This review was published in the November 2012 issue of QEFI.
The same mag included this piece about Mike's success with his Maxa at the Trnava F5J event, flown only a few weeks after he completed the model.

News, Views and Comment

Proctor's Progress

In this issue, Mike Proctor reviews the Maxa 4e from Vladimir's Models. Mike purchased his model from Neil Stainton at HyperFlight, who writes with news of Mike's competition success:

"Hi Kevin,

Mike just emailed me that the Maxa review will appear in the November issue. That is great, thank you.

But I thought I would bring to your attention, in case Mike has been too much of a gentleman to mention it, that he won the first FAI F5J Eurotour event in Trnava, Slovakia in August. This is a very prestigious competition that has been running for several years (previously to non-FAI rules), and is, I think, the first time a Brit has won an international electric thermal soaring competition – ever!

Mike might need to strengthen his mantelpiece to support his new trophy!

Mike has worked tirelessly for many years to improve electric thermal soaring, first by canvassing opinions and running 200 W/kg events for several years, and then morphing these into the successful and popular eSoaring class when altitude limiters became available. For the last few years he and George Shering helped steer the FAI F5 Working Group to create a very challenging F5J electric thermal soaring class, which was just ratified this Spring. It is very fitting that he should win the very first Eurotour event to use these rules.

More info here: www.esoaring.net/forum/viewtopic.php?f=9&t=2286

BTW, he was flying his Maxa!

Kind regards,
Neil"

Mike Proctor tops the podium at the F5J Eurotour event in Trnava, Slovakia *(Paul Newell photos)*

A big 4 metre wing and small prop don't look right somehow but Maxa goes up well on a 14" x 8" (10 m/sec) and the blades do not cause much drag when folded

Maxa 4e Electric

'Maxa' is the right name; everything about this model is at a maximum. Is it Vladimir's best yet? We asked Mike Proctor for his opinion

The Model

The model and its aerofoil, having more camber than usual, are designed by multi-discipline (F3B, F3J and F3K) World Champion, Joe Wurts and realised by Vladimir's Models using some new materials techniques. With Joe's model flying record and his background as an aerodynamicist one would expect it to be good.

Maxa was designed primarily as a lightweight F3J glider, in which version, with an airframe weight around 1450 g, it can be flown at around 1700 g or less! When configured as an electric soarer, sub 2 kg weights are achievable, with some small installation problems that will become obvious later.

Maxa is available in a variety of colours. Mine is pink and white on top, and carbon black underneath. Being an X-tail model with generous dihedral, I hope to have plenty to see in side elevations. From underneath the black should be excellent.

All the components are moulded with the exception of the tailplane, an open structure with carbon D-box, which looks exactly the same as that used on the Supra and AVA but, of course, it is in two pieces. The wing is moulded using spread carbon fabric specially developed by Vladimir using a process essentially involving passing carbon material through rollers to produce very thin cloth. The resulting components are superb. The centre-section is very strong and light but with a spar substantial enough to take a full F3J tow; the tips are very light and everything is stiff! Additionally the centre-section comes pre-wired for the flap and aileron servos.

The fuselage comes in two pieces; a pod with carbon rear and 2.4 friendly Kevlar front and a boom with the fin pre-assembled. The pod has Vladimir's now classic self-attaching canopy and although slim – the nose is only 32 mm diameter – there is plenty of room for a motor, ESC, Rx and battery.

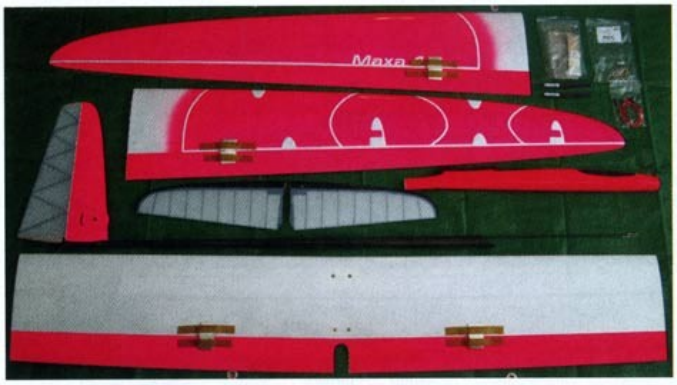
Life, The Servos And Everything

The big question is how to position everything, especially the servos, to achieve the correct C of G?

