

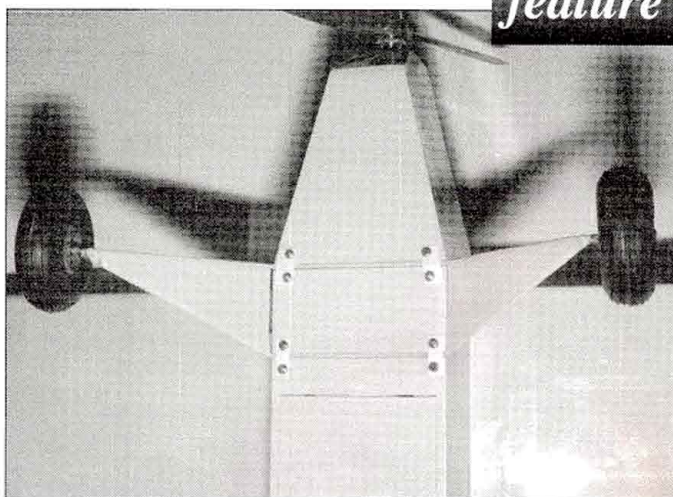
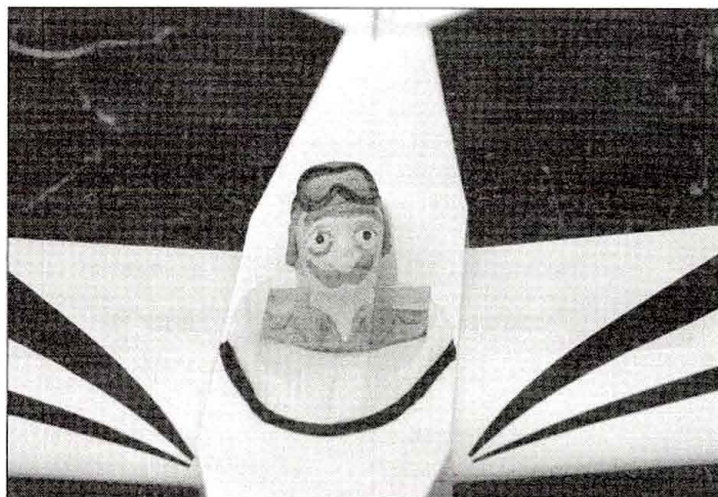
Dereck Woodward based this pleasing little sports flier on the American MiniMAX home-build design. Flies well on an .049, is quick and cheap to make and you'll still have room in the car for your mates!

build from our full-
PLANS

Tecspects

Designer:	Dereck Woodward
Model name:	Spooky
Type:	Semi-scale lightweight sports
Wing span:	36"
Engine size:	Cox Texaco .049 cu. in.
Thrust line:	2 degrees right/2 degrees down
Wing area:	118 sq. in.
Tailplane span:	10.5/8"
Radio:	2 ch. (rudder/elevator) std size
Flight battery:	500 mAh
Wheels:	2" dia.
Covering:	Litespan

SPOOKY



Some aircraft demand to be modelled - just look at the numbers of Tiger Moth models around. When I first saw a photo of the Tennessee Engineering and Manufacture - TEAM, for short - full-size 'miniMAX', I was convinced the skies would soon be full of them - in all sizes. Over a year later, the entire collection of miniMAX models amounts to one 1/4 scale American plan. Time to move!

Well, I moved - house - thus I managed to lose an excellent Bill Hannan three-view (anyone have a copy?). Eventually, I collected some photos, TEAM's info pack and even a set of construction plans for the full-size.

That should be enough for a scale 1/3 size replica, right? Wrong! I doodled up this look-alike 36" span version, for Cox 049 and rudder/elevator control. So 'stand - way - off', she's known as 'MicroMAX' before Sue, my lovely American wife, decided that a model in Halloween's traditional orange and black Just had to be called 'Spooky'. So now you know!

