in Wyoming, rode a bull in a rodeo, broke a wrist and elbow and studied for a history degree at Newcastle, but only got a 2.1 because he was busy flying Bulldogs in the University Air Squadron. He got his pilot’s licence having lost his driver’s—“part of growing up”—at age 24. At this point he was selling cardboard boxes around industrial estates. He later became Sales, and then Managing Director of the cardboard company. Nowadays he’s Director of Pursuit Dynamics plc. Kester’s uncle kept a Piper Cub on a farm strip in which Kester flew 100 hours in his first year of having a PPL, “looking for the shortest, dirtiest strip to land on”.

His first aircraft was a Topsy Nipper (“control jams and engine failures”), then he bought Stuart Goldspink’s Pitts Special (“in a pub”). Kester, who has a lovely, self-deprecating smile adds, “I flew, perhaps with rather too much enthusiasm.” He lent the Pitts to a friend, who crashed it. A somewhat chastened Kester joined Alan Cassidy’s group and flew a Pitts S2A and CAP 222. With the benefit of Alan’s training and the CAP, Kester was soon making his mark in international contests at Advanced level, placing fourth in the qualifying programme in 2000 and ninth in the much more demanding Free. In the 2002 World Advanced, he hit Silver and moved up to Unlimited. This year he won the Icicle Trophy and came fourth in the Welsh Open, which Mark won.

Mark Jefferies, 42, 2,500 flying hours, married to Cathy, father to Tasmin, 9, and Tara, 7, first met Kester nine years ago. “He

was standing at the pumps and said if he refuelled my Yak 52, would I give him a flight in it. I thought ‘cocky little s***’, took him up, flew an outside loop.” (An outside loop begins and ends inverted and inflicts around 3.5 negative g—blood pools in the head.)

“Yes,” says Kester, “but I loved it.”

Leonard, Mark’s father left his sons a farm and airstrip. Mark (competent, a little brusque, unassuming) learned to fly in a Bellanca Scout in 1980, went straight to aerobatics and soon began winning contests, first in the Bücker Jungmann he restored, then in the Laser. He built the Laser himself. Mark and brother John turned the airstrip into a thriving airfield, Little Gransden, ran the farm, and set up a business importing and servicing Russian aircraft, Yak UK. Mark doesn’t just fly contest aerobatics, he is one of the UK’s top four or five airshow performers. He has been British aerobatics champion six times, covering all levels, and has scored several times in the top five at international contests. In recent years, though, the Laser has held him back. It’s both small and underpowered with just 200 hp, though world-class fifteen years ago (and Mark built one of the best).

Trainer Alan Cassidy, 55, 4,000 flying hours, married to Angela, was a Wing Commander in the RAF, took early retirement and set up an aerobatics school at White Waltham with G-STUA, the Pitts S2A he’s continued to operate for the last thirteen years, trading as Freestyle Aviation. Alan’s face is creased with laughter lines, he’s a plain speaker who exudes authority. He has flown contests in a wide variety of aircraft—including, for some years, a Yak 55—but recently his favoured mount has been a CAP 232. Alan has won the British Unlimited championships four times and has placed in the top five internationally at Advanced and in the top twenty at Unlimited. His aerobatic instruction book, *Better Aerobatics*, is a bestseller and he’s a regular contributor to *Pilot*.

135 of the Extra 300 that started the line.

Why would anyone want a single-seat version when a two-seater is available? The 300S is only a bit less expensive than the 300L. It is, however some 50 kg lighter, and smaller—roughly a foot in length and a foot in span, which gives it a slight performance advantage. Having to accommodate only one person, the

cockpit provides a better view out, along with increased comfort and space. There is also the subtle but important psychological factor of knowing there are no compromises. The most important difference is that the centre of gravity of a single-seater is not subject to the vagaries of different numbers of occupants, so that spin and flick-roll characteristics are always the same.

