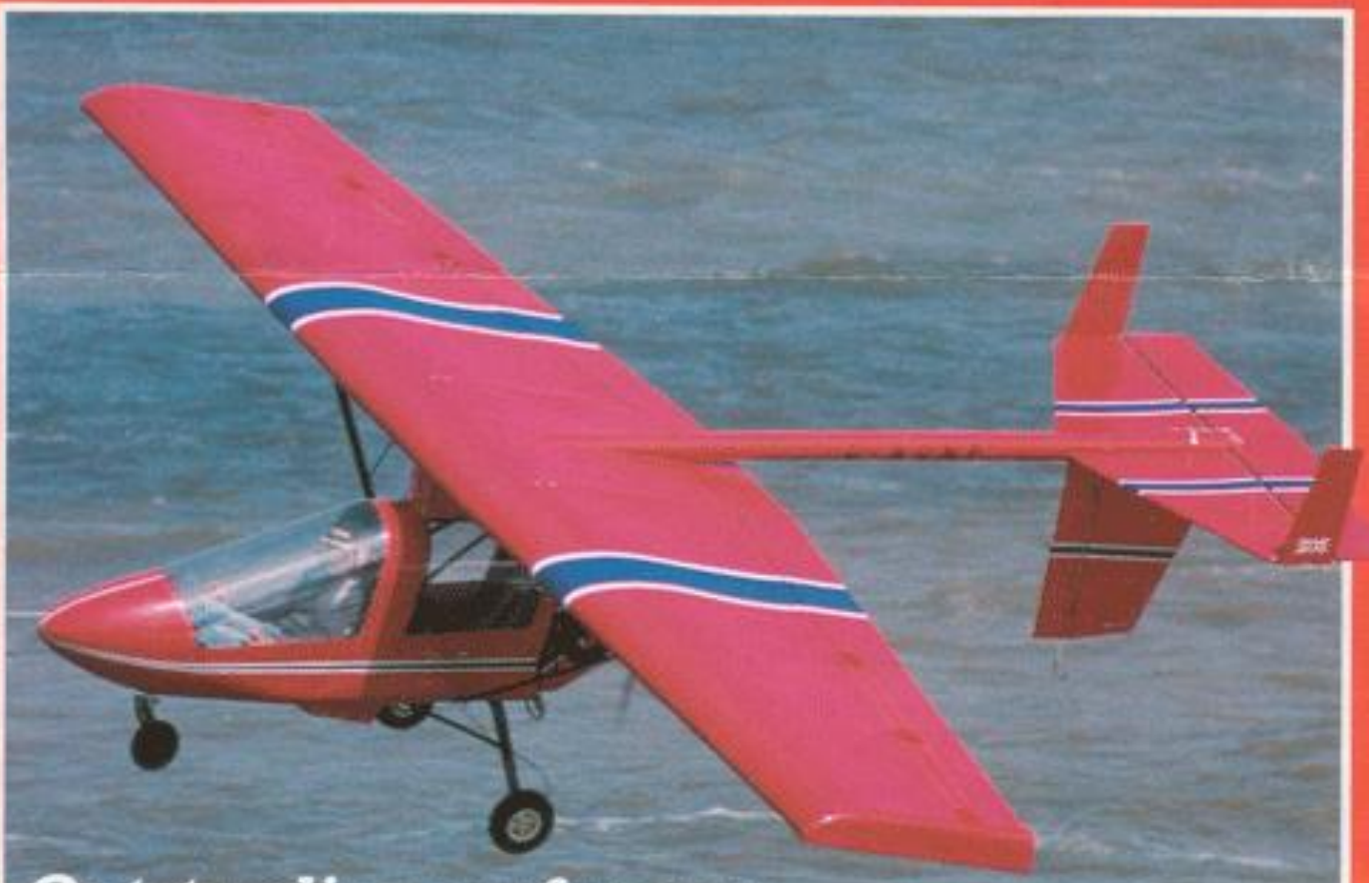
Pilot

September 1989 £1.50



Outstanding performer: CFM's new Streak Shadow — now a kitplane.