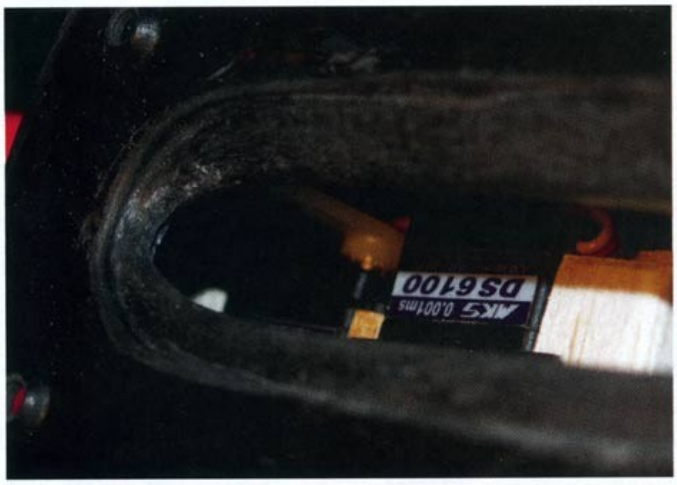
Let's look at the problem, starting at the fin, which houses the pre-installed elevator bellcrank and actuating arm. The boom has the two carbon pushrods pre-installed; one is already connected to the elevator bellcrank, the other just needs hooking up after the rudder horn is fitted. With a super light tailplane and a long nose this model is designed to balance with just glider R/C equipment installed. How best to put electric set-up in there?

It was clear that a trial run was the first order of the day, to determine what can go where in an electric version. The boom was taped in place, the wing screwed to the fuselage and the tail mounted to the fin. The C of G was marked at 95 mm from the leading edge and balancing trials began.

I had two light motors available, one inrunner and one outrunner. Both were geared and each weighed a measly 130 g; they would both perform best on a 4S LiPo. It quickly became apparent that even with the lightest components in place and the elevator and rudder servos in the fuselage front, it would need at least 25 g of ballast in the tail, or a change to fin mounted servos to make the



Component spread. Bags contain all the metal bits and bobs, wiring for Rx/wing connection and plastic servo hatch covers



Servos in place. There's not much room but being quickly removable makes things easier and allows the receiver to be positioned behind them

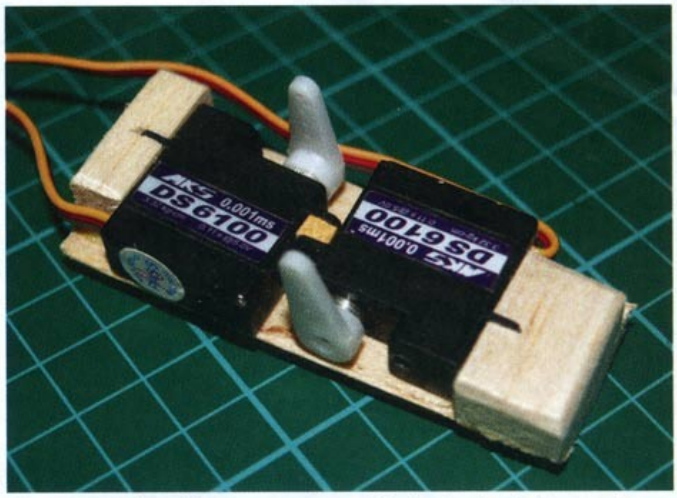
difference. Much soul searching followed!

Should I start chopping a hatch into the fin; make a way through to the boom for the wiring and pull out the pre-installed control tubes? No! Why? This is a review model and it should be completed as 'normally' as possible to be fair to all concerned. Also, all indications are that the most I can save on the total airframe weight is 25 g, so would it be worth the effort? Finally, Vladimir must have realised the problem by now and a fin with rear mounted servos must be imminent. (Two days after writing these words I saw the first schematic for the new 'Electric Fin'. It comes unmounted to the boom and with exit shrouds to enable the servos to be installed from below. I understand there are no hatches for access as would more normally be the case.) So such a solution is likely to be readily available soon anyway.