It’s been at least half-a-dozen years since I flew an Unlimited aerobatic aircraft, but Mark and Kester let me fly their 300S, reasoning that the design is docile enough for even me to survive. After strapping on a parachute, I climbed in. The seat reclines to enhance g-tolerance and is very comfortable. I noted a generous luggage space behind it with a polycarbonate see-through floor for



Big, no nonsense throttle lever on the left. Push rod below it sets propeller pitch—advance for maximum performance, but beware noise complaints from over-revving. Instrument panel's main function is to keep out of the way. Don't be fooled by the polycarbonate floor—the pilot looks ahead, up and to the side.

checking that nothing has worked its way into the rear fuselage.

While I did up the dual straps, Kester ran me through what I'd need to know for a successful flight. There really wasn't much: an electric fuel pump to prime, then switch off; a mixture control to set lean while cranking the engine, then rich when it fired; a plunger for setting the prop to 2,500 rpm for (relatively) quiet aerobatics over the field if it needed resetting (full fine for take-off is irrelevant with this much power).

He made sure I'd locked the canopy, then stepped back. Time to go.

The engine made a lot of noise, but felt smooth. The toe-brakes were effective. In the 300S, you do still sit behind the wing, as in the 300, but you get a pretty good view over the nose and also over the wings. Turn your head left and the sighting wires are dead in line. Taxying was fine, with the exhilarating feeling of being absolutely in control (unobstructed view out, instant throttle and brake response, positive steering), but also of riding a well-trained Bengal tiger.

Lined up, I eased the throttle and

the tiger roared and leaped along the runway. The acceleration was impressive and with a partly-obstructed view, I worried whether we were running straight, and how much runway was left. Mark had suggested leaving the tail down, but Kester had said I could raise it, so I did. Much better—plenty of runway and running straight. Nice rudder and elevator gearing: no feelings of twitchiness, just firm, positive control. The aircraft was clearly ready to fly so I moved the stick back. We were off.

Keeping to the recommended climb speed, I discovered, meant flying very nose-high and my internal, ancestral monkey was beginning to gibber with fright at the vertical acceleration—at this rate we'd soon be leaving the atmosphere. Levelling off at 2,500 I banked through a couple of circles to get my bearings, then—you don't muck about in a borrowed 300S—set about flying some aerobatics.

I didn't fly any good aerobatics until I'd reduced to two-thirds throttle, cut back on the g and roll inputs and lowered my ambitions to the quarter- and half-vertical rolls,

Aerobatics Contests

CONTESTS IN THE UK are held at five levels of progressive difficulty: Beginners, Standard, Intermediate, Advanced, Unlimited. World Unlimited and European Unlimited contests have been staged in alternate years for several decades. World aerobatics contests were held in the thirties, and older readers may remember the Lockheed Trophy contests in the sixties. However, these were small-scale, primitive affairs, though attended, unlike today's events, by large audiences. Spanish aerobatic display pilot Colonel Aresti (he flew a Bücker Jungmeister) developed a standard annotation and scoring system, which revolutionised the sport.

In the last dozen years, Unlimited aerobatics became somewhat oversubscribed. It also grew rapidly more demanding on both machinery and pilots. Accordingly, international contests at Advanced level were introduced and have become increasingly popular. Contests at Advanced and Unlimited level begin with Programme Q (which used to be the Group I or Compulsory Programme). This is designed to reduce entry numbers by eliminating the weaker competitors. The Group II (also called Free Programme) is a test of creativity, since it is composed individually by each entrant to complex rules. The Group III is also known as the Unknown Programme—because unlike the previous two, the sequence of manoeuvres is sprung on the competitors the night before they are due to fly, and they are forbidden to practise. The Group IV (not always staged) is a four-minute Freestyle... an aerobatic display flight judged for its entertainment value.

Cuban eights and four-point rolls I usually fly. The 300S could fly this kind of stuff all day long without straining the pilot's body or brain.

Mark has fitted a weighted vane as part of the sighting ironmongery on the wingtip. To make a stall turn you hit the vertical and hold it until the weight is no longer held up by the airflow, at which point the contraption flops over, you kick on left rudder and pivot as neatly as a disco dancer.