The ups and downs of glider-towing.

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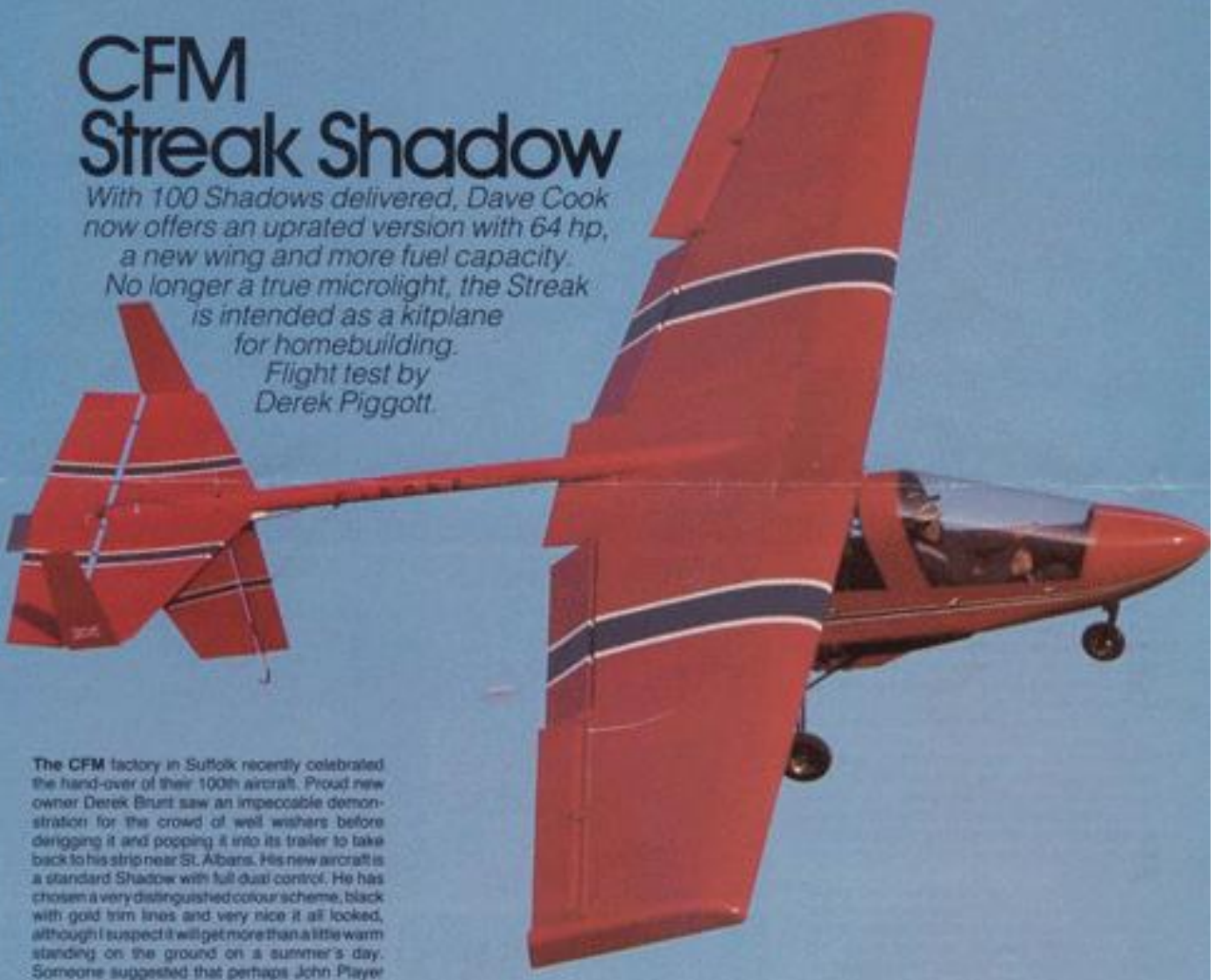
300hp two-seat hot rod: Socata's Epsilon military trainer.