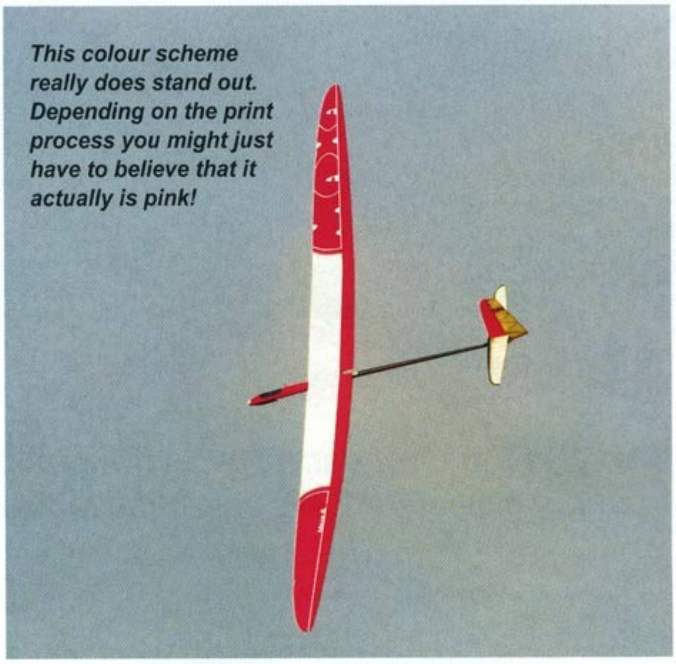
Fuselage Installation Begins

Having had the advantage of looking at the build threads of two other Maxa constructors it became clear that my thoughts of getting the elevator and rudder servos as far back in the pod as possible were well justified. I started to source some small, powerful servos.

They needed to be low in height if they were to go vertically into the fuselage under the wing and it very quickly became clear that this was virtually impossible because the fuselage narrows with height and the arms could not swing! Inverted was dismissed as too complex and restricting for wing servo connection. However, if I could find servos no more than 25 mm high, I might be able to lie them flat and operate the arms vertically, close to the fuselage sides. Coming close to a solution several times revealed that not



Elevator and rudder servos were fitted onto the balsa carrier and installed through the canopy before being bolted in place

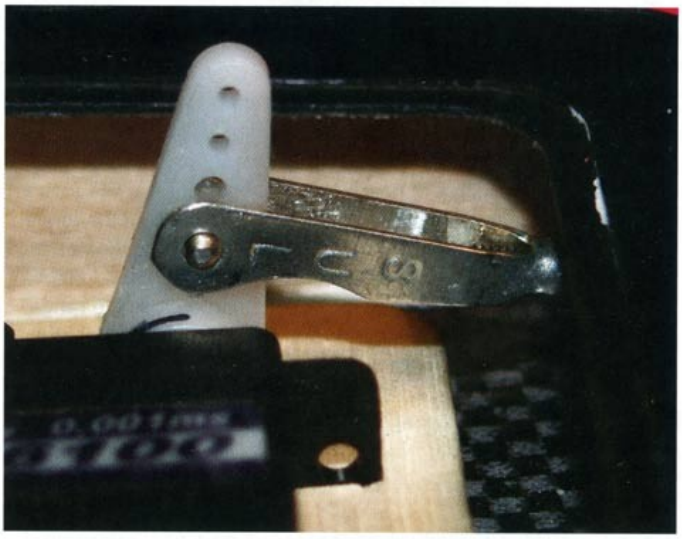


This colour scheme really does stand out. Depending on the print process you might just have to believe that it actually is pink!

