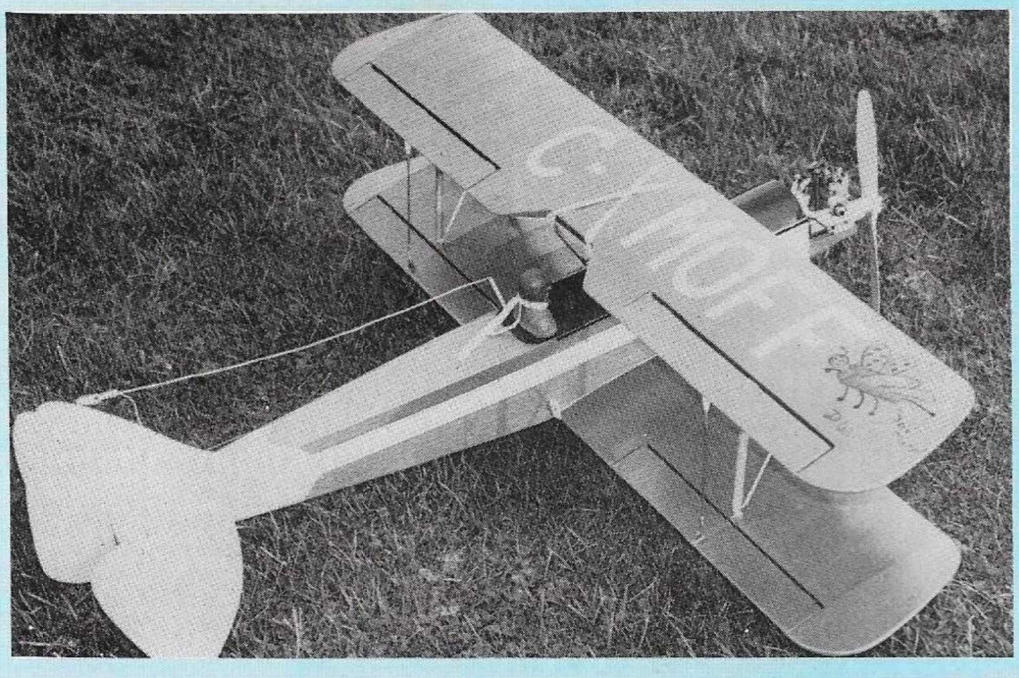
BOX-MOFF



One for the fun flyer!
designed by DERECK WOODWARD.

The Biplane — for any lover of flight, is surely the most evocative of all flying machines. From the hesitant first flights of the Wrights to the howl of a big Lycoming Pitts twisting across the sky, biplanes are a part of aviation history. Throughout most of that time fly the Moths — Gypsy and Cirrus Moths, elegant Hornet and Fox Moths, ageless Tiger Moths and the engaging, aerobatic Box Moff.

The what Moff? No — Box Moff, very rare indeed. So rare that the real one never existed, but the model is all fun and coupled to a 40 four-stroke, she's a cute little thing to take for a flight of fancy on nice days. Add to that, she's cheap to build, doesn't take up half the house and is good-natured.

So for a humorous trip into the era of real airplanes with two wings and a big fan, let's go make a little balsa dust.

Those wing things

Sorry folks, if you want nostalgia, you just have to cut out wing ribs! I try to do them first, a lot of guys use the sandwich method with two ply templates but I go for the coffee method. This needs only one ply template which you cut around with a knife. With the parallel chord all the ribs are basically the same shape, with odd holes and trimming as required. Where does the coffee come in? When I get bored I go make one and drink it while reading back numbers of R.C. Model World.

Worried about the centre spars? On a wing rib two centre spars take eight cuts, two spars top and two bottom take twelve cuts — centre spars also need no webbing, hence centre spars are quicker. Slip the ribs over the spars so each rib is about ⅛in. from it's correct position. Now run P.V.A. glue around the spars at the rib position, then slide ribs into position over the glue. Rest the spars over the plan on scrap pieces of ¼in., correctly align ribs, weight down and leave to set. If it was not quick and easy, I certainly would not use it. Note the length of the spars — by a strange coincidence it is the same as a sheet of balsa. One meadium hard sheet of ¼in. balsa and a little careful stripping and there's your spars.

