

Garry Hume reports

In the evolution of a species, a relatively minor adaptation can lead to significant advantage and a competitive edge over its predecessors. The same is sometimes true in paragliding and hang gliding. At other times it is just marketing hype to extend a model's life and sell a reworked older design as this year's "must have" glider.

Avian have been quietly evolving the species and some recent small changes have made a big difference, particularly the addition of polyhedral. Birds have it and many high-end sailplanes have it - so why not hang gliders?

The Cheetah was a great glider but its Achilles heel, as I reported in my test in June 2004, was a lack of straight-line stability at high speed unless a fin was fitted. For me the advantages of exceptional sink rate, easy landings and light handling in roll made up for this shortcoming. I bought one - and a fin - but others may have dismissed it before appreciating its finer points if they flew it without a fin on a windy, rough day.

Late last summer I got a call asking if I was interested in reviewing Avian's newest glider, the Evo. In fact I was offered two - a Dacron and a Mylar composite version - to compare. Storing two extra gliders took up all of the garage and half my utility room. How my wife loved having them around!

Recently I have been lucky enough to fly and review some superb state-of-the-art topless gliders in the UK and overseas - the Wills Wing T2, Airborne C4, etc - so the following comparison is pretty current.

Setup and build

The setup is straightforward and broadly similar to all the latest generation of topless gliders. There are 12 curved battens each side, plus three undersurface battens. The curved battens fit with an 'over-centre' mini cam that locates in an eyelet let into the sail trailing edge. This arrangement is much kinder on the cloth than the small flip-end battens used by Aeros, Airborne, etc, although they are very slightly slower to use. If you plan to keep the glider for some time the Avian system wins hands down - flip ends will eventually wear though the sail near the tips if you occasionally brush the sail on the ground. The battens are now permanently marked with the batten numbers - essential as they are very similar in length across the mid-span.

The new "Speed frame" uprights and fittings are an engineering work of art and offer a couple of advantages. The first is the obvious one - significant drag reduction. Avian claim this is the slipperiest design on the market. It certainly looks the part, though I have no way of objectively measuring the difference. At mid-range speeds the vortex-generating corners can be heard working as a dull hum. The use of a turbulent boundary layer to encourage an overall laminar flow is a well-known technique to reduce drag at the relatively slow speeds we fly at. A large streamlined bolt is screwed in to the A-frame corners as opposed to the more

usual pip-pin - very neat and minimalist. The A-frame engineering gained admiring comments whenever I rigged.

The actual uprights are in two halves that slide together. The claim is that this design allows the thin aerofoil section to break relatively easily if you have a bad landing and hit them directly from behind. Due to the exceptional landing characteristics of the Evo (and my Cheetah) I have not tested this theory in well over 100 hours flying in the past year.

Another advantage of the new A-frame design becomes apparent when rigging on the keel. Unlike earlier A-frames (on a wide variety of makes), there is virtually no "rock" and the glider stays level as the wings are spread. Quite how this works is hard to see but it is a small but positive improvement when rigging.

The new A-frame is also claimed to improve handling. I could not detect a difference in flight but it certainly does seem more connected when ground handling. I am not mad keen however on the base bar. It is the same as the Wills Wing bar, made of aerofoil section aluminium. A carbon bar (available from Avian) is still my preference, with a more rounded section where the hands normally grip. The VG pulls out at a slightly rearward angle rather than the straight pull. I am not sure why but it works fine all the same. It does take a couple of flights to naturally pull at this angle.

The pitch rods and fittings have been lightened further from the Cheetah, as well as made stiffer. They are simple and easy to use. When all the battens are inserted and tensioned, you check they are in position (they drop into place as you rig) and close the inspection zip. A piece of tape sewn into the bottom surface holds the two sprogs each side in place behind the zip.

The sail cut is clean and crisp. It uses conventional battens at the tips plus neat "Hoerner" fairings made of carbon fibre. The Evo certainly looks the part and drew admiring glances on the hill, with many commenting especially on the ultra-high-quality engineering.

