

# CFM Shadow and Streak

*The Shadow, a sporty, safe two-stroke—and the four-stroke Streak, even more fun and now also approved as a microlight.*

*Tested by*

*John 'Ernie' Hoblyn.*

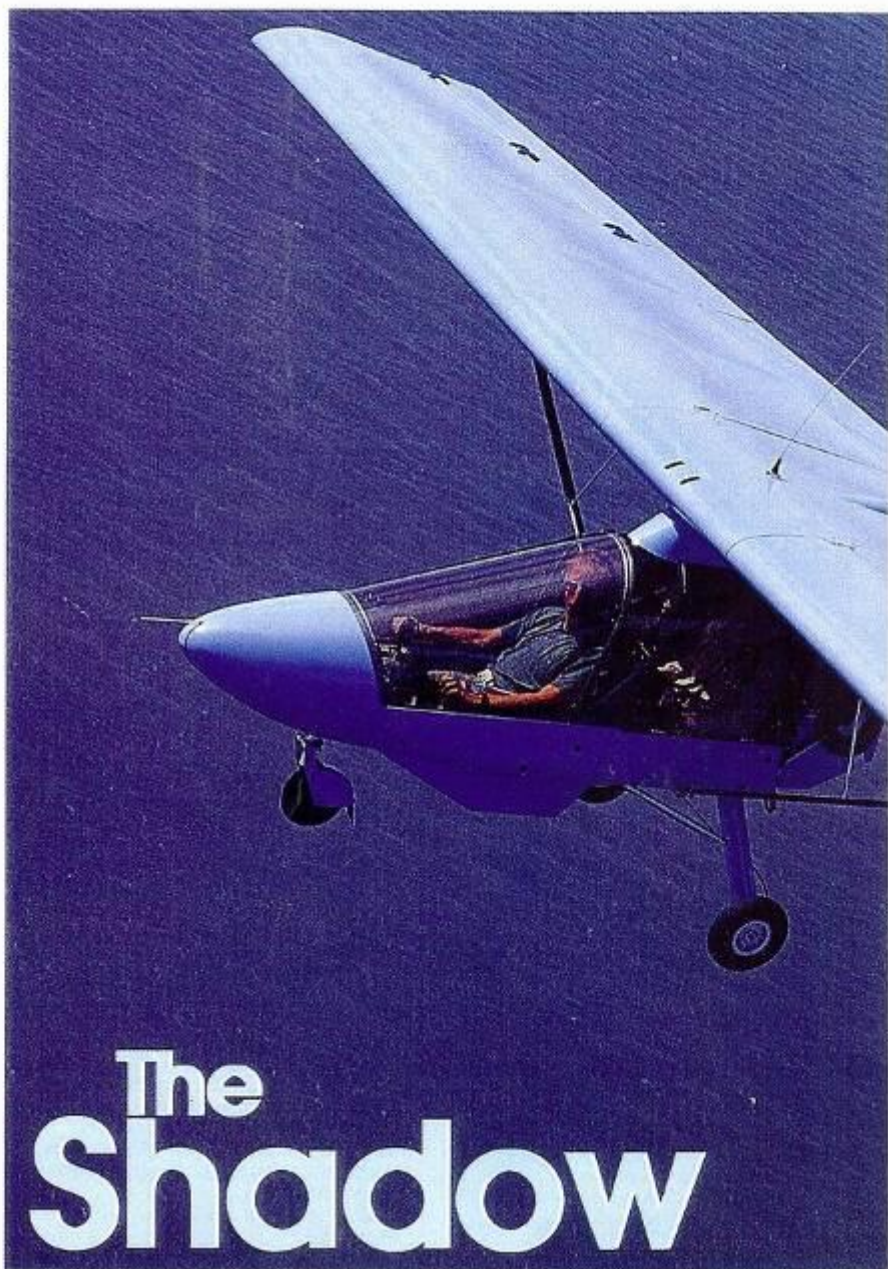
*Photos by Ed Hicks.*

**U**P BETIMES AND I to Framlingham in deepest Suffolk, to visit my good friend Anthony Preston for the purpose of test-flying two aeroplanes, to paraphrase Samuel Pepys. Anthony, who is the General Manager of CFM Shadow, had offered me the chance to try two of their machines. Thinking that it would be bad manners to turn down the chance of free flying, I borrowed a friend's Taylorcraft, picked up Ed Hicks to take the photos and set off for Suffolk.