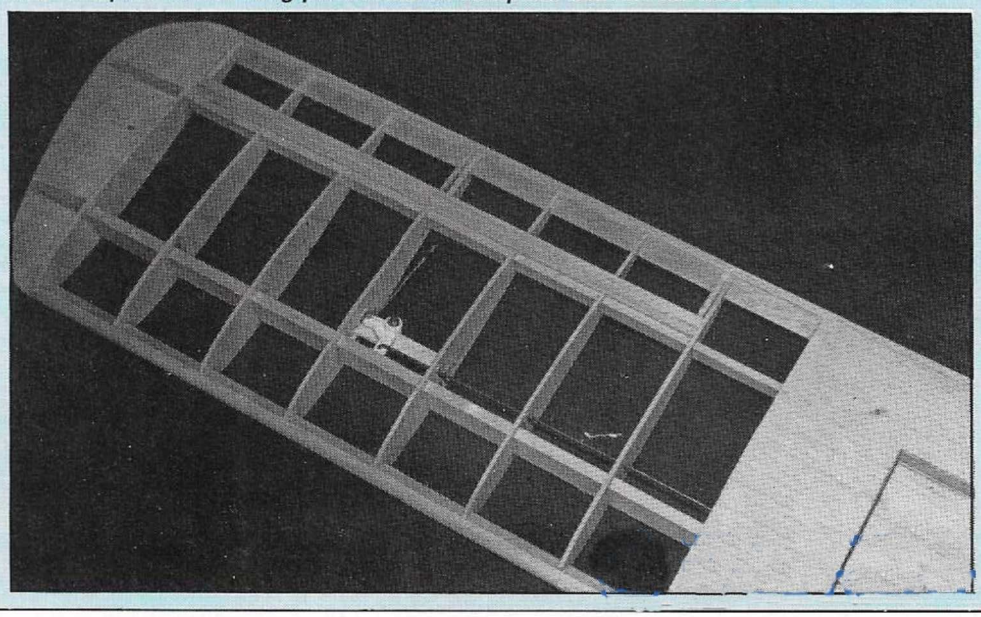
Trailing edge look a little different? A hacksaw cut in each rib end, glue in the ¾ x 1/32in. balsa top and bottom, a little light sanding and it's done. Very resistant to bench rash, car door bites, etc. Of course, you may prefer to carve and sand most of a sheet of ½in. balsa onto the floor.

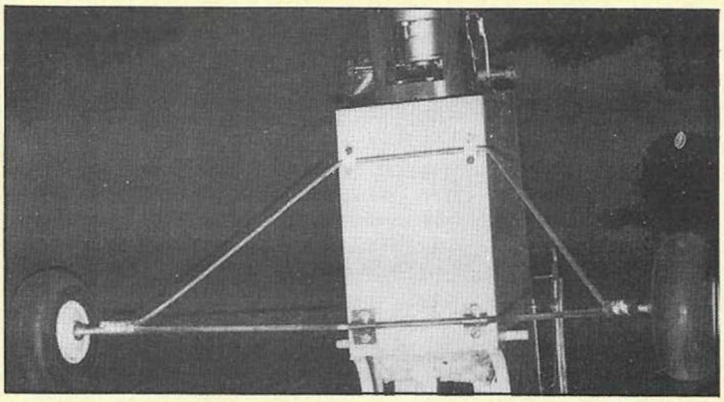
For the ailerons I make up the sub spar and aileron leading edge slot them up for hinges, cut out the ribs at the appropriate stations and install the spar/aileron leading edge as a pair. They are then shaped in situ before cutting the aileron free from the wing structure. This should ensure that they match up later. All four ailerons are identical.

When you fit the aileron cranks in the bottom wing, sketch your hardware in on the plan, make sure there are no snags being built in as you proceed.