Back in the eighties, I flew a 200 hp Laser in Unlimited contests. This

was the design that was eventually developed to become the Extra 300S I was flying now, so comparisons are interesting. I could see similarities and differences between the 300S and its, for me, more familiar ancestor. The view from the Extra is several million times better. Both aircraft are brutal and willing to inflict pain if you push them to their limits.

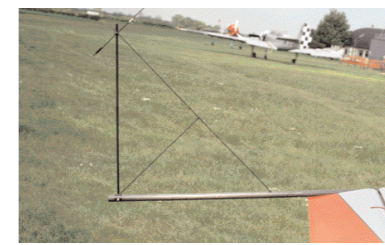
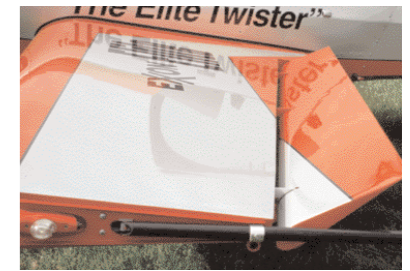
Some things have not improved. In both aircraft the wing is reluctant to stall, so instead of spinning, you can easily get a (zero in competition) semi-stalled spiral dive, and flicks, if not entered with the right degree of viciousness, are nothing better than ultra-rapid barrel rolls. In the Extra 300S I tried a half-dozen flicks from various speeds and attitudes, and only one (confirmed by Mark, who was watching and giving me feedback on the radio) was successful. On that one I'd been vicious. On the other hand, at a ludicrously low speed I pushed out after a stall-turn and completed the push with a low-speed, negative half-loop. The wing was buffeting and complaining but didn't stall. It made such a tight radius that it had Mark laughing.

The Laser had been murder in rolling circles. There was just one speed at which it could be made both to yaw and not lose height, 120 mph—any faster and the rudder wouldn't work. In the Extra, speed was not critical and I was starting to make sense of rolling circles even on this first flight.

Roll rate seemed a lot faster in the Extra—too fast for me. Full deflection made my head hurt. My clumsy attempts at full deflection worked. Kester told me that he and Mark like to keep the tailwheel off the runway to save wear and tear. I used to do the same in the Laser, but you have to be in practice.

We repaired to the pub for sandwiches and questions. Just how do you make the 300S spin? Mark told me, "Stick back, trickle of power and you nudge forward elevator to make the nose drop at the stall, then

maintaining the fast approach speed and on skimming the hedge without actually hitting it. I managed both, closed the throttle, levelled out over the grass and waited for the speed to dissipate. As the aircraft slowed, I had to raise the nose to keep flying, and lost most of the view ahead. A moment's fright—had I zoomed or introduced some aileron?—and the wheels touched. Mark's voice on the radio: "Greaser!" Feeling absurdly pleased, I let the Extra slow, braked, turned and taxied in. Once down, it had run straight by itself, so the self-centring in the castoring tailwheel works. Kester told me that he and Mark like to keep the tailwheel off the runway to save wear and tear. I used to do the same in the Laser, but you have to be in practice.



Just look at those control deflections, and those massive ailerons! The penalties for a flightpath a few degrees off vertical or 45° lines are horrendous, thus the wire sighting device on each wingtip (upper left photograph). Align the appropriate wire with the horizon, allow for wind, judges' position and you might get a high score.

close the throttle and apply full rudder and elevator." Then he added helpfully, "It's a matter of asserting yourself with the aeroplane."

I asked how the Extra compared with the leading rivals, the Su-26 and CAP 232. One advantage of the 300S over the CAP 232 is that the pilot's seat is easier to adjust, which makes it better for group ownership. It is also probably easier to learn on, having more stability. Being a little further behind the wing gives the pilot a better view downwards. The CAP, having larger control surfaces, provides more authority and can snap roll at slower speeds. The Su-26 has to be flown faster, requires more muscle and is a lot more tiring to fly. It uses one-third more fuel and, in the opinion of both Kester and Mark, is no more likely to win than an Extra or CAP.