I reckon she captures the cheeky charm of TEAM's single seater. She builds quick and cheap, flies just right for a little light hearted patch buzzing and doesn't need the trailer that 1/3 scale replica would, a corner of the car boot is sufficient to get her to the field.

There are some UK built miniMAXes

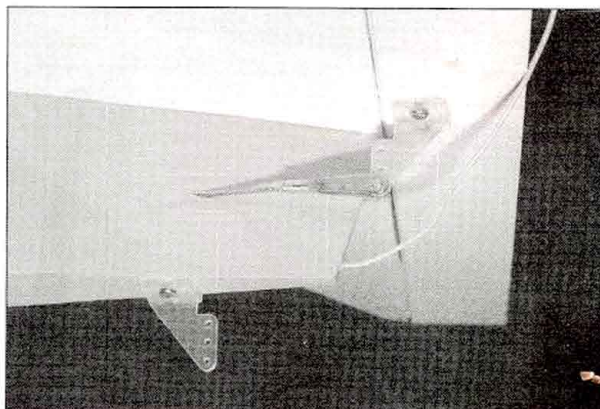
about now, so she could either be dressed up as a real one, or finished as what you'll build yourself when you move up to true 'realism in flight'.

As a caring designer...

This is the flying bit. So, as everyone reads it first, I've just saved you turning pages. Spooky is designed for flying as a rest from pattern and hot 'fun' ships, cruising around low and as close in as safety allows. Never mind aeros, I've models that take care of those whimsies, this is for figure eights and circles round the patch, maybe the odd low fly-by with a tad of bank, so we can see the topsides.

As our 'patch' is a touch lumpy for ROG (rise off ground) with a little model, I usually hand launch her myself, transmitter in right hand, model in left. A step and push sees her away. I let her fly straight just to establish that the Cox is happy with life before turning or climbing.

On a smooth surface, ROG is a drama free affair. There's little swing and she'll be off quick enough. The climb is adequate, there's little fun in going up high anyway So from there on, it's all about puttering about. Well, 'puttering' is not the word to describe a Cox at 11,000 r.p.m., but you get the picture.



So Spooky is smoothly controllable on two channels, she'll go from one bank to the other fast and smooth, like flying with ailerons. As the inspiration is a slow ultralight, true aerobatic ability should be a lazy chandelle turn.

I did persist in the interests of checking the envelope, though - honest! Aerobatics are really limited to a loop, maybe a roll off the top and I have persisted to a full barrel roll, which involved rather a lot of the considerable height we started off with. Now who's looking at four channel micro R/C gear and a PAW 80 with a throttle, then?

When it all goes quiet up front, remember that a light, fat model won't penetrate far. Keep the nose down and head for the patch, leaving the flare 'til you're there.

Let's build

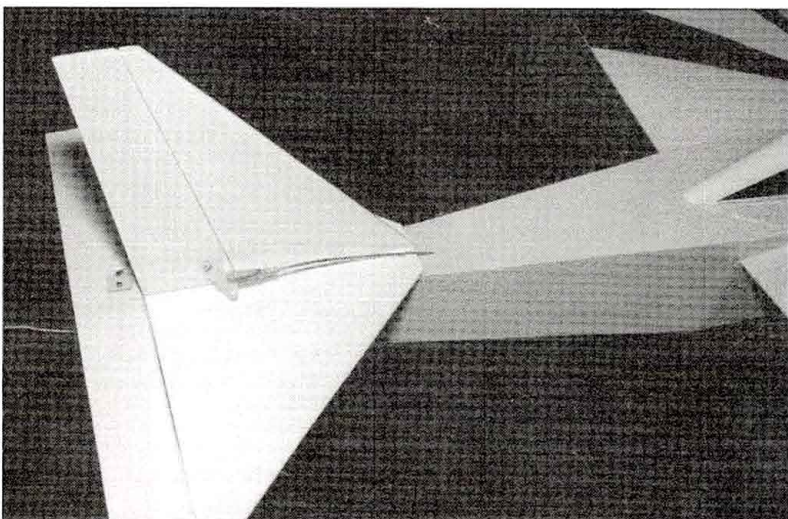
An ounce or so was saved by using glue as the wing mounting system. A one-piece airframe means starting off with the wing, so cut out one rib accurately, from ply if you like to keep templates, or balsa if you feel up to carefully cutting around a balsa master. I usually do it that way, in a hurry as usual.