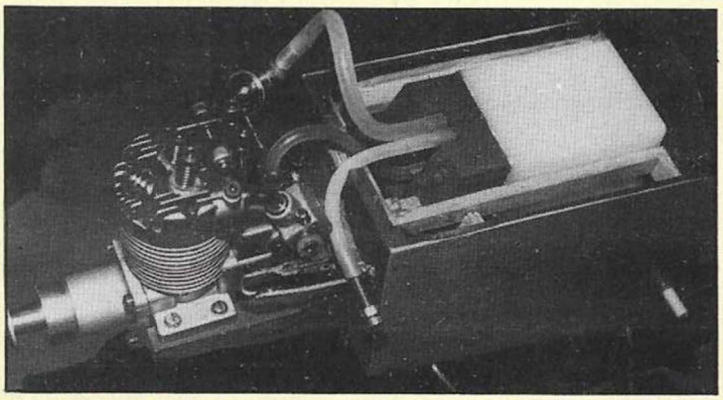
The cut out in the top wing centre section is really for effect, just cut out the trailing edge and edge the cut out with ¼in. balsa. Both wing centre bays are sheeted up as shown, don't forget the scrap build up off the spars to rib height under the sheeting. Add the ply spare and rib re-inforcement for the strut, epoxy in the wire hooks then add the balsa gussets to fair up to rib level.

Near complete lower wing panel. Aileron complete but not cut free.

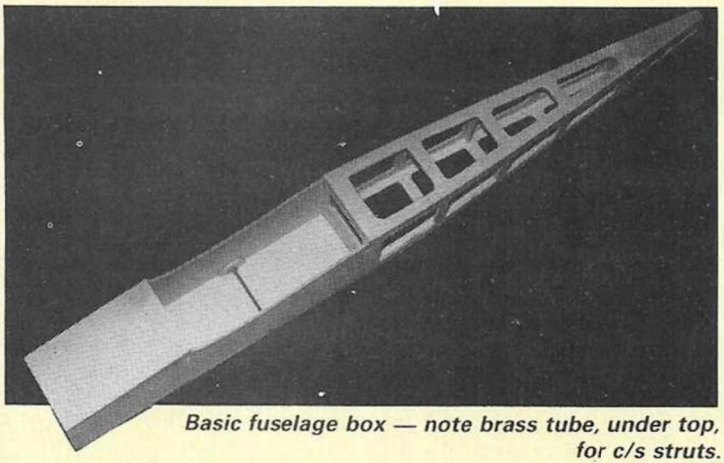




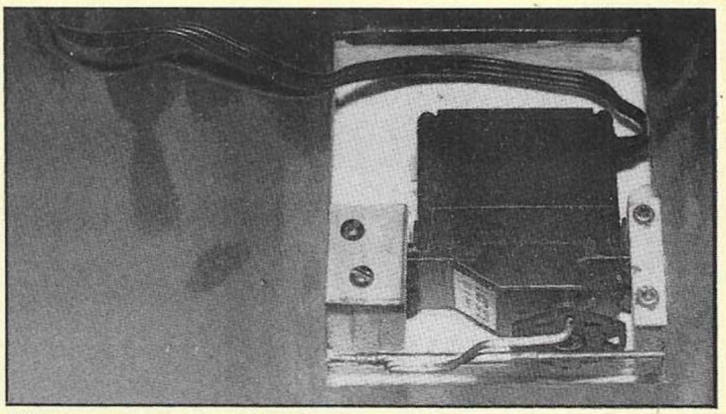
Main gear. Handles grass and tarmac equally well.



Front end. Enya 40-4C and 6oz SLEC Maxi-Tank. Cooling and access is unbeatable!



Basic fuselage box — note brass tube, under top, for c/s struts.



Aileron servo retained by ply plates in balsa guides.

Incidentally, the strut system has been crash tested — pilot error! The whole thing sort of collapsed gracefully with minimal damage following an impromptu inverted landing.

Now you have a pair of light, stiff wings, you'll need something to keep them apart.

The Fuselage

The only unusual part about the body is that it is made totaly from plywood. The material is known as Liteply, I obtain mine from The Balsa Cabin and it is pretty close to instant fuselage. The material is workable with a good sharp knife and a fret saw with a 3ft. by 1ft. sheet being sufficient for the fuselage.