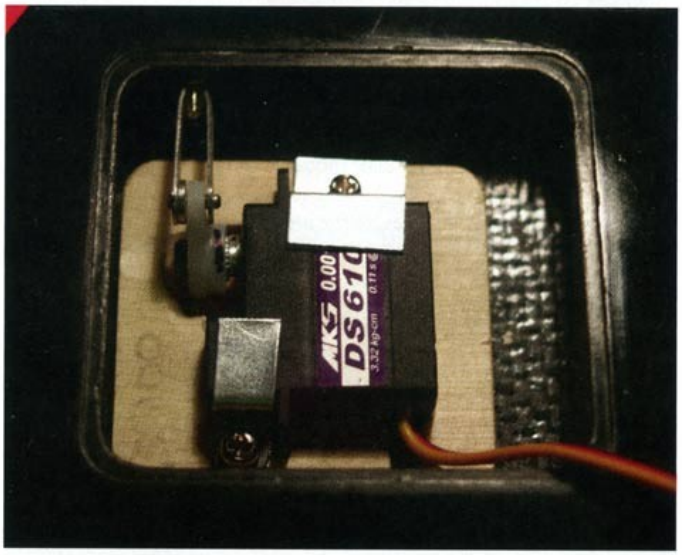
all manufacturers/vendors quote the full height of servos, rather just the case height – no good in my situation. I finally ended up where I should have started, back at Hyperflight's website, where not only were there servos of the correct height but with a proper 3-view drawing to prove it! I ordered two MKS DS6100: weight 10 g, metal gears, 3.2 kg-cm. I was not disappointed when they arrived. Much experimentation followed and eventually I developed a way to install them as a pair, under the wing, slightly forward in the access hole but critically with the front (elevator) servo arm just able to be hooked up to the clevis. The servos were installed as a unit and fixed with a single 4 mm nylon bolt through the fuselage floor. In this manner they could be slid in from the canopy end and bolted in place very easily. I planned for the Rx to go behind them but the space available looked frighteningly small! I needn't have worried, it went in easily, with the two fuselage servos connected directly, the wing servo extension leads plugged in and an extension lead for the ESC to be connected. The height switch/logger is placed in series with the ESC and needs a connection under the canopy.

I did all the above work before gluing the carbon boom to the pod. Trial runs showed that it sat 'true' in horizontal and vertical planes, when held in place. So with the tailplane in place to ensure it was level with the wing, I applied epoxy with a very small amount of

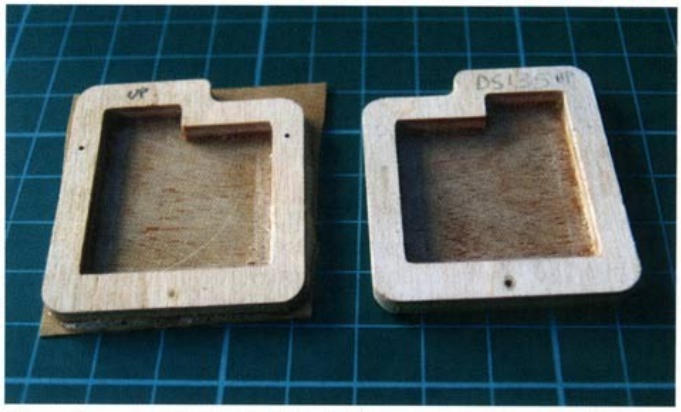
Flap and aileron connectors are pre-installed



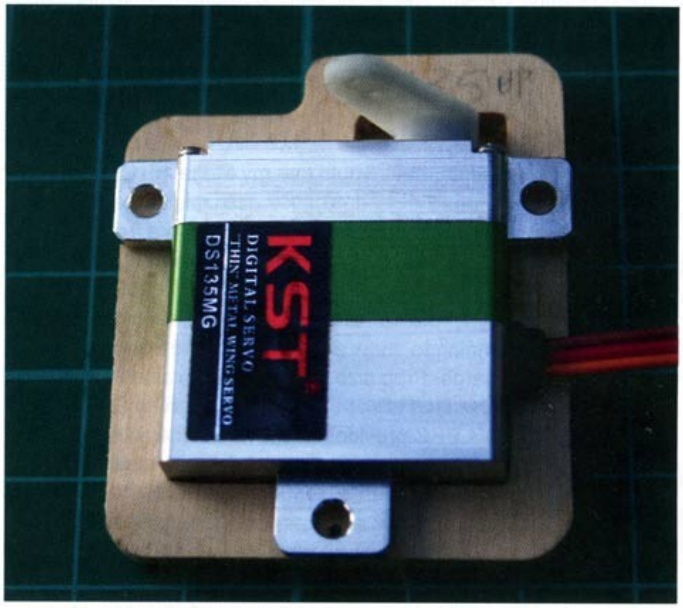
Since the geometry of the linkages required such a short servo horn, one side of the metal link needed a little relief to avoid binding



DS6100 installed in its frame with homemade clips to secure. Clear cover held in place with tape at this stage. Vladimir supplies a nice one-piece O-ring vinyl sticker to hold these down



Servo trays backed with thin ply before and after trimming. This allows positioning and installing without the fear of also gluing the servo permanently in place! Remember to clear the glue from the screw holes



KST 135 flap servo has hefty side mounting lugs for direct fixing to the ply frame. Metal gears seem very durable and the servo yields easily if the controls are touched when handling, which is an important feature to save damage

micro-balloons to thicken it and hold it till it set. I then left it carefully to harden whilst I moved on to the wing.

