

Elf mini DLG

ANDY ELLISON GETS ATHLETIC WITH A LIGHTWEIGHT DISCUS-LAUNCH GLIDER



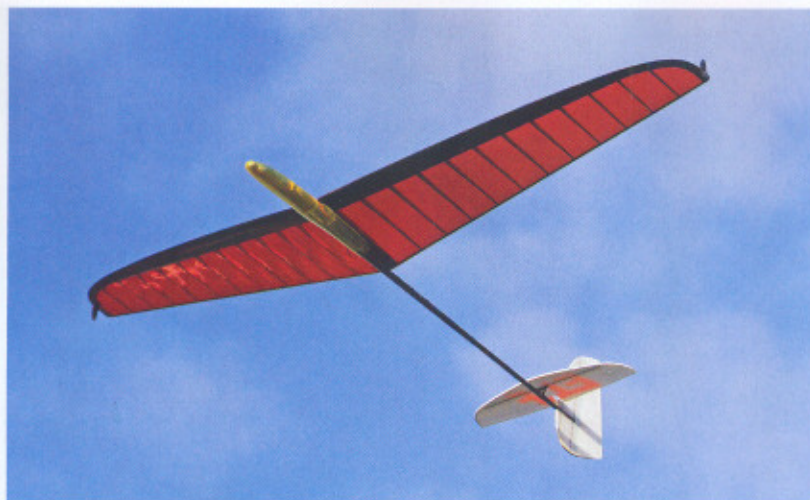
The Mosquito Class is a term originating in Japan for small Discus Launched Gliders (DLGs), borne out of a requirement for an aircraft that took minimal storage room and could be flown in quite small spaces. The competition class has never really caught on in the rest of the world, but the term now seems to have been adopted for all mini DLGs (1 metre span or less), and the new Elf from Ukrainian modelling concern Vladimir's Models is the latest popular addition to be touted under this banner.

The 1m span Elf is a rudder / elevator mini DLG that weighs only 3.3oz (95g) or so, ready to fly. It's so light that virtually no effort is required to achieve a reasonable launch height of 25m+, and its hang time in still,

dead air is fascinating to watch, to the point where having to move the sticks and fly it is a distraction. It's very reminiscent of the old free-flight towline gliders I used to build as a kid, and on a calm day it's rock-steady in the air. It's Vladimir Gavrilko's take on Dr Mark Drela's ground-breaking Apogee design, but constructed with the famed Vladimir's Models flavour and techniques that result in perhaps the best strength-for-weight R/C gliders available on the market. Construction is to an incredibly high standard, demonstrating planning and innovation that makes me proud to be an aeromodeller, and part of a group that can achieve such things. The kit is very highly prefabricated with the wing, fin, and tailplane ostensibly finished. Only the simple

pod 'n' boom fuselage with its corresponding radio and linkage installations requires a little work, but nothing amounting to more than a couple of evenings.

The Elf's one-piece wing is both light and stiff, with a generous 11° dihedral. Meanwhile, the I.e. D-box is moulded from thin carbon fibre cross-weave, giving good torsional strength and preserving the excellent aerodynamics of Drela's aerofoils. The substantial wing spar is again composite, with carbon spar caps spaced over vertical grain balsa shear webs and bound with Kevlar thread. Balsa ribs are connected to the thin carbon t.e. using carbon rib cap strips, and the area aft of the spar is covered with heat-shrink film (which I understand to be Oracover). The



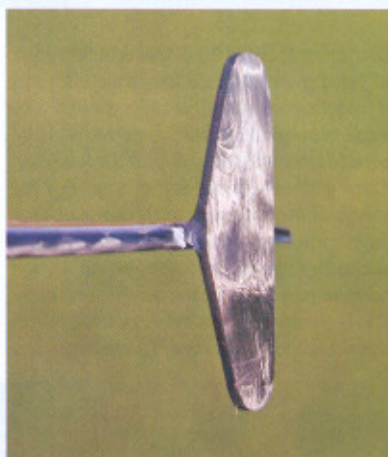
D-box is beautifully curved around the planform of the wing, and at either tip there's a slot for bonding in a supplied launching winglet, making the model suitable for left- or right-handed launchers.

The pod 'n' boom fuselage is very clever. Here, the tapered, wrapped carbon fuselage boom extends all the way to the nose and is chamfered and back-filled to provide a flat surface for installing the servos and battery pack. The under-wing part of the pod glues to the boom and follows the contour of the aerofoil perfectly for a gap-free result. At the rear of this, under the wing t.e., is space for the Rx. You'll see from the photos that the front of the fuselage pod is a transparent plastic, slip-on nose cone. In truth, the only thing I really don't like about the model is the opaqueness of the pod which clearly demonstrates function over form.

The tail feathers are made from a rigid close-cell foam with carbon sparring and a vacuum-bagged, epoxy glass finish. This covering doubles as a living hinge for the rudder. The all-moving tailplane sits on top of a V-mount that incorporates a tiny pivot; movement is free and easy and provided the linkage is slop-free it'll easily withstand launch loads. All pushrods, throwing pegs, wing bolts and accessories are included in the kit. A simple, quite well-illustrated assembly guide (in colour) completes the contents.