One just cuts out the sides, top and bottom plus formers from Liteply and glue together. Due to a total lack of curves I found marking out by measurement easier and more accurate than tracing. The idea is not really very original, but certainly gives a true, light, cheap and strong fuselage.

Note how the centre section struttery plugs into brass tubes epoxied into the fuselage. The struts are made up in place, but are then removed for covering, etc. The vestigial top deck is largely ornamental and on my prototype was from card (cereal packet!) over balsa formers. No cowling was fitted on my Moff, basic it may look but the access and cooling is good.

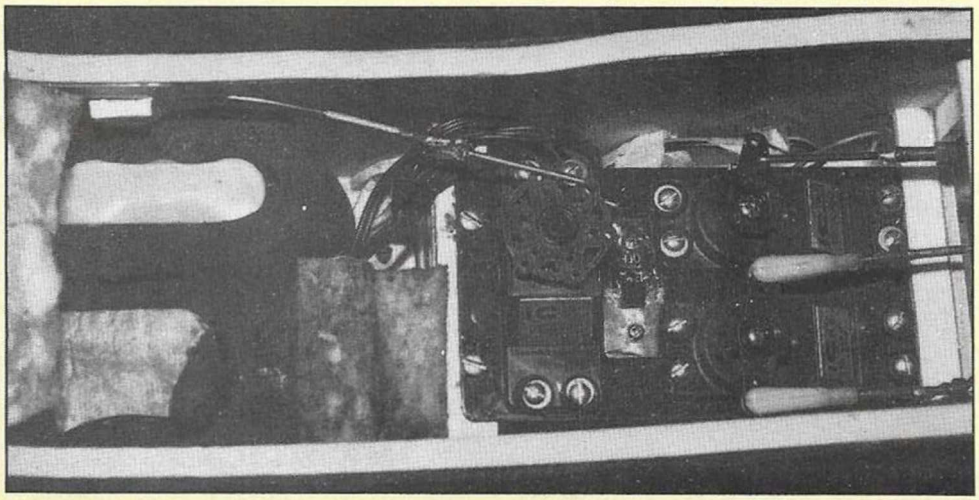
A six oz. fuel tank fits easily, held in the huge tank bay by ¼ x ½ in. balsa framework.

Tailfeathers, well what can one say about a few pieces of ¼in. balsa cut to a well known shape. Select firm but light stock here — no 'Heart of Oak' timber, please. Note that the fin and tailskid mount key through the fuselage top and bottom respectively to give a good solid rear end.

Getting it together

Right, we have a pile of bits so let's make it into a biplane. Lightly band the bottom wing into place and check for squareness.

Radio Bay — nicad and receiver at front. Closed loop adjustment for rudder is internal.



Now try the top wing, note the ¼in. wide ply epoxied to the wire top wing cradel. This prevents the wire damaging the wing sheeting. If the top wing is not parallel to the bottom, adjust by packing on the low side.

Now add the fin and skid, result — one easy to rig biplane, nice and true.

Wing struts are from 3/16 x 3/8in. spruce, and are made to suit your model. The ends are from ¼in. tinplate strip, folded around a piece of wire then epoxied into a sawcut in the strut end. When the epoxy has cured, drill through both wood and tin and add hooks as shown, bent from paper clips. Struts are retained in use by rubber band 'incidence wires'.

The undercarriage is a big, solid affair from piano wire giving lots of prop clearance.

Please don't forget to fit a dummy pilot, nothing elaborate is needed but a biplane without a pilot is a real downer.