A tip for accuracy is to select the hard balsa mainspars, mark them as 'top' and, surprise, 'bottom', then cut out the spar notches to match. Not all 1/8" x 1/4" is created equal! All ribs are cut to the same profile, the centre ribs being trimmed for 1/16" sheeting. 'Quarter grain' or 'ribstock' sheet in a

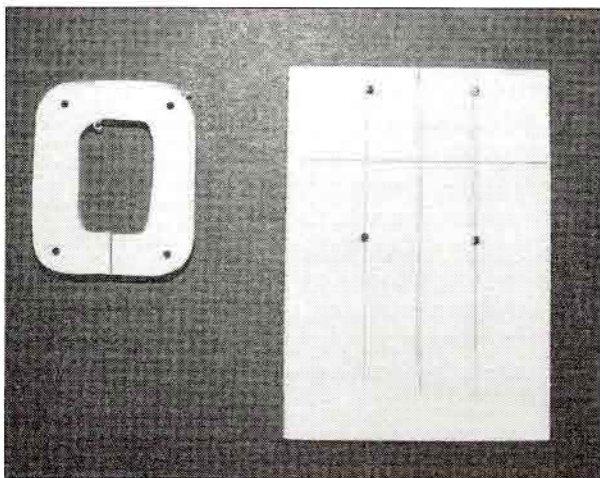
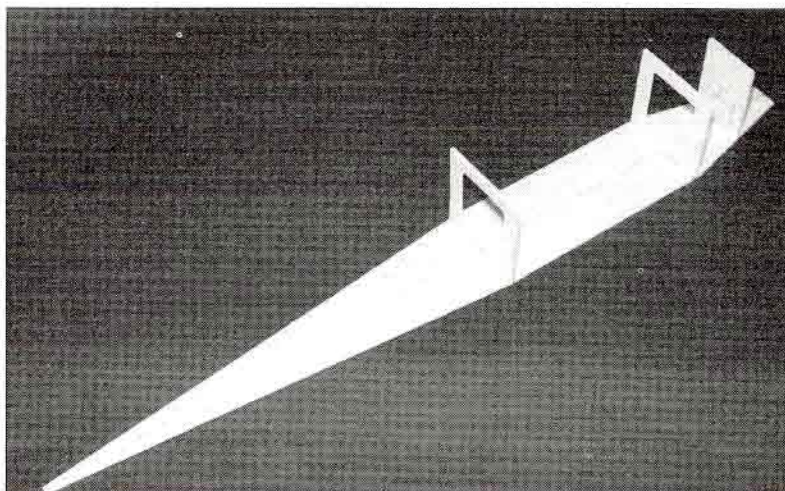
The pilot (top left) is America's finest WW1 ace Captain Eddy from Ace R/C! Please fit somebody in the office - it'll look silly without it. The undercarriage (top right) is simply a faired in pair of wire legs. Clips holding it to the fuselage are cut from pinned nylon hinges. Works fine.

Yes, the tailskid (above) does look like a control horn! Tube for Rx aerial is much tidier and the elevator adjustment is in the radio bay.

Rudder drive (shown at left) is well air-cooled! Works fine on this 16 oz cruiser.



First steps in fuselage construction. Here F1, F2 and F3 are glued to the undersurface of the fuselage top. Pay attention to the down and side thrust angles of F1!



The firewall - F1 - is made from 1/8" ply backed by a 1/8" ply doubler for the engine fixing screws.

medium weight is what you're after for the ribs.