My first meeting with a CFM Shadow occurred a few months before. A friend had gone to the Shadow Flight Centre at Old Sarum in Wiltshire and had a flight in one which had been adapted for teaching disabled students. He raved about it so much that I went along and had a go. I have to admit that I went there not expecting to enjoy it very much, but I found it great fun to fly. That one was a C Series, I was now going to fly both the newer D Series Shadow, which is still a microlight, and the Streak, a Group A aircraft. (See 'Small Light Aeroplane' panel.)

Our flight up to Framlingham had been under a gloomy overcast but Anthony had promised us good weather and on reaching Suffolk the sky cleared. We landed under blue skies with a gentle wind down the runway. Framlingham, locally known as Parham, was once home to a USAAF Group of B-17s. The Tower survives as a museum, and 500 metres of the former perimeter track serves as runway.

Coincidentally, Anthony was born and raised nearby, but he never expected the place to survive so long and certainly could not have foreseen that he would one day be back here working. He went with me for a familiarisation flight in the Shadow, then I went up with him in the Taylorcraft to make sure he was happy to fly it as a camera platform. With the formalities out of the way we loaded our respective passengers, Ed with Anthony to take the photos and Andy Taylor with me to act as ballast. Andy is a CAD draughtsman at CFM, and I have no idea what he had done wrong to result in him having to fly with me, poor fellow.



Shadow aileron response is just adequate and a hefty application of rudder is required to make balanced turns. Stick forces in roll quite high too, but pitch and yaw control are very good. Below: the enlarged, box-like belly footwell is the most obvious D Series characteristic.



**O**N THE GROUND the aircraft sits with its tail resting on a small skid and the self-castoring nosewheel hangs free, making this easy to inspect. Damping of the nosewheel system is achieved by simply turning it one way or the other, thus adjusting the tension in the retaining cable. I was warned that too little damping could cause nosewheel shimmy, but as we shall see later I found out the effect of too much damping for myself.

The walkround inspection is straightforward. All the locating pins on the wing and control fittings are highly visible and any problems would be immediately apparent. Access to the aileron control rod inner end connection is by a pair of zipped panels in the fabric, one on each wing. The wings are strut-braced and designed for ease of removal and replacement. This is a simple matter of removing the safety-pin style clips, getting a friend to hold the wingtip, removing eight pins from the wing roots, struts, jury struts, along with aileron and flap operating rods, then the wing comes off, making hanging in the garage at home a distinct possibility.

The two-stroke Rotax 582, being uncowled at the rear of the fuselage, makes inspection of the fuel, coolant, electrical and exhaust systems simple. Starting is by means of a pull-rope, like that used on an outboard motor, with its handle in the front cockpit.

There is a simple but effective fuel primer,



of a type which again is familiar to anyone who has ever used an outboard motor, which fills the carburetors before starting. Continuing to the rear, the visual inspection of the tailplane is simple because again all the locating and control systems are visible and any defects obvious. The tail, which is the same on both types, is mounted on a boom and comprises a horizontal stabiliser with an upright fixed fin at each end. The elevator has a trim tab which is operated by a tiny electrical servo system. This is fitted within the elevator itself, the only connection being an electric cable to the control switch. The rudder is mounted vertically below the elevator, and pivots from a vertical bar and small fixed fin.

Gaining access to the front cockpit means leaning on the front of the cockpit to get the nosewheel on the ground, then climbing in from the right-hand side. All the controls fall easily to hand—at least, they did for me, at

six feet tall. The throttle is on the left-hand side and the control stick is on the right with inbuilt PTT and electric trim controls. There is no seat or pedal adjustment, so while I think an exceptionally tall pilot would manage, a very short pilot might need to make up personalised seat cushions to reach the controls comfortably. The harness is a four-point type and very easy to adjust.