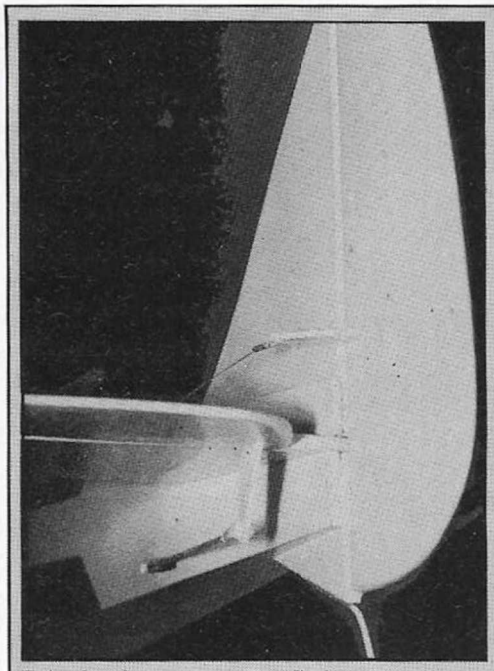
Steering Gear

First a note on the ailerons. With all four going ¼in. each way, the roll rate is very fast and pretty axial. I tried her on the lower two only with 3/8in. each way, this gave a slower, more barrelly roll, with roll rate varying dramatically with airspeed. I do advise fitting all four ailerons for efficiency.

The radio bay easily takes standard gear, servos to the rear, battery and receiver to the front. I used closed loop to drive the rudder and a 'Goldenrod' type cable on the elevator. Throttle control is by flexible bowden cable as usual. The aileron servo sits in a balsa box and is retained in place by ply plates screwed into place.

Covering

My Box Moff is done in Solartex with paint and film trim. Structure is rigid enough for a full film finish. Whatever you use, make it cheerful and easy to identify which way up



Tail feathers — a well known shape. Rudder cable adjustment is at servo end of cables for neatness.

she is!

As well as sealing the covering job, ensure that the nose area and tank bay is proofed against oil seepage.

When I think I've finished a model, I like to put it to one side for a night, then go and check her over to see if anything has been forgotten. There's usually something.

Happy? Good, let's go flying.

Call Rolling...

Taxying on grass is easy (as long as the wind is light). To turn, rudder over and blip the throttle. To turn faster a dab of down elevator unloads the tailskid. All great fun and very practical. In a strong wind or on tarmac — I pick her up and carry her, it's much quicker.

Straight into wind then, ease the throttle to full from a standing start, let the speed build then ease her away into her natural element.

Box Moff is neutrally stable in pitch roll and yaw, with only slight yaw/roll coupling. Aileron response is rapid, as is the rudder, elevator is rather smoother but still powerful. That is my preference, tune to suit yourself as you get familiar with her.

To stall, enter a fairly steep climb, throttle to idle and pull up. Box Moff will then wander along rather slowly until you stop trying to provoke her, then she'll fly along as if nothing happened. From this behaviour to rudder/elevator spins, upright and inverted and a high speed flick roll is beyond me. Flick roll tricks are great fun, hard 'up' and rudder over and she's away. To exit, centralise 180 degrees before desired exit, with those stubby wings she flicks fast.

This has led to two party pieces I developed for the Moff. Into a vertically banked turn, pull full up then hard top rudder to snap roll over into the vertical bank the other way. The other trick is to enter a vertical climb on full power and do a sort of one and a half snap at the top to reverse direction, somewhat like a stall turn. I am still working on the latter, but it works often enough to be interesting.

Oh yes — she will also do all the routine stuff like loops, rolls, inverted, cuban eights in a cute biplane fashion with panache and safety.

When it's time to land, especially if you find yourself deadstick, remember that drag caused by all those wings, struts etc. Don't try stretching the glide or you will get a sinking feeling! I remember this as 'lower the nose and descend in control, raise the nose and come down out of control'. With power available, I approach to land on about quarter power then take all the power off at five feet or so, flaring as the wheels skim the ground. Deadstick, remember the above, watch your airspeed lest the ground rise up to smite thee. I find it great fun to position the model , chop the throttle to idle and land without opening up again. This requires a steep accurate glide approach into an accurately flared landing. If I get it right (about once in ten), I get this warm sense of achievement.

So, for some wind in the wires, barnstorming fun, try a Box Moff, I don't think you'll be disappointed. If a pseudo-Moth doesn't appeal, change the tip and tail shapes and imitate your favourite bipe, perhaps add a cowling. Unlike some designers, I won't mind at all. Good luck, have fun and fly safe.