CFM Streak Shadow

With 100 Shadows delivered, Dave Cook now offers an uprated version with 64 hp, a new wing and more fuel capacity. No longer a true microlight, the Streak is intended as a kitplane for homebuilding. Flight test by Derek Piggott.

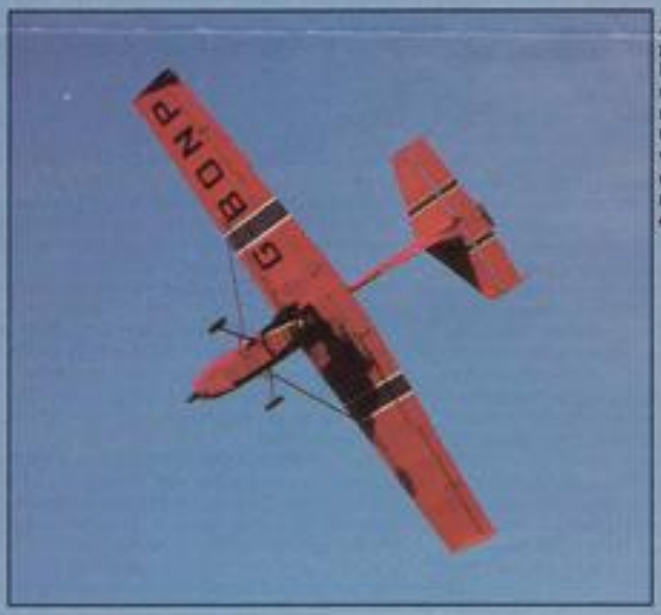


The CFM factory in Suffolk recently celebrated the hand-over of their 100th aircraft. Proud new owner Derek Brunt saw an impeccable demonstration for the crowd of well wishers before derigging it and popping it into its trailer to take back to his strip near St. Albans. His new aircraft is a standard Shadow with full dual control. He has chosen a very distinguished colour scheme, black with gold trim lines and very nice it all looked, although I suspect it will get more than a little warm standing on the ground on a summer's day. Someone suggested that perhaps John Player would want to sponsor him when they see his nice paint scheme?

The handing-over ceremony was quite an occasion, with all the staff and shareholders of CFM and many of the local dignitaries present. The designer, David Cook, likes to be known as a mechanical engineer who flies, and is the managing director and founder of CFM Metal-Fax Ltd. He is justly very proud of their achievements, and pointed out that there are very few light aircraft companies in the UK who could claim to have made over 100 aircraft of the same type.

The prototype Shadow is a true homebuilt aircraft and was made in David's garage. It first flew early in 1983, and is still flying. It was awarded a British Engineering Design Award in 1987. Shadows have many long-distance flights to their credit, including two flights to Australia and one to India. It is used for basic instruction by four microlight flying schools in this country, and also for observation and patrol duties in several foreign countries.

The party and flying demonstration was held on the local cricket pitch in true barnstorming style. David demonstrated his latest design, the Streak Shadow. This is an uprated Shadow using the more powerful Rotax 532 developing 64 hp. The wing has been thinned and shortened and the fuel capacity increased to twelve gallons, giving an increase in the maximum take-off weight to 900 ⏵



As well as more power the Streak has a thinned and shortened wing and more fuel capacity; the 900-lb take-off weight puts it outside the microlight category.

Triple-fin arrangement may not be the most elegant, but it works well at all speeds. Dave Cook parks his Streak and the trailer he occasionally transports it on a cricket pitch that is also his 'aerodrome'. The Rotax 532 is twin-cylinder, water-cooled: starting is by toggle, with an electric starter an option.

pounds. This takes it outside the microlight class except possibly as a single-seater machine.

Because it is classed as an ultralight in the UK and as an Experimental aircraft in the USA the Streak will only be available to homebuilders in kit form. The standard Shadow, being a true microlight, is produced as both a kit and a completed ready to fly aircraft.