Wing Servo Installation

This was the easy bit – another reason why I left it till last!

The wing hatches are a good size and the recesses deep enough to take quite thick servos, so what to use? The tips are big and light so a light servo seemed appropriate. And having been happy with the DS6100s in the fuselage, I decided to use two more here. Having got my finger tip between the arm and the casing when the servo tester was on 'auto cycle', I knew they were powerful!

For flaps, I thought I needed something a bit heftier and for this I acquired two KST135 wing servos: 23 g and 5.2 kg. Even though these units come with a very nice metal horn, I used the nylon one, preferring to have something which will break first in the system. Hyperflight provide ply servo frames for these and other many servos. They make wing mounting very easy.

It is only necessary to screw the horns into the ailerons, assemble the clevis ends onto the stainless control rods, attach them to the servo and control horns, then fix the servo in place. It is essential

that the servo arms are positioned correctly on the splines when the control surfaces are at neutral.

Breaking the habit of a lifetime, I followed the excellent set-up instructions on Vladimir's website to get the correct geometry when establishing the servo arm angle and horn length. Fantastic, it worked perfectly – I must do that again!

Having got everything loosely in place, I set the aileron (or flap) at neutral with a light spring clip and a piece of 1.5 mm ply across the root. Then, with the aileron servo fixed into its frame and everything lined up, I glued the frame in place. I used 5-minute epoxy mixed with a little micro balloons for this job and wafted the underneath with a hot air gun; not too surprisingly it takes about 5 minutes to do each one. However, as it is very likely that you will glue the servo into the frame as you do this, it is best to put a base layer onto the frame, giving a larger wing-to-frame gluing area and keeping the servo clean for later removal. Also, make sure you have all the servo mounting screws in place as you glue up. If not, the glue will fill the holes and you are then faced with having to re-drill them very close to the wing skin! Plugging the servos into the pre-wired loom completed the wing centre panel. A short extension lead (100 mm) was needed for the tip servos.

Back To The Front

I decided, after testing, that I would use my Mega 16-15-3 with a 5.2 Kontronik gearbox and 4S LiPo. This might seem a bit excessive to some of you but a 30 second run on a 14" x 8" Aeronaut prop indicated that the outer casing was just warm and it was producing over 400 W at 33 A. I tested 1300/1600/1800 batteries. Using only a 1300 LiPo, the fourth run (from cold in each case) was just beginning to show a power drop and less than 1 Ah was needed to recharge. Prop size may also seem small but I have several models on this kind of set-up and they all go up OK.

A 60 A ESC with 5 A BEC provides the power to the six digital servos. I have not managed to exceed 2.8 A in static tests and have yet to obtain actual in-flight figures.

I installed one Rx aerial internally along the fuselage side and was happily taping it in place when I realised that the carbon filled prop blade was on the other side of the skin! I did a literal U-turn and taped it a little further back. The remaining aerial was installed vertically just behind the canopy.

Balance: The Final Frontier

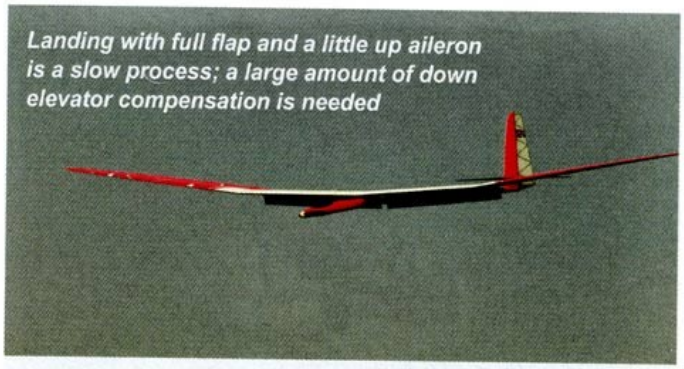
With the battery (a 4S-1600) and ESC already as far back as possible, I had no adjustment options available, so it was all down to how much tail weight would be needed. To balance 97 mm back from the leading edge I needed 15 g at the tail – not bad! Total flying weight with a 185 g 4S-1600 pack was just over 2 kg; with a 1300 pack it was just under 2 kg. The three batteries only had a spread of weight of 50 g. It would be possible to save over half the battery weight by going to a 3S 1300 65C pack and use much higher current, requiring more pack changing. So if you want it lighter it can be done.