The main difference between the Cheetah and the Evo is the latter's polyhedral. Most aircraft have a small amount of dihedral. The latest rigid designs such as the Atos VR employ polyhedral, with reduced dihedral at the centre section and the wing tips canted up further. Polyhedral usually allows a reduction in overall dihedral, making for a more efficient wing and allowing tighter slow turns in thermals, with less tendency to slideslip.

However as weight-shift gliders generally have anhedral (tips lower than the centre section) in order to speed roll rate, I was not sure how - or even if - the idea would work with a hang glider. If you think it through, it should slow the roll rate unless the centre-section anhedral is significantly increased! However the Evo's polyhedral is not dramatic - only a couple of degrees. The proof is in the flying, and it works perfectly.

Flying

For my first flight I chose the Dacron version, which I flew on a summer's evening at Clough Head (a big westerly site in the Lakes with a tough carry-up). Rigging was very

straightforward with no surprises, backed by an excellent owner's manual. However by the time I was ready the wind had switched off. Launch was very straightforward. The static balance is very neutral and it's easy to hold the glider level for take-off. It lifts easily with no tendency to drop a wing. I contour-flew my way along the bottom of a huge cliff face, working small gullies and spurs with tiny weak bumps of residual lift, instantly at home with the feel of the wing. The handling was so confidence-inspiring I was soon doing this with the VG on. I noticed a subtle but better - and lighter - feel in roll compared to my Cheetah.

Eventually I went down, too low for the normal side landing on the hill shoulder. The bottom landing appeared to be absolutely nil wind, but as I rounded out on a very slight upslope a light tailwind was apparent. This would have resulted in a nose-in with many gliders unless the flare was absolutely spot-on. The Evo however can be safely flared even a little late and will still obediently drop its tail and stop. A perfect two-step landing was the result.

Some pilots with other makes of glider advise the use of 30 or 50% VG to land in nil wind, but no such nonsense is needed with the Evo. Landing with the VG on can be very bad for your health if you hit thermic turbulence or need to avoid an unseen hazard. If a manufacturer or dealer advises taking off (other than aerotowing) or landing with VG I suggest there is a design flaw.

When thermalling, the polyhedral adds poise. You can push out harder and turn tighter to maximise light lift and small surges without sliding down on the inner wing. Roll is also lighter than the Cheetah, noticeably so compared to the equivalent size C4, T2, etc. Another benefit is the way the glider can be flown with far more VG applied than its predecessor in similar conditions. On many gliders, if you are tipped by turbulence with a lot of VG applied it can take far longer than you expect to straighten up. The Evo strongly resists this and is equal to the C4 in this respect. At high speed, the glider tracks straight and true, as good as anything else in the high-end topless class, with no need for a fin. The Evo is up there with the best in terms of stability.



Specification

Model	Evo 150
Sail area (m ²)	14.5
Span (m)	10.4
Aspect ratio	7.5:1
Packed length (m)	5.9
Short-packed length (m)	4.6
No. of battens	31
Airframe material	7075-T6
Flying weight (kg)	35
Certificated pilot weight (kg)	80 - 110
Certification	BHPA No. 0401164
Price (base model)	£4,799*
Price (as flown on test)	£5,502

* Options include Mylar sail or high-performance Dacron, ultra-low drag control frame with aluminium or carbon-fibre speed bar, tail fin and thin racing wires.

I have subsequently flown both the Mylar and Dacron versions in nil wind, strong thermals, high winds and wave and been amazed. In the past Mylar definitely made a glider much stiffer in roll, but there was nothing that I could tell between either glider, though the Mylar may have had the edge in high-speed glide efficiency. As Mylar looks better (the new composite version is both tougher and more flexible than older filmic sail materials) and there is a slight performance advantage, I would probably choose Mylar.