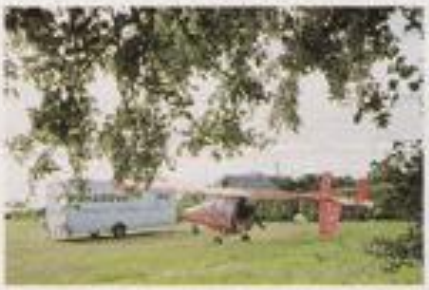
Would-be owners of the Streak will have to join the Popular Flying Association, assemble their aircraft from the kit and get a full PPL Group A licence. Assembling the kit is not difficult, and already some 45 owners have bought kits. Unlike the usual kit story we hear of from the USA where the majority of kits never get built, David says that to date of the 45 kits all but six delivered are already flying.

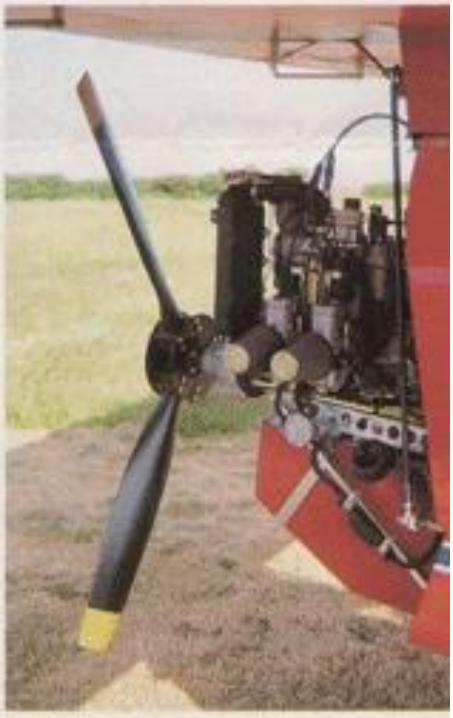
The kits come with all the fittings nicely plated and finished, all welding completed, the foam ribs cut out and the main spar and leading edge torsion box completely finished. No special jigs are required for assembly, and the fuselage components — which are mainly of glassfibre and impregnated paper honeycomb sandwich — are precision cut and drilled, making it almost impossible to assemble them out of true. The factory only turns out kits, and if a customer wants a finished aircraft a kit is drawn from stores and assembled at the works.

Producing the completed aircraft will not be possible with the Streak, which is too heavy to be classed as a microlight. Being a normal light aircraft, it cannot go into series production without costly CAA certification, and this is simply not a viable proposition for such a low-cost aircraft.

The Streak has a similar-looking wing to that of the Shadow, but the normal thick fifteen per cent has been thinned to twelve per cent and the span reduced from ten to 8.53 metres. Owners of a Shadow could possibly upgrade their machines by building the new wing, changing the fuselage boom and windscreen and changing the engine. Everything else is standard and interchangeable.

The idea of putting the more powerful Rotax 532 into the Shadow is not new. Tests were done several years ago seeking improved performance for hot-and-high airfields, and for the sea-plane version. However since the standard Shadow fitted with this engine could exceed V_{no} in level flight, the Streak was designed for the higher speeds possible with the bigger engine. The results are impressive.





As I had not flown a Shadow for some years David sat in the back while I had a quick flight round the airfield to get used to it and to make sure that I wouldn't get lost in the poor visibility. After this he climbed out to let me explore the aircraft more fully.

The superb view ahead and the effective wheel-brakes and rudder make it easy to taxy. Cockpit checks are minimal: trim set, choke in, fuel on and sufficient, flaps set up or down one notch for a short take-off, and harness and hatches secured.

The side-stick control seems a little strange for take-off, because apart from looking out to an aileron, there is no clue to the central position. However once in the air you just fly the aircraft, and the position of stick comes naturally.

Opening the throttle fully makes the Streak leap forward, and with the aileron neutral and the stick

right back the nose-wheel leaves the ground almost immediately. A very small check forward holds the aircraft in the take-off attitude, and a few seconds later it leaves the ground and is way above the normal climbing speed of 60-70 mph.

