72” MOSQUITO BUILD ARTICLE

FUSELAGE

Before you start thinking about building the fuselage, you will need the assistance of a building jig otherwise a twisted or distorted fuselage will be net result… i can guarantee.

So begin by making up the two fuselage halves known as FS1 & FS2.

Mark all the former positions on the fuselage sides, then glue formers F3, 4, & 5 into position on one side only.

Now use a fuselage jig to clamp into position the other fuselage side.

Now add formers F6, 7, 8 & 9

Before adding formers F1 & F2, the outside of the fuselage at this point will need to be wetted thoroughly and vertical ‘saw cuts’ added to a depth of 3mm to the inside face to aid the sharp bending radius.

Fit F1 & F2 and apply pressure using clamps to retain the formers.

Now add the top spine S1 & S2 and add the top 6mm sq longerons.

Remove the fuselage from the jig and replace, up-side down. Now add the bottom spine S3 & S5 and the bottom 6mm sq longerons. Add bomb bay access hatch formers, F3A, 4A, & 5A. Leave a slight gap between F3 & F3A and between F5 & F5A. this will allow a saw blade to be inserted when the hatch is being removed.

Now begin to sheet fuselage using soft 3mm balsa Do this in sections between the spines and the longerons and the fuselage sides. The build photo log will give some direction on how best to achieve this, so have this to hand.

When the sheeting is complete, it will require a fair amount smoothing with a razor plane and sanding block. Some lightweight filler will be required here and there.

When happy, cut away the access for the tail wheel and trim the cockpit opening. You will need to remove part of S1 and the spars to provide an unimpeded opening. On the prototype, I further removed the top cross piece of F3 but only do this when the base airframe is finished.

TAILPLANE

The tailplane is a built up affairs and constructed over the plan. The ribs are fully symmetrical so it doesn’t matter which way round they are fitted. However you will need a small amount of dihedral built in, so when you build the tailplane over the plan, it is effectively upside down! The dihedral is produced as a consequence of the ribs depth

tapering. When you remove and turned over the tailplane, you will get the picture so to speak!

Firstly make up the tailing edge from a laminate of 3mm, incorporating TB1.
Now pin the trailing edge to the plan. Fit the ribs on to the trailing edge and the 'bottom' spar. You will have to notch the spar at the between the two T1s to allow for the dihedral. Now trim and fit the inner leading edge made from 3mm sheet balsa. Note this is made in three sections. Remove the tailplane from the plan and fit the bottom spar. The positive dihedral should be just noticeable to you now!

Trim the trailing and leading edges flush with the ribs and sheet top and bottom with 1.5mm soft balsa. Note that the bottom sheeting will stop and start again at T1 to allow the retracting tail wheel to recess.

The outer leading edge can now be applied. Finally shape the leading edge to a smooth flowing curve.

The elevator is made from a 3mm balsa centre core cut to the size of the elevator. The leading edge is cut from 9mm sheet balsa to match the depth of the tailplane trailing edge. The leading edge is glued centrally to the core.
3mm riblets are then applied to the top and bottom of the centre core as detailed on the plan. This effect gives an 'open framework' appearance for the elevator. Finally cut out the tailplane tips and glue these to the ends of each elevator and sand to a smooth profile which should blend into the tailplane seamlessly.

The fin is made from a sandwich of 9mm-3mm-9mm balsa. The cut outlines for each piece are shown on the plans. The fin should be profiled with a razor plane and sanding block. When finished cut away the matching profile on the top of the fuselage to allow the fin to be inserted between the fuselage spine S2.

The rudder is made in a similar way to the elevators with a centre core and riblets .

WINGS

The wings are traditional type construction and made over the plan.
Before construction can start, the spars need to be made. At W9 the spar changes size from 9mm sq to 3mmx 9mm so as shown on the plan, make up two sets of wing spars. When done, pin the lower main wing spar on to plan. You will note that each rib has a jig tab profile and these have been set to give the correct washout for the wing panel. Between W10 & W11, a piece of 1mm packing will be require under the spar as shown on the plan. Now fit all of the wing ribs remembering to angle W3 & W4 to take account of the wing dihedral against the nacelles.

Now trim and fit the top main spar and the top rear spar. Fit the inner leading edge and the trailing edge where the aileron sits and the top spar at the flap position. Now sand the top inner leading edge, spars and trailing edges flush with the ribs, so the wing skin sits flush on to the ribs. Now begin to sheet the top of the wing with 2.5mm medium/ grade sheet balsa. When done, remove the wing panel from the building board and fit the remaining spars to the underside and trim off the jig tabs. Now trim the wing trailing edge to the exact profile as shown on the plan.

The aileron and flap servo mounting bearers should now be recessed into wing ribs W2 & W3 and W7 & W8. At this point either install the aileron extension lead or install a ‘draw’ string for this to be done later. Now apply the shear webbing between the main spars as shown on the plan.

Now sand the bottom inner leading edge, spars and trailing edges flush with the ribs.

Now fit the wing outer tubes and bond these into the ribs and against the sheer webbing using epoxy glue.

Begin to sheet the underside of the wing with 2.5mm medium sheet balsa. Be careful not to induce any ‘twists’ when enclosing the wing with the underside sheeting. Might be an idea to make a wing ‘cradle’ to support the wing during the sheeting process

Now trim bottom wing skins flush with the edges. Now fit the outer leading edge, made from 12mm sheet balsa and shape this to the profile as shown on the plan. Again it may be useful to have the download build photos to hand as they give a pictorial view of how and where the wing skin is trimmed back to.

