MEGA PLAN 2 Stinger

The flip side of our free Mega-Plan reveals Terry Eato's dynamic delta

Why put the engine in the middle you may ask? Well why not? By doing this it has several advantages over conventional locations for the motor. To start with since the engine is well away from harm it is very difficult to break a prop. Most of the exhaust residue misses the model so it's cleaner at the end of the day. With the motor in the middle you can afford to have a long nose which takes away those orientation problems usually associated with pure delta shaped models. Added to all this the distinctive shape of twin fins and the lovely beating noise generated by the prop passing through the slot in the wing are guaranteed to turn heads at your local flying site.

Inboard prop slot makes an interesting design feature. Best use a starter though or those fins could soon suffer!

Wing construction

This is very easy to cut from white foam by the hot wire method. If you can't cut your own and don't have a club member who can help then I am sure one of the foam wing suppliers listed in the classified ads will be able to help.

As the model has no tail and thus no elevator, it has to be controlled by two control surfaces called elevons. They combine the function of elevator (both up or both down) with aileron (each surface moves in opposite directions) to give roll control.

Before joining the wings a decision has to be made on the control method for the elevons. You have the following choices.

1) Put the servos into the wing, under the surface and electronically mix either from the transmitter or via a seperate on board mixer.

2) Lay snakes into the wing and fit two servos into the nose, mixed electronically.

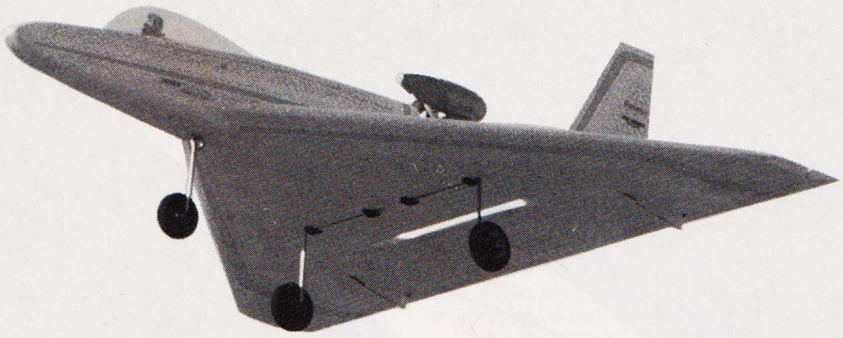
3) Lay snakes into the wing, fit two servos in the nose and mix mechanically.

Option 1 is the best since it gives very positive slop free surface control. Options 1 and 2 need transmitter or electronic mixing functions; if you haven't got either of these then option 3 is ok but keep the system slop to a mimimum.

If the servos are to be wing mounted then cut the hole on the underside for the servo and then pass a heated piano wire down into the foam core so that a hole is created forward of F2 into the servo cut out. This procedure is a lot less painful and easier than you think.

If snakes are to be used it is best to put them in before the veneer or balsa is added. If this is not possible then cut out a slim channel on the under surface and tack the snake in with epoxy. The slot can be filled with 1/16in balsa and then sanded to the original profile.

Join the wing halves with epoxy, noting that forward of F2 is removed so only tack the leading edge part of the joint to aid alignment. Add the 1/2in sheet trailing edge and when dry carefully cut out the fuselage area forward of F2 from the foam wing.



Cut F1 from good quality 1/4in ply and make up the sub assembly from U1, U2, F1 and the hardwood block as shown on the plan. Make sure the joints are well glued, use half hour epoxy for this.

Cut a slot for F1 in the wing and a recess for U1 and U2 so that the complete assembly can be offered up from the bottom, leaving F1 sticking out.

Now epoxy the complete assembly into the wing using liberal amounts of 1/2 hour epoxy, remembering that this assembly supports the engine and the main undercarriage.

Fuselage

Next cut the fuselage sides and add the 1/32in ply doubler together with the 1/4in x 3/8in lite ply or hard balsa strengtheners.

After F2 and F3 have been cut out it is possible to dry assemble the fuselage into the wing. If F2 and F3 have been cut very slightly oversize it should be possible to achieve a very snug fit. Now glue F2 and F3 to the fuselage sides, not forgetting the 1/2in triangular reinforcement. Add F4 making sure the fuselage remains true and doesn't pull to one side.

Whilst the fuselage is in place fit the 1/2in sheet leading edge, paying particular attention to where it butts up against the fuselage side. On one side let into the foam leading edge a plastic tube or drinking straw; this is very important as the tube is for the aerial. Remove the fuselage assembly and shape the leading edge.

The nose leg is supported by a simple hardwood block bushed with a brass tube. If you prefer a commercial unit then use it as there is plenty of room.