The climb is impressive, though perhaps because of the hot and extremely humid weather, not quite the 1,600 feet a minute suggested in the brochure. The stalling is practically unchanged with the smaller thinner wing, and at my weight (180 pounds) and cg position there is no stall break unless the nose is raised to a ridiculous attitude. Really abusing the aircraft by applying full rudder and a little power with the nose sky-high, there is a gentle gradual nose and wing drop which can be stopped by either the rudder or aileron. It is completely controllable down to an indicated 40 mph and with full flap I could get down to 31-32 mph indicated with a little power on. However as there haven't been any position error checks on the ASI system and it is using cockpit static, these speeds may not be absolutely accurate. Most impressive is the effect of applying full power at very low speeds; the Streak simply romps away accelerating like a scalded cat.

The general handling is almost unchanged except for the small increase in stalling speed. (If you can call the docile mushy flight at low speed with the stick hard back a stall.) The adverse yaw is not excessive, and rolling from about 45 to 45 at speeds between 60 and 80 mph takes about three seconds. The sideslipping is normal.

An optional extra on the Streak is a very clever electrically-operated trim tab on the elevator. This is worked by a small servo of the kind used on radio-controlled model aircraft worked by a three-position rocker switch just ahead of the front cockpit throttle. Three tell-tale lights on the panel indicate the full forward and full backward position with red bulbs and the mid-position with a green one. Any intermediate position is available by pressing the switch until the trimming is exact. This works very well and lends itself to being fitted on to the stick like a fighter aircraft. Full forward trim gives hands-off flying at a fast cruising speed, and a continuous cruise at full throttle requires a small push to remind you that you are close to V_{ne}. Full back trims it out for a hands-off glide.

Performance is impressive, with a fast cruise of 100 mph and an economical cruise of 70-75 mph at 4,500 rpm using a little over two gallons per hour. The speed builds up rapidly to about 120 mph at full throttle, and at this speed it is really inspiring to pull it up nearly vertically to zoom up hundreds of feet slowly decelerating. What a speed range!

At full throttle and flying at high speeds the aircraft seemed rather noisy from the ground, but because of the high rate of climb it is very quickly out of earshot, and it should be less obtrusive than many other light aircraft.

Static tests have shown the wing to stand more than the requirements of 6g ultimate, and with its snappy performance many pilots might begin to think about aerobatics. However it must not be forgotten that this is only just out of the microlight class, and should be treated as strictly non-aerobatic. Fortunately the stick forces per g are fairly high, making it very unlikely that anyone will accidently over-stress it in a moment of excitement.

Taking off from the village cricket pitch, David demonstrated the performance of the Streak in a very impressive manner, screaming across the field at 120 mph before zooming up to nearly a thousand feet for near hovering flight almost stationary against the light wind. It was a super demonstration and everyone was duly impressed.

For the would-be microlight designer there are several interesting features about both these aircraft. By setting the wing at a very low incidence to the fuselage the flying attitude is naturally very nose-high at low speeds. This is so obviously wrong that it makes it very unlikely that the stall will be reached by unintentionally flying too slowly, as the nose position for the stalling angle of attack is extremly high. However the slim fuselage and nose give the front cockpit pilot a very good view at normal cruising speeds.