Selecting the trailing edge pieces from medium grade and some harder stock for the leading edge leaves you to find some light, flexible 1/16" sheet for the LE and centre section sheeting. Now build two panels.

To ensure stable washout, glue ribs to lower spar, add the TE and LE then leave to set. Now pack up the TE, using scrap balsa as shims. The top spar and LE sheet will lock the washout in when all is dry. What's this 'dry off' business then? I'm too careful with the budget to use pricey instant glues for entire projects, yellow aliphatic woodworkers' glue is my usual choice. Setting time? I think I build much faster than most anyway.

Here's where the 1/8" thick root ribs come in. Block each wing half up to the correct tip dihedral and sand the root rib back to vertical. I use one of Balsa Cabin's 12" x 1" x 3" sanding blocks. By resting it on edge, the abrasive face is vertical. The appliance of very little science.

Now the little fellows can be glued up to the correct dihedral by a simple and well fitting butt-joint. Of course they fit well - I have every faith in your abilities!

At this point we - actually, you - have a choice of wing bracing. Being a low wing loading, low 'G' model (if it isn't, it's down to you.), the traditional ply

brace as shown on the plan would be fine. Why not, it's worked for thousands of similar wings. But I went hi-tech here. After joining the wing panels I used some carbon fibre tissue to join the spars, LE and TE. The carbon adheres well with cyano. glue. Bear in mind that the wing is also glued into a three inch wide fuselage - that's enough centre bracing for me. It is still there on mine, and she's been into some strange attitudes

A carve and sand exercise to knock the LE and TE into shape, then run over the whole thing with a wide sanding block to smooth off the inevitable lumps and bumps. Now set it aside and build the rest.

At the back

Are a large set of tail surfaces. That's a hint - light is bright, unless you wish to end up with lead under the bonnet. Guilty, me lud! The tailplane is built up to save weight, the rest are from light, stiff 1/8" sheet. I didn't do it that way, but a built up fin would save a little weight in all the right places.

Now, the big bit

The fuselage is probably best built upside down. Cut out the top sheet as per the drawing. While you're at it, cut out the sides and doublers. Note the true lengths are greater than the side view, thanks to the tapers involved. Also, ensure the wing cutouts in sides and doublers accurately match the wing section.

For the firewall, I use 1/8" ply with a ring of 1/8" ply behind to give 1/4" local thickness for self-tappers to mount the Cox with. Yes, it works. No. 2 by 5/8" self-tappers, sold as servo fixing screws, will hold Mr Cox's 049 gems in place. I drill 1/16" holes, run the screws through, then soak the holes in thin cyano. to harden the threads. Haven't lost one yet (but don't intend to use this method on a lawnmower lump).

Pin the fuselage top down and glue the formers to it. Remember you're working inverted, so watch out which way up things fit. This is a good way to guarantee there'll be none of the dreaded banana fuselage disease, by the way.

Keeping up with the 'inside-out' theme, fit the 1/16" balsa doublers between F2 & 3. These actually sit inside the formers and top, as do the gussets aft of F3 and the 1/8" balsa doublers ahead of F2. I'd advise checking that the wing fits into the doublers accurately before fitting, to make life a little easier later on. It looks a little different? Fine, remember that light weight and a small, well balanced engine means there is no need for ply doublers or hefty longerons.

Now that the fuselage will stand up for itself, I fit the wing. Slip the wing through the fuselage side cutouts and juggle it round the dihedral, or remove the fuselage above the wing and drop the latter in. When happy, glue the wing into position.

Wasn't that quicker than messing about lining up nuts and bolts? I think I'll figure out something more sophisticated before I build that 1/3 rd scale version though.

As per the real miniMAX, the tailplane sits atop the rear fuselage. Glue substitutes for removable fixing methods again. Now you have the wing, fuselage and tailplane all in alignment, fit the radio gear while the whole business is accessible.