Glue the fuselage into the wing, again using 1/2 hour epoxy to form a really good joint. Add and shape the 1/2in bottom sheeting. Before the top sheeting can be added the fuel tank needs to be installed. There is room for an 8oz tank, remember that it has to face forward. I used brass tube to bring the fuel feed and pressure feed back through F1. Now add the top sheeting, the hatch and the nose block. The hatch is faced with ply formers H2 and H3 which allow for easier shaping of the top sheeting.

The engine is mounted on a commercial mount, preferably aluminium. The engine should be positioned such that the prop centre line aligns with the middle of the slot shown on the plan. If this is not possible – your engine may be longer or shorter than mine – then don't worry, the slot can be repositioned. It's position is not critical.

With the engine mounted use the prop to mark the slot centre line. Carefully cut the slot out, lining with 1/4in balsa, rounding the edges as shown on the plan.

The main undercarriage is formed from two lengths of 10swg wire held in place with saddle clamps.

Fins

These are very simple assemblies made from 3/16in medium balsa sheet. The spruce strengthening is not absolutely necessary but it does make sanding a more pleasant task and adds a lot of 'ding' resistance.

The elevons are made from 1/2in x 2in leading edge stock capped with 1/16in ply in the middle.

Covering

Covering the Stinger presents no difficulty. No extra strength is derived from it so any method is ok as long as excessive weight is not added. The original was covered in white Solarspan and Sticka Trim to good effect.

By moving the nicad around it should be possible to balance the model on the centre of gravity shown on the plan. The wheel sizes shown are for a fairly smooth surface; if your patch is on the rough side then increase the wheel diameters to suit.

No reflex was needed for the model to fly straight and level with the centre of gravity shown on the plan.

The control throws are shown on the plan. I found a ratio of 2:1 elevator to aileron throw gave a nicely balanced control response.

Flying

I would recommend that an electric starter be used to start the engine – flick starting would be a little dangerous!

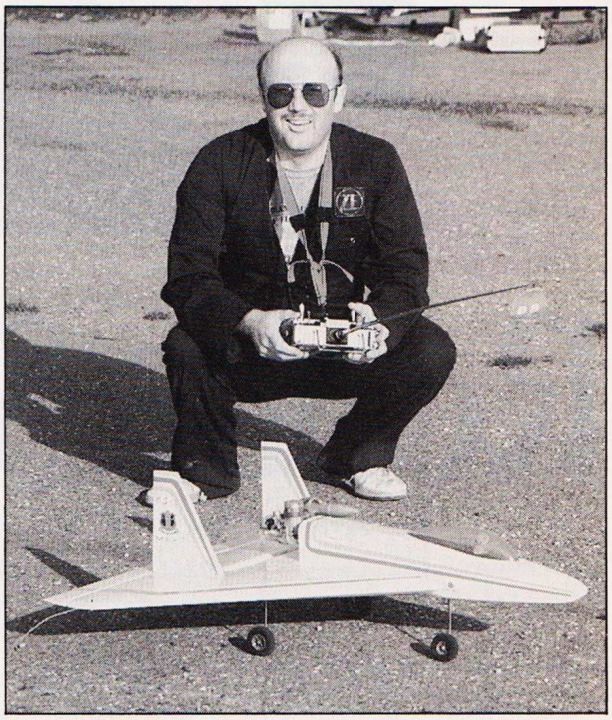
The ground handling is excellent, high speed turns even across wind are no problem.

The take off is quite conventional with just a touch of up elevator needed. If a good 0.40 is fitted vertical out of sight climbs are the norm.

Stinger handles superbly especially in the rolling axis where it stays put until instructed to move. Like many other deltas it has an amazing speed range, blisteringly fast at full bore but amazingly slow on low power settings, great for those nose high low speed landings.

The delta planform really gives you the best of both worlds, the buzz of high speed low level flight and docile low speed handling allowing you to get it back safely on the landing strip.

Stinger is my first own design delta. If it pleases you as much with its performance and different looks as it has me, then that will be reward enough. For the future what about a double size version, 0.90 engine, retracts, air brakes, wheel brakes... we can all dream can't we. Happy Landings.



Terry looks pleased with Stinger – why not build one too and join in the fun? (Photos by Gary Barlow)

DATA FILE

STINGER

Plan Specifications

Designed By	Terry Eato
Type of Aircraft	Sports Delta
Wingspan	34 inches
Total Wing Area	476 inches^2
Aerofoil	O/D symmetrical
Dihedral at each tip	None
Fuselage Length	22 inches
Fin Height	7.5 inches
Rec. Engine Range	0.25-0.46 cu.in. two stroke
Fuel Tank Size	8oz
Rec No of Channels	Four
Control Functions	Elevons, Noseleg, Throttle

Materials used in Construction

Fuselage	Balsa/ply
Wing	Foam/veneer
Weight Ready to Fly	3.5-4.5 lbs
Wing Loading	17-21 oz sq/ft.