To The Flying Field

The weather has been pretty awful, as if you needed reminding, and it had just decided to improve as the Maxa 4E was ready to fly.

I range tested it from as many 'bad angles' as I could. Having a full carbon wing this seemed a good idea but I could not find anywhere that gave a poor signal.

A final stick wiggle to check all was correct and off it went. As a starting point, I used much the same settings as on my Supra, which needed a good amount of down elevator on the climb and was pleased to watch the Maxa climb at a near perfect angle, all the way to 200 m, in about 20 seconds. In fact I let go of the sticks



Landing with full flap and a little up aileron is a slow process; a large amount of down elevator compensation is needed

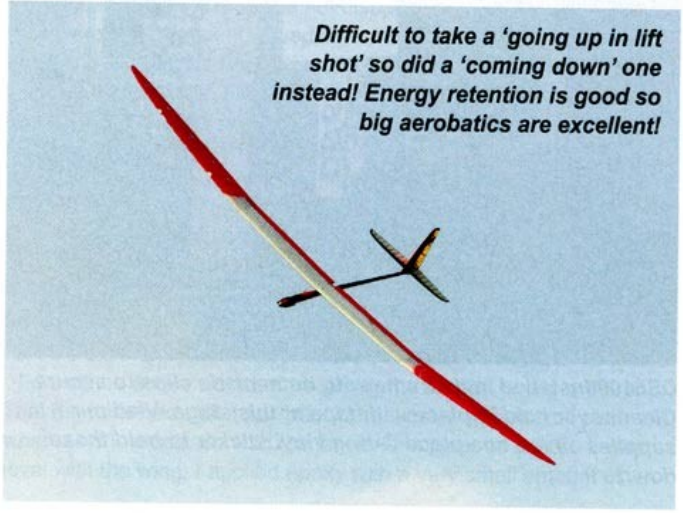
for half of the climb and it just got on with it – must be a moral there somewhere! The model transitioned well from power to glide with no hint of a stall and continued to glide without any adjustment to the trims. I had set the elevator to be neutral when it was at right angles to the fin post.

One aspect of the Wurts aerofoil family used on the Maxa is that they have different camber settings from most other aerofoils, using more flap than I would normally expect, especially for Thermal where eight degrees is used. In Cruise mode it's two degrees and in Speed, zero degrees.

With these settings, and the C of G at 97 mm, I found the Maxa was okay in Cruise and Speed, but was on the edge of becoming unstable in Thermal mode without a little down trim to help. However, a second flight of nearly half an hour from a low launch in very light lift indicated just how good was the potential of the model.

Every time I got to about 200 m, I flew to a different part of the field in search of new lift and eventually used the height gained to try the landing flap setting (also my fail-safe setting) across the range of the stick movement. Again the Supra settings were spot on, the model being very controllable at slow speeds with full down flap. The Speed setting was surprisingly good; for a model which could glide so slowly, it covered the sky quickly with minimum height loss. Energy retention following a shallow dive is very good. It shows the lightest lift very well and is very forgiving in flight. Sink rate is low, as you would expect, and having had the opportunity to fly the Maxa in company with a similarly sized Super AVA on a balmy evening, I would say they are very much on a par. But the Maxa has the ability to cover much more sky and return better from downwind.

Although a round ballast tube, stretching from the canopy top to the boom is provided, I did not install it. Actually I could not have done so; having decided to use a battery that almost completely blocks the rear fuselage, that option was not available to me. Having seen 4 m AVA's flown in 15 mph winds, I cannot imagine that the Maxa could not do likewise. Above 15 mph in turbulent UK conditions, a change to a smaller model is often a better move.



Difficult to take a 'going up in lift shot' so did a 'coming down' one instead! Energy retention is good so big aerobatics are excellent!