Steerage

There's space enough for a 500 mAh NiCad pack. Thanks to heavy tailfeather wood, I found this to be a valuable option. Next, a radio bay that will accept standard gear with ease. I used servos that are barely an honest 'mini' rating and a regular receiver, so small gear is not essential for Spooky.

Snakes do fine for the rudder and elevator drives. I used Goldberg flexible outers with flexible cable inners. At the control ends I used soldered Goldberg quicklinks which feature a neat clip that snaps over the end of the pin.

Adjustment is from inside the radio bay by tinning the cable ends and securing them to the servo output arms by Du-Bro fastenings. The latter are neat and provide mounting and adjustment in one. All that hardware is available in the UK, by the way. I am well known for buying strange holiday souvenirs in the shape of modelling bits, but all these were bought 'at home'.

A tidy touch is to fit a tube into the fuselage for the aerial. I use odd snake outers that appeared in the workshop. Like odd socks, these have no matching component and their appearance is largely a mystery. Another source is to splice drinking straws together to provide whatever length is needed.

No doubt some will say this is asking for interference. Well, none of my radios has been interfered with yet and the aerial is no closer to the control snakes than flapping cheerfully in the breeze. Why not be tidy?

All that remains is to anchor the snakes half way down the fuselage. I use scrap 1/4" by 1/16" or 3/32" strip to build a structure around the snakes.

This may look a little 'al fresco', but it is light and ensures the snakes are supported in their natural curves. No flapping snakes inside our fuselages, please.

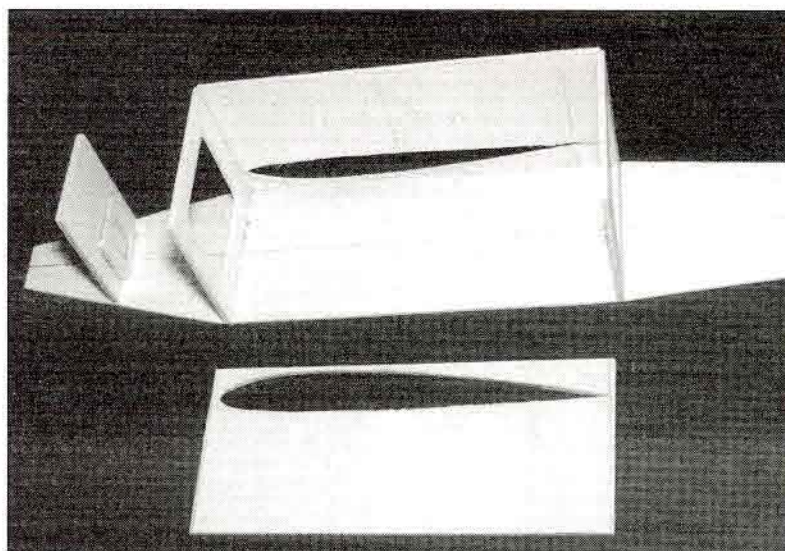
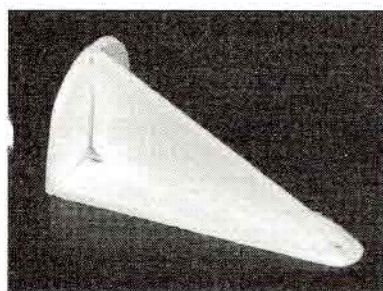
Back to the woodwork

Now sheet up the fuselage bottom. At the rear end is a ply plate for a nylon control horn serving as a tail skid. This cheap and cheery idea holds the back up, will take the odd ground loop with indifference and can be replaced quickly when worn.

The main undercarriage is much simplified, as the full-sized miniMAX wing struts fasten to the axle ends. I omitted them and used two pieces of bent piano wire soldered together. The 'V's are filled with a little scrap balsa epoxied in place and covered with Solartex; this holds them securely in place.