Once I was settled in, Andy pulled the starter from outside (although it is in the front cockpit it is at such an angle that I feel only Superman could pull it whilst seated). The engine started easily with full choke and no throttle. I pushed the choke in almost immediately and set the idle at 2,400 rpm, the speed at which the clatter from the reduction gearbox disappears.

As Andy climbed in and settled himself in the rear cockpit, I closed the canopy and ran through the checks. The extra two inches of cockpit width plus the extra headroom make this aircraft much more comfortable than the C series and I felt less restricted, particularly twisting to lock the rear of the two front canopy latches. The rear cockpit is still a bit of a struggle to get in and out of, but the extra width and the bigger footwell, which sticks out under the fuselage and looks like a triumph of practicality over aerodynamics, make it much more comfortable than that of the C Series.

Not being used to a castoring nosewheel, I found that I was over-controlling the steering. The secret is to brake on one side to initiate a turn, then use the opposite brake to start straightening up just before reaching the desired line. It also helps to keep a bit of power on.

After completing the engine checks, I lined up on the runway, having made sure that the nosewheel was running straight and also that I was holding the ailerons in the neutral posi-

tion. This is essential because the side-stick has no reference point, although the neutral position is where the hand lies at rest. I am sure that a few flights would be adequate for this to become natural.

The take-off drill is to apply full power and pull the stick right back to get the nosewheel off the ground, then hold a slightly nose-high attitude until, after a very short run, the aircraft lifts off.

Climb out is at 55 knots and at the sort of nose-high attitude I last saw when flying a Pitts S-1. When my friend Dave Bennett flew one at Old Sarum, he likened it to an F-16. He always did have a fertile imagination, but sitting in the cockpit with no engine or prop in front of me, the wings just at the periphery of my vision, the excellent visibility and this ridiculously nose-high attitude, I knew what he meant.

The specification figures say 950 fpm dual or 1,400 fpm solo and I'm not going to argue with them, and all this from 64 hp. I levelled out at 2,000 feet and spent some time playing before forming with the Taylorcraft to start



At 64 hp, D Series' Rotax 582 is 14 hp up on the 503 used in earlier Shadows. Cockpit is two inches wider and has greater headroom. The side-stick is angled for comfort, but has no obvious reference point for its neutral position—a glance at the ailerons is required. Below: pusher engine allows excellent visibility.



PILOT

the photo shoot.

The electric elevator trim on this particular aircraft had been set in a way which presumably suits the owner, but I found that I was flying with it set at full nose-up all the time. It also has an LCD position indicator which I found almost impossible to see.

Much has been made of the stalling characteristics of the wing, and it is all true. The power-off stall just doesn't happen, you simply lose forward speed whilst gaining vertical speed. Pulling more g into the stall results in a definite nose drop, but even if you hold it fully stalled the ailerons still work perfectly well. Full power gives such a ridiculously nose-high attitude that you might as well go the whole way and do a stall turn—except of course it is not cleared for such things. With full power and the stick hard back in a steep turn you go around *very quickly indeed*, but I couldn't make it stall.

For an aircraft which has Frise ailerons differentially operated, I was surprised to find that if they are used without the rudder, you get textbook adverse yaw. In fact it was almost impossible to turn without a hefty application of rudder, the machine simply banked one way and yawed the other.

With judicious amounts of rudder it was easy to make a balanced turn, but I have to say that the aileron response is best described as adequate. Reversing a sixty-degree banked turn produced a sluggish response and when I caught some wake vortex passing 100 yards astern of the Taylorcraft, I had to dive away as I could not counter the roll. Anthony tells me that the problem is well-known and CFM is working on improvements.

In contrast, pitch and yaw control were very good and the machine could be thrown around in quite a sporty manner without any worries.