ELF SERVICE

Assembly starts with the wing, where there's very little to do other than add your choice of left, right or both throwing pegs to the wing tip. These need a little shaping in accordance with the photographs in the instructions, and you'll also want to sand the edges to suit your



fingers. I chose to add both pegs, if only to avoid having to laterally balance the wings.

With the wing finished the fin can be added to the fuselage boom, not forgetting to slip the pod moulding and tailplane V-mount over the back of the boom beforehand. The rudder horn is fitted by making a small slit in the surface with a scalpel and then securing with cyano. I followed the instructions to the letter here, but were I to do it again I'd put the rudder horn on the opposite side of the control surface, making for an easier control run later in the build. Incidentally, there's a school of



thought within the DLG world that the rudder linkage should be under tension and not compression when the model is launched which, as illustrated, would be the case for a right-handed throw. That said, I can't see how it would make much difference here; everything is so light that the launch forces shouldn't affect it if on the 'wrong' side.

It's very important to get the tailplane mount glued to the tail as squarely as possible; if this is even slightly wrong, the clearance slot in the all-moving tailplane will hit the fin on one side. Measure twice and cut once, or maybe add the mount to the tailplane off the model (not as the instructions advise) once the fin is glued in.

With this the wing can be attached to the under-wing part of the fuselage pod and bolted securely in place, the whole ensemble then being slid into position. The nose cone must be attached to the front to ensure that the pod isn't pushed back too far to prevent it fitting later and then, without disturbing the longitudinal position, the whole thing squared up with the tailplane. Only then can you add one drop of thin cyano to the boom / pod joint before removing the wing and cursing the clouding of the glue that just spoiled the look of your transparent fuselage pod!

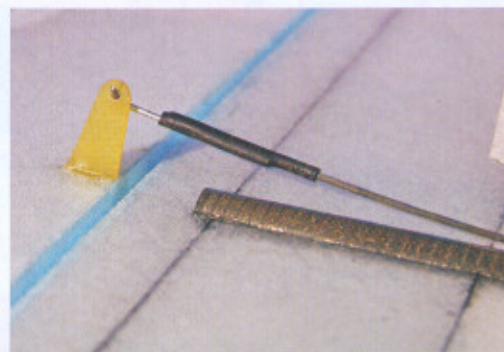
The Elf doesn't like wind, but then, it's lighter than some of my shockies!

The tip launching pegs attach with strong cyano into an existing open slot in either tip. Fit both pegs for maximum fun with friends, or just one for minimum weight.

LINKAGE LATHER

Linkages are next. Essentially, these comprise two simple carbon pushrods supported at around 30mm intervals by pieces of plastic tubing stuck on the

Pushrod ends are 'L' bends, retained with a little heat-shrink.



Slopetrash Jnr demonstrates the DLG launch technique.



outside of the boom. Sounds easy enough, but stand by for the trickiest part of the build! The risk, and it's a high one, is gluing the pushrod to the tubing when cyanoing said pieces to the outside of the boom along the line of the linkage. The instructions helpfully point out that it's somewhat easier to avoid this if you don't actually use the pushrod to assist in getting the tubes aligned, replacing it for the time being with a piece of

piano wire, threading the small pieces of tubing (cut from a larger length) along the outside and then gluing each piece in turn to the outside of the rear fuselage boom. If you do make a sloppy cyano mistake it's far easier to break piano wire loose than fragile carbon pushrod. Taking your time and using pipette nozzles, whilst working on one piece of tubing at a time, will allow you to execute this tricky operation without a problem.



The pushrods are made off at the rear end by gluing a simple Z-bend to the carbon pushrod and finishing with a little heat-shrink tubing to tidy it up.

HEART ATTACK

Where servos are concerned, I used a pair of the recommended Ripmax SD100s (Dymond D47s), which are fabulously light and small for their performance. They're rated at 9.6V, which means that if you hook them



up to a Spektrum Rx you can run the whole lot off an unregulated 2s Li-Po, which is exactly what I did. Neil at Hyperflight supplies a 2s 180mAh pack that's perfect for the Elf and can, on occasion, supply the even natter Smart Li-Po packs that include a regulator, charging circuit and switch! The servos are glued to the flattened portion of the fuselage boom, leaving room in front for the battery and balance weight.

My Spektrum 6100E Rx fitted nicely within the fuselage pod under the rear of the wing without modification or case removal. Other receivers will fit but the list is limited, so be aware.

I had to remove the balancing lead from the Li-Po to properly allow the nose cone to fit, and I made up a simple extension lead to act as a switch on removal of the outer cone. A few turns of electrical solder around the foremost extremity of the

boom had the C of G in the mid-range and the model ready for programming and first flights.

NO BLOW

One thing's for sure, the little Elf DLG doesn't much like wind. The 3.4oz (98g) all-up weight of my model - with a conservative C of G - is considerably less than most of my indoor shockies! As a result of this and its obscenely low wing loading, it becomes a difficult model to get back upwind if you thermal too far away from the launch point in anything much more than a 10mph blow. A 5mph wind is better, 0mph is better still!