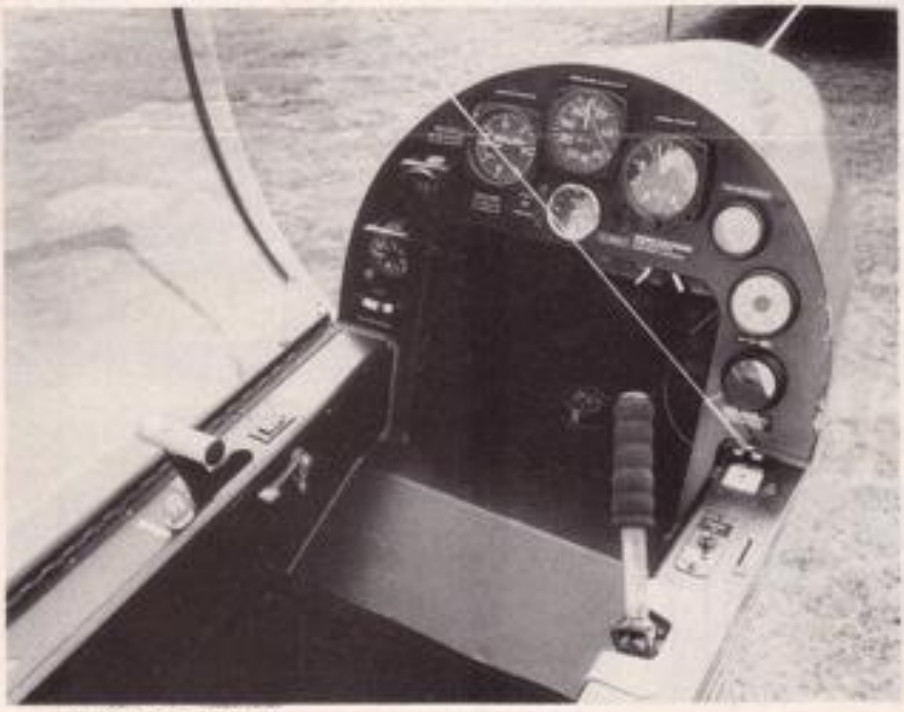
On the ground the aircraft sits with the wing in a no-lift position reducing the risk of a blow-over in strong winds, and this set-up makes landings easy for the beginner because the nose-wheel is always well clear of the ground even if the student fails to round out. It would take a very high approach speed indeed or a very determined student to touch down on the nose-wheel. A fully held-off landing has the tail skid just off the ground, and the nose-wheel can be held off for some time after touchdown.

Many larger pilots will be disappointed to find that they cannot get into the cockpit comfortably, and others that they cannot get in at all. I did not measure the cockpit width, but it would have made the new machine even more attractive if the cockpit had been widened by several inches. Getting into the rear cockpit is an art that needs a practice. It also needs to be larger. At present it is certainly not a machine for large instructors wearing their winter woollies. I found the rear cockpit rudder pedals and heel brakes awkward, and I was glad not to need them during the landing run.

I prefer the stick forces to be a little lighter, but that is a personal preference and not a real criticism.

The engine behaved impeccably, starting each time on the first pull of the starter toggle; but the bigger engine needs quite a pull, and it would be nice to have the electric starter which is an available optional extra.

I can recommend the Streak if you want to build your own aircraft and are not too wide across the bottom. A super fun machine with a very good performance and a worthy complement to the standard Shadow. Both types are easy and quick to rig and can live in their trailer at home instead of costing hangarage. They can be operated from almost any reasonably smooth field — even, as demonstrated, from a cricket pitch.



Cockpit width is definitely on the narrow side. Note the side-stick controller, and electric trim-switch. G-meter is something that might usefully be fitted in all lightplanes.

CFM Streak Shadow

Dimensions	
Span	28 ft
Length	21 ft
Height	5 ft 9 in
Wing area	140 sq ft
Empty weight	388 lb
Max take-off weight	900 lb
Useful load	512 lb
Fuel capacity	12 imp gall (21.5 opt)
Performance	
V_{ne}	140 mph
Max speed	121 mph
80% cruise	100 mph, 3.3 gph
50% cruise	75 mph, 2.1 gph
	400 sm, 5½ hr with 12 gal
Minimum speed	31 mph
Rate of climb	1,100-1,300 fpm two-up
	1,600-1,800 fpm solo
Ceiling	29,000 ft

Engine: Rotax 532 64 hp twin-cylinder liquid-cooled, driving a three blade wooden prop.
Manufacturer: CFM Metal-Fax Ltd., Unit 2D, Eastlands Industrial Estate, Leiston, Suffolk IP16 4LL. Tel: 0728 832353 or 833076.
Price: £10,950 for a kit including everything but instruments. +