After 25 Flights

Maxa is a model that would be at home in either UK Height Limited eSoaring or FAI F5J soaring, where its ability to maximise flight times from low down in very light lift will be a great asset. Being a large model (there is also 3.5 m version) it is easy to see, another asset in a 15-minute fly-off situation. Visibility is further aided by the colour schemes available; my white/pink top surfaces and fin stand out well. The bright fuselage helps but is small by comparison with the flying surfaces. The black carbon finish on the wing underside shows up well in any sky.

For subsequent flights I moved the C of G forward slightly (3 mm) and found the model to be easier to handle. I may move it back later in the light of experience. I also increased the aileron upward movement, which helped when changing the thermal turn direction at low speeds. I will continue to play with the Thermal flap to see what happens. Landing in long grass is the norm for me and I have been very pleased with the KST servos used on the big flaps. They have resisted all my attempts to damage them by not retracting the flap quickly enough every time!

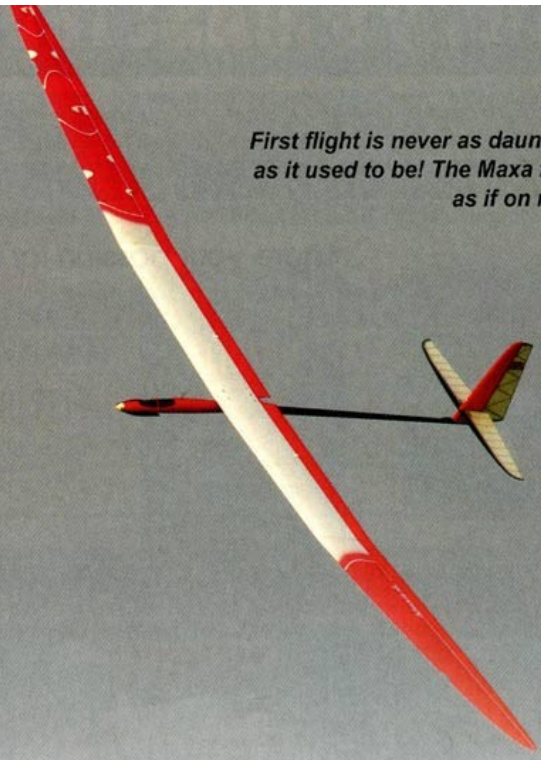
And The Answer Is...

BUT is it Vladimir's best yet? It should be – it is the most expensive! The simple answer is: Yes! This is a big, light model that thermals exceptionally well. It is forgiving, predictable and controllable in all flight phases. What more do you want?

I am indebted to Anthony Brindle who has also recently built a Maxa 4E and offered useful help and info during this review. Also to Barry Flude, Ian Cowe and Alan Wilkinson for their photography.

Q&EFI

Is it Vladimir's best yet? Mike says: Yes!



First flight is never as daunting as it used to be! The Maxa flew as if on rails

Quiet&Electric Flight International Specification

INFORMATION

Name: Maxa 4E
Manufacturer: Vladimir's Models
Distributor: Hyperflight.co.uk
Price: £1,449
Model Type: Fully flapped, cross tail, FAI F5J or UK eSoaring class, lightweight electric glider
Motor: Mega 16-15-3
Construction: All moulded, except tail, rudder & fin. Full 'hard spread carbon' wing, carbon boom and rear pod, '2.4 friendly' nose section in Kevlar epoxy

R/C FUNCTIONS

1 Ailerons (2 servos)
2 Flaps (2 servos)
3 Elevator
4 Rudder
5 Throttle (ESC)

SPECIFICATIONS

Wingspan: 3900 mm
Fuselage Length: 1700 mm
Wing Area: 82.2 dm sq
Weight, empty: 1450 g
Weight, as tested: 2040 g with 1600 4S LiPo. Less is possible!
Prop: 14 x 8 Aeronaut
ESC: 60A with 5A BEC
Servos: Ailerons, elevator, rudder – MKS DS1600 (metal geared), Flaps – KST 135MG

TEST

DISLIKES

Tricky to obtain a balance on this version but the problem has now been addressed by the manufacturer

LIKES

Excellent quality construction and finish
Strong, lightweight construction
Available in highly visible colours
Easy to fly
Low sink rate, good penetration qualities
Pre-wired wing. Rx connection leads supplied
Sub 2 kg flying weight (1850 gm) achievable if desired with small 3S battery
Next generation will have new fin designed for rear-mounted servos

To ease RC installation the model is now made with a fin designed to house the rudder and elevator servos, as shown in these CAD drawings.