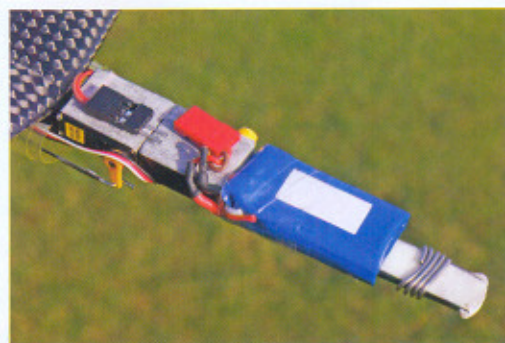
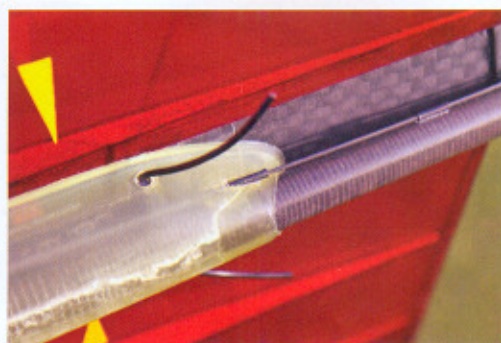
There's no need for athletic prowess during launch, indeed the Elf can be side-arm launched without the obligatory discus launch spin and will still make good height. 25m+ seems to be the norm, and a proper run and spin up can put at least another 10m on this. With a rearward C of G the model has a tendency to tuck a little from level flight, but it does indicate absurdly light areas of lift in this mode. It seems that Slopetrash Jnr has adopted the Elf as his own, although I have no idea how that happened. I fly it with the C of G about mid-range, perhaps even

slightly forwards, but as he's not yet learnt the noble art of prolonging flight with thermal activity, a forward C of G tames the little model down some and permits easy and predictable aerobatics from apogee to the hand-catch he's become frustratingly good at. The Elf will still indicate lift easily and turns on a sixpence thanks to good control authority and that generous dihedral angle. It feels fragile in the hand, indeed I was worried that the wing tips would start to give as Jnr tossed the model around roughly, but I needn't have worried. The tail surfaces - which I feared wouldn't last his early thumps into the floor - are plenty strong enough and after what must by now be a thousand chucks, everything is still tight and pristine. This is no doubt due to a noticeable lack of inertia in unplanned arrivals.

Elevator authority at the recommended throws is enough to almost fold the model in half if you bang it on at speed, but it sure does make for great aerobatics! 300 metres or so is the highest I've had the Elf before my ageing eyesight starts to tell lies to my epoxy-addled brain cells, at which point I bottle it and head down, looping all the way.

The small amount of space this little model requires is amazing, and I can easily pick my way up and around trees in the local park during quick lunchtime sorties. The ease and predictability of the hand-catch here has frustrated many-a dog, and on occasion I've been given to tease the ones whose owners don't clear up after them. In my mind, I'm performing a public service, though I'm certain that they perceive my activity quite differently!

I don't think the model's been de-rigged since its first flights, other than to bind the Rx to a different Tx, and with this battery and the low current drain from the two servos it's



Somewhat annoyingly the smoking of the pod to boom cyano joint spoils the effect of having a translucent fuselage.

A few turns of electrical solder at the front of the battery pack allows for very fine adjustment of the balance.

entirely possible to fly the Elf virtually all day. It's been in the back of the car on many occasions, often being the last model flown at dusk when the winds drop off to nothing. We love it to bits here, despite its basic controls. Whilst DLG die-hards may refer to it as 'a toy for part-time glider-guiders', it's hard to see how wing control surfaces or camber-changing flaps could change it for the better and not devastate the fantastic performance with increased weight.

X-BOX DISTRACTION

In summary the Elf is a well made, well thought-out and simple model that flies exceptionally well in the right conditions. The build is fiddly and requires concentration but

completes quickly in experienced hands, aided by well-illustrated instructions and loads of useful information online. In our household it's proving to be a good little fun machine that has the appeal needed to drag a 12-year-old boy away from his X-Box and out into the fresh air for hours of fun in the company of his embarrassing old dad!

DATAFILE

Name:	Elf mini DLG
Model type:	Discus launch glider
Manufactured by:	Vladimir's Models
Available from:	Hyperflight.co.uk Tel. 01926 314011 www.hyperflight.co.uk
RRP:	£125
Wingspan:	39.4" (1000mm)
Fuselage length:	27" (682mm)
Wing area:	1.25sq. ft. (0.11sq. m)
All-up weight:	3.4oz (98g)
Wing loading:	2.7oz / sq. ft. (0.8kg / sq. m)
Wing aerofoil:	AG12, AG13, AG14
Aspect ratio:	8.6
Functions (servos):	Elevator (1); rudder (1)

Quality:	Poor	Acceptable	Excellent
Assembly:	Easy	Intermediate	Difficult
Flying:	Novice	Improver	Experienced