Having had my play, it was time to formate on the Taylorcraft for the photo shoot. Engine response for formation work was excellent, but the lack of aileron authority made holding formation very hard work, although I suppose that is not the type of flying most people would be doing in this type of aircraft.

Once Ed had all the photos he needed we returned to base to change aircraft. Predictably, with such a gentle stall the approach and landing were no problem at all, the wheel still being right down the runway. After touchdown the drill is to keep the nosewheel held off as long as possible using rudder for directional control.

## Now the Streak's a 'Small Light Aeroplane'

SINCE I WROTE this article there has been a major change in the regulations governing microlights/small light aircraft. The CAA is now happy for microlight pilots to fly aircraft with a max gross weight of up to 450 kilos.

Changing the ANO will take six to twelve months, meanwhile they have created a Small Light Aeroplane category. At the PFA Rally, PFA Chief Engineer Francis Donaldson announced that the Streak Shadow is among the aircraft which can be considered for inclusion in this category. If you already own one and wish your aircraft to be included, contact whoever issued your Permit to Fly, either the PFA or BMAA, and they will amend the permit for you.—John 'Ernie' Hoblyn.



**T**O THE UNTUTORED eye, the Streak looks very much like the Shadow but it is a totally different machine. I had seen one with the wings off at North Weald and the section looks quite slim and almost symmetrical. The span, at nearly five feet less than the Shadow, puts the wing-loading above microlight limits. This makes it a much more compact aircraft and, allied with the eighty-horsepower four-stroke engine, I was really looking forward to the second flight.

The walkround check is much the same as previously described, and here again the totally exposed engine makes checking easy, even for parts like the exhaust system which are not normally seen on many aircraft.

Before starting the 912 Rotax it is necessary to pressurise the system using the electric boost pump and apply full choke, then, this being the de luxe version, turn the key for the electric starter. The engine started easily

and continued to run smoothly as I pushed the choke in.

The start of the test flight was not very auspicious. As we started to taxi out, Andy yelled that the left tyre had a puncture. Luckily a spare wheel was to hand and, with two of us lifting the fuselage (try that in a Cessna 172!) Andy swapped them over. However, as I tried to taxi out, it was very difficult to get a steering response, something which had not been a problem on the Shadow. We eventually decided that the problem lay in the nose-wheel damping system which needed some grease. A few adjustments and a quick test taxi down the runway and I was ready to go.

Although niggling at the time, these two problems showed how easy it is to fix faults on such simple, light machines, problems which might have meant a couple of hours in a maintenance hangar for larger, more complex aircraft.

With all the problems out of the way I could go and play. The take-off drill is the same as for the Shadow, but the plane leapt into the air and the climb-out, again at 55 knots, was even more nose-high. Because the engine rotates the opposite way to that of the Shadow, the Streak needs a heavy left foot, instead of right, on climb-out. On this aircraft the elevator trim was set much more to my liking.

To my immense relief, the aileron authority is a vast improvement on that of the Shadow, giving a much crisper response from the same aileron area. Maybe it's the lower roll inertia of the smaller Streak wing, or possibly flexing of the longer Shadow wing in response to aileron inputs. I don't know what the reason is, but I was much happier flying close formation in the Streak.

I was also quite relieved to find that the Streak does have a recognisable stall, albeit a very benign one after which the ailerons continue to work. I can never totally convince myself that learning to fly in an aircraft with no recognisable stall and hence no spin is a good thing in the long run, unless the pilot is going to stay with that kind of aircraft for ever. The day that pilot gets into something less benign—a Bulldog for instance—is likely to result in at best a very frightened pilot, at worst... well, I'll leave you to think about that.

Back to the job in hand. After throwing the Streak around for a while to familiarise myself with its handling characteristics, I closed up on the Taylorcraft for the photo shoot. This time I enjoyed myself tucking right up under the Taylorcraft wing, without having to worry



**The Streak's span is nearly five feet less than the Shadow's and the aileron authority is a vast improvement, giving a much crisper aileron response. This and the extra power makes the Streak immense fun to fly. The Streak does have a recognisable stall, albeit a very benign one throughout which the ailerons continue to work. In August, CFM announced its signing of a contract with the Indian Air Force for 24 912-powered Streaks.**



too much whether I would be able to get out of the way if necessary. Ed even commented that the grimace on my face could almost pass for a smile!