The overall performance is definitely up there with the best. I have flown it alongside highly-tweaked Moyes and Icaro full competition models. The Evo's glide seemed bang on the money on long, fast inter-thermal glides, and in weak tiny cores I felt I often had a climb advantage. It is always a pleasure to look down on the "madding crowd," especially outcoring a flock of paragliders at Bache Hill, standing the glider almost vertically on a wingtip during the Cross Country flying festival.

Conclusion

This is without doubt the best glider Avian have yet built. It is also in the same class as the C4, T2, Litespeed, etc, whereas in the past there may have been some areas where the original Cheetah missed out. I strongly recommend you fly all models on the market before shelling out your hard-earned money. However, when you come to try the Evo for yourself, be prepared to succumb to some of the seven deadly sins - lust, envy and covetousness for starters. You will be trying to explain to your partner why you need to get a new glider for those super-safe landings, and the world-class performance - and then add pride as well once you buy it.



Handling, manners with large amounts of VG applied, straight-line stability, superb landing characteristics.



None, though a carbon base bar is slightly more comfortable on long, tough flights.

Manufacturer's comment

I can't add much to Garry's comments other than please come and fly one! If you borrow someone else's, make sure it is the latest Evo. Flying an earlier generation Cheetah will not reveal the really large breakthrough in handling of the Evo.

STEVE ELKINS, AVIAN HANG GLIDERS

[Garry Hume has since had his own Cheetah uprated to Evo spec - another example of a Skywings tester putting his money where his mouth is. JS]

Flying the Evo - a second opinion

Mike Thorn tries the Evo for size

I had a good feeling about the Homegrown Festival, and my premonition of something special happening came true when Garry Hume gave me the opportunity to fly the Evo on a perfect afternoon at Bache.

I was impressed by the glider's neutral balance and ease in manoeuvring to launch. The launch was a revelation! The glider lifts its weight effortlessly, and with just a puff of wind feels like it's ready to go. The high performance feeling was immediately apparent, yet it also felt rock steady so I could concentrate on the lift rather than the glider.

After mindlessly gaining 300ft I slotted into a workable lift line and tracked upwind to check it out at speed. My abiding memory is the beautiful harmonic note it whispered at 50mph. Pulling on VG was easy but I was surprised at how much cord there was; it takes a bit of time to get it fully on. The Evo had no tendency to yaw or oscillate on full VG. Pitch pressure I found to be light and neutral at all speeds.

Next was the top landing. In light laminar flow many topless gliders go on forever and keep you guessing as to when to flare. The flare sequence was long and easy, the glider mutating from a performance ship to a pussycat. Wow! It felt solid all the way to a stop.

The next day it was a waiting game on Bache with light thermals and ridge lift. I took off right after Garry. We were both riding Evos and looking for meaty lifting air. It wasn't here and it wasn't there, but we were staying up when most paragliders were landing. This is my favourite situation in a hang glider. Sniffing the hillside for anything usable, and flying with every sinew focused on the job. A bomb-out is one bad decision away. Gary flew through a small area of light lift and kept going. I was lower and decided to stay and see if it would improve. I didn't need to think about the glider in such a tight situation - it allowed me to just focus on the intense feedback loop with the air I was in. I did at least a dozen 360s, falling out of the lift on the downwind turn really close to the hill. This is when a glider's roll rate is so crucial and the Evo was superb.

After grovelling for a long time it was a sweet victory to get in a full circle of lift. I set the bank angle and looked around. Garry and I danced together for a while before I decided to top land on the lower launch, pulling off an easy crosswind uphill landing.

I have seen enough to know that the Evo is a glorious example of all that is good and great about hang gliders. Speed, glide, sensitivity, balance and confidence-building ease in the final flare. The other thing I must mention is the super-smooth sail finish and the really cool control-frame junction. Well done Avian!



The Evo can also be used under power PHOTO: PAUL SEMINARA



Control frame corner



Leading edge detail



Cross tube junction