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Why 'The Elite Twister'?

'TWISTER' REFERS TO a unique manoeuvre in which Mark Jefferies starts with two left rolls on the axis of the aircraft, then rolls right and sideways, snapping around three times to a vertical position at zero airspeed, after which he barrels back through his own flight path. 'Elite' is a reference to the sponsor's flagship piston-engine aircraft oil, Exxon Aviation Oil Elite 20W-50, a semi-synthetic, multigrade product introduced in Europe in 2003.



(Above) Kester Scrope, graduate of Ampleforth, 'the Andrex puppy of aerobatics', showing his spiritual side, and (Right) in a tie, off to make a living in the real world.



airframe and engine when imported from Czechoslovakia. It had been stored for a while, following the death (in an unrelated flying accident) of its previous owner. There are always risks when an aircraft is returned to service, and on Kester's second flight, the engine failed—the result of hidden corrosion. His skills and the aircraft's tractability got it back on the ground undamaged. Kester subsequently flew G-IIUI

1,200 miles to Lithuania for painting at Yak UK's facility there—Mark flew it back in April 2004.

Since then the pair have been hard at work. As an indication of how serious they are, Kester crash-dieted through March and lost a stone. In the twelve weeks to the Welsh Nationals, which Mark won, they flew 25 hours.

A typical practice flight lasts fifteen minutes chock-to-chock, with every third flight watched from the ground, if not by trainer Alan Cassidy, then by whichever partner isn't flying. Training at Unlimited level tends to be concentrated into the week before a contest. Unlimited contest flights are so demanding, that even thoroughly g-exposed and fit people like Mark and Kester can only manage three a day. Today's aerobatic syllabus contains too many manoeuvres for pilots to rehearse them all, and it takes shrewd guidance from trainer

Alan to direct the schedule for each practice flight.

The first test for the aircraft was at a UK Unlimited contest earlier this year. Mark won, and Kester came fourth. (Trainer Alan came second flying a CAP 232.) The first international test was the European Unlimited contest in Lithuania on 22 July—result awaited at the time of writing.

In the meantime, Mark is flying at airshows—Kester supplies the commentary—promoting their sponsor. Kester adds, "Our engine has a rough time, corrosion in the winter lay-off, high wear from rapid heating and cooling in addition to g-induced stresses, and with Exxon Elite we know the oil gives maximum protection and reliability." The sponsorship allows them to employ a trainer and put in more hours of practice... and the sponsor gets the satisfaction of supporting European Unlimited aerobatics. ■

Teams and Individuals

AT FIRST SIGHT contest aerobatics is a me, me, me sport, with each lonely pilot fighting for himself... or herself. Women are ranked separately and compete in substantial, though smaller numbers than men. To an extent it is selfish, because each contestant is seeking perfection, that sense of immaculate control over machine and setting which can become so addictive. The sport derives from display aerobatics and it has a strong element of showing off, as does acting or playing music in public. Performers seek applause. The difference between contest and airshow aerobatics, is that contestants are only satisfied with the applause of experts—judges and fellow pilots. They are competitive, but they know that ranking isn't really the point, it's the percentage of the maximum possible scores and the knowledge that they are getting better. After a while, there is a strong incentive in just

taking part.

When two or more pilots share an aeroplane, they help each other. Each country fields a team; increasingly, the team practices together under the guidance of a manager (Alan in the current Europeans) and members give each other strong mutual support. Mark Jefferies explains, "The first team member to fly an Unknown can give pointers to the others: the heights you need to be at for different stages of the sequence, ideal speeds for entering each manoeuvre, the wind strength and direction at different altitudes. In a sense, we're all competing with each other, but no one doubts the pointers for a moment. There's absolute trust within the team."

Aerobatics at any level is expensive and time-consuming, but international aerobatics requires a huge sacrifice. At least the sponsor is absorbing some of the pain.