Once Ed was happy with the photos we returned once more to Framlingham. Landing the Shadow had been so easy, I'd surprised myself then with a reasonably smooth touch-down. By now the wind was stronger and right across the runway. The approach is flown at 120° to the runway, which meant I was approaching downwind. The turn onto final caught me out and we were blown past the centreline. Rather than take a chance on the fairly short runway, I went around and made a better job the second time, although I instinctively three-pointed it, thus proving how strong the rudder post/tail skid is!





## Overall impressions

**FIRST, THE SHADOW.** On the whole this is a great little plane and fun to fly. It can be flown right up to its limits without ever putting its pilot in any danger. Once you are used to it, it can be thrown around in a very sporty way. I would like to see some improvement in

the aileron response, but having said that I am told by friends who are microlight instructors that it is by no means the worst microlight in that respect. I found the stick forces in roll quite high as well, but I feel that was partly due to my being unused to the side-stick, which requires the use of the wrist muscles which will soon strengthen. Anthony tells me that once you get used to it, the extra strength is useful for playing squash.

Second, the Streak. I found this immense fun to fly and a vast improvement on the Shadow. The stick forces in roll are still heavy but at least they produce a better response. I personally feel happier flying with a four-stroke engine because two-stroke Rotax engines have not had a very good press in the past. Having said that, Raymond Proost of Shadow Flight Centre told me that in six years operating two-strokes they have never had an engine fail, which he puts down to correct maintenance and operating procedures being strictly followed, including a long

warm-up period before flight.

Although the Streak was classed as a Group A aeroplane in its basic form (*but note the new category*) it was possible to fly it as a microlight in single-seat configuration. This brought the wing-loading within the regulations and must have made it a very sporty microlight indeed. There was also the option of a 912-engined Shadow microlight, also a single-seater, with increased tankage instead of the rear seat.

Of the two aircraft I have to say that I much prefer the Streak because of the extra power and much improved aileron response. Having said that, the Shadow has certainly proved itself to be an excellent and durable machine during its trip to Australia with Brian Milton. Both variants are seriously practical aeroplanes which can be dismantled to go on a trailer in twenty minutes or so. Small wonder some 400 have been sold around the world.

The choice really is down to personal requirements—you pay your money and you take your choice.

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	Shadow	Streak
<b>Dimensions</b>		
Wing span	10 m	8.5 m
Length	6.4 m	6.4 m
Height	1.75 m	1.75 m
Wing area	15.3 sq m	13.0 sq m
<b>Weights and loadings</b>		
Empty weight	203 kg	199 kg
Mtow	390 kg	408 kg
Useful load	232 kg	209 kg
Fuel capacity	23 lt	26.5 lt
<b>Performance</b>		
Stall	33 kt	38 kt
V <sub>ne</sub>	108 kt	122 kt
Max cruise	96 kt	105 kt
50% cruise	70 kt	78 kt
Range at 50%	122 nm	150 nm
Climb, dual	950 fpm	810 fpm
solo	1,400 fpm	1,400 fpm
<b>Engine:</b>		
	64 bhp	80 bhp
	Rotax 582	Rotax 912

Manufacturer: CFM Aircraft Ltd, Unit 2D, Eastlands Industrial Estate, Leiston, Suffolk, IP16 4LL. Tel: 01728 832353, fax: 01728 832944, e-mail: [cfmaircraft@compuserve.com](mailto:cfmaircraft@compuserve.com) web: [www.cfm-aircraft.co.uk](http://www.cfm-aircraft.co.uk)

Prices, including VAT (Rotax 582 engine\*)  
 Factory-built   £23,995   £23,995  
 Kit               £14,995   £15,195

\*add £4,500 to kit, £7,775 factory-built for Rotax 912 option



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How it is to really fly

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