At the fuselage, the gear sits in grooves made up from 1/16" and 1/8" ply. A pair of these fabrications are glued to the fuselage bottom as per plan and the U/C is clamped up into the grooves. For light, unobtrusive U/C clamps, dismantle a pinned two part nylon hinge. Snip off the hinge edge part and cut what's left into two spanwise strips. There's a pair of thin nylon straps and, if you used the right hinge, they have pre-fitted holes.

Screw these to the ply U/C rails and they'll do fine. Most of the undercarriage stresses are taken by the ply into the fuselage anyway. The straps mostly stop the U/C from falling off, they're quite adequate for that purpose.



As the fuselage is all straight lines, Derek fitted the sides between F2 and F3 to the doublers then glued the lot in place. Front and rear sides plus doublers finish the fuselage off.

Covering

I reckon the only thing to top Solarfilm may be Litespan, with a little paint trim perhaps. There's no need to use anything heavy on this stiff little structure.

Covering a one-piece frame does take a little forward planning though. You may prefer to leave off the tail surfaces until the components are fully covered, then assemble the airframe.

One useful trick for covering the fuselage sides goes thus. Cut some narrow (1/4" or thereabouts) strips of film and cover the wing/fuselage join first. This gives a 1/8" filmed edge on each to allow for minor inaccuracies.

Now cut out a rectangle of film to allow an inch or so spare on the full fuselage sides. Carefully mark the wing root position on this and make a cut-out to the wing section. This needs to be an accurate match for the section - I use the wingtip.

Now carefully slip the film over the wing and settle it down onto the fuselage. Iron into place and that's it. Covering the wings is easy, thanks to the parallel chord and that the wing joins a straight edged stretch of fuselage at right angles.

Odds and ends dept.

Suffering a little tail heaviness? There's an ideal location for a little

'church roof' inside the nose and right under the crankcase. This ensures that any weight needed is added in the most useful position - as far forward as possible.

As I mostly hand launch Spooky, I mounted the switch vertically in the right fuselage side. I can launch her with my left hand, holding the Tx in my right, and have an instant visual check pre-launch, my hand being clear of the switch. Why? Ever hand launched an R/C model and knocked the switch off?

For power, I'm using a Cox 'Texaco' .049. This turns a 7" prop, rather than the usual 6", at lower revs. While hardly quieter than other Coxes, this engine handles well even on 5% nitro fuel rather than their usual diet of 15% plus.

The 'Texaco engine won't tolerate aerobatics. That isn't any criticism as it was designed for duration models which don't fly inverted anyway, just a point to bear in mind. If you want loops, etc., the Black Widow will stand some throwing around or there's the Dragonfly with a clunk tank that allows the full range of aeros

The pilot's headrest fascinated Woodward so much that he took a picture of it! This is clad in rolled card (old re-cycled cereal packet) then filmed to finish.

Tailpiece

A few figures from my US \$ pricelists - out of date, but interesting all the same. The basic miniMAX kit was around \$3,000 in mid-1992. Fancy petrol engines for your 'biggies'? The basic miniMAX uses a 28 HP Rotax 277, the 'hotter' Z-MAX uses a 45 HP Zenoah flat twin. Familiar names...

Size: 25 feet span, weight around 240 lbs. Performance: miniMAX cruises at 55 m.p.h., climbs 650 f.p.m. at 40 m.p.h. and stalls at 26 m.p.h.. Z-MAX, the high performance closed canopy version, lights up the sky with 90 m.p.h. at the top end.

Now, who still wants to build models? Apparently a large proportion of buyers of the full-sized plans in the US are modellers and some of those sales also resulted in full-sized aircraft being built.

Dreaming? The last address I had for the UK agents was UFM, 19 Kingshill Rd., Dursley, Glos. Phone number: 01453 860755!



Radio room. Two large-ish minis at the rear, standard Futaba receiver at the front and the NiCad sits between F1 and F2.