NACELLES

The main parts of the nacelle structure are made from 6mm lite ply. Make up NA1, NA2, N2, N3 & N4 and glue these to form the structure. Now glue this into position(between W3 & W4).
Now draw a centre line and mark the positions of N5 through to N8. Glue these into position noting the correct upright angle as shown on the plan. Note that bracing pieces are glued across N5 & N6.

The main undercarriage mount RM1 can be cut and fitted.

Now add the nacelle sides NA3 & NA4 and glue these to the side edges of N2, N3, N4 and then bend this round to pick up the bases of N5 to N8. Glues to the wing sheeting too.

Now thoroughly wet the balsa nacelle sides and using clamps, roll the sides against N5 to N8 to pick up the full profile of the nacelle.

Now fit N9

Add the top and bottom 4.5mm sq longerons and then begin to sheet the top & bottom front section with 3mm soft balsa. Once again the outside of the sheeting should be wetted to aid the bending process. The rear top fairing can now be added using a laminate of 12mm and 6mm balsa.

The rear bottom pieces, made from 12mm balsa, and the side rear fillets, made from 3mm balsa, can now be fitted and roughly shaped.

On the prototype, I decided to add undercarriage doors and the easiest way to make these is to form them from solid balsa. By doing this the doors will be much stronger and of course, retain their shape.

Firstly, tack glue N4A into location and then make up the side pieces from 12mm balsa. You will need to chamfer the bottom edge to about 30deg and the hinge line edge to about 70deg. Test fit these pieces and when happy, tack glue them into position. Trim the bottom edge again if necessary so the bottom sheeting its flush across both side pieces. Again, the build photos should help here.
Fit the bottom sheeting and with a razor plane, begin to shape the underside to a smooth flowing shape.
Add the rear block and 'blend' this to shape.

Finally use sand paper to smooth the underside to a finished state.

The undercarriage doors can now be cut free using a hacksaw blade and knife. Before completely removing, draw a centre line down the middle and then run a knife along to split into the two doors.

N4A, which is only used as a jig former, can now be discarded.

The inside of each door can now be fashioned to a smooth concaved curve. For the hinges, I used mylar strip in the positions as shown on the plan. By the way, the fluffy mylar hinges that SLEC Ltd sell are ideal for this job.

On the assumption you are fitting retracts, there will be bit of fettling work. The wing sheeting and the lower 9mm x 3mm spar will need to be removed to allow the big 5" wheel to retract. The lower part of N5 & N6 plus the brace will also need removing to give unimpeded access.

It is worth pointing out that when removing the bulk of N5 & N6, the sides may 'spring in' slightly so a little shaping adjustment may be required on the undercarriage doors.

The pulling closed of the doors is done by a simple rubber band, looped though a T-pin, secured to each door. As the legs retracts, the rubber band is pulled into the nacelle and the doors close.

To keep the doors open and avoid fouling the legs, a shaped door stay is glued to the inside of the doors running back from the front edge. Once again the photo build log should assist understanding here.

BACK TO THE WINGS

Make up each individual aileron as shown on the plan by cutting to shape the bottom skin first. Trim and fit the leading edge. Now fit the aileron ribs and the aileron horn support block. Finally enclose with the top skin and trim to shape as shown on the plan.

Make up the four individual flaps as detailed on the plan. Note that Robart pin type hinges are need for the flaps and torque rods drive the outer part of the flap.

The wing tips are made from block balsa or a sandwich of (12mm & 6mm) sheet balsa. Glue the tips on to W12 and then roughly shape the tips to shape then finally sand to a smooth flowing profile to match the wing.

FINISHING & COVERING

The VAC formed nose cone can now be fitted and blended in the the fuselage. Use lightweight filler to take out any imperfections in the joint. You will not need to make the nose detachable.

The Bomb bay access hatch could be made to open and bomb doors but as time was pressing on this build, I decided to leave it as a hatch. Access for the batteries and the radio is done via this hatch.

If you plan to buy the additional wood pack that goes with the CNC pack, the wing tubes will be supplied as part of this pack. The front and rear outer phenolic tubes are cut into three pieces and are glue fitted into the wings and fuselage. The inner aluminium tubes remain in one piece and are glue secured in ONE wing only. This allows the tubes to then slide through the fuselage and into the other wing to make a very rigid joint. The wings are held secure from pulling out by a simple self-tapping screw and spring washer that goes through the inner and outer main wing tube, as detailed on the plan.

As part of the vac set, two scale spinners are supplied. There is a detail on the plan on how to fit these.

The cock pit detailing can now be done if you so wish. The pilots used were the 1/9th scale latex ‘unpainted’ type which were originally sourced from J Perkins stockist. However, TND Ltd now distributes these pilots under the ACE pilot banner from a new manufacture. All the moulds have been remade and the quality is now excellent with sharp definition. Notwithstanding this, the manufactures have kindly put together a Mosquito pair of pilot & navigator just for this model so you really can have a scale model in every way. If you wish to acquire these, please go to the web site for more detail of all the range.

The radio installation is quite straight forward. Three 6kg standard servos were used in the fuselage to drive the elevator, rudder and steerable tail wheel. The elevator used a standard carbon tube push rod (from Bucks Composites) with 3mm metal rod ends. The rudder control used a closed wire system.

Due to time constraint, the prototypes were covered using silver iron-on Profilm ‘Easycoat’ and using 900 carbide paper, the shiny surface was removed ready for painting.

PAINTING AND ROLLING OUT

The prototype mark and type was based on the only airworthy Mosquito currently flying and based in New Zealand.

The paints used were the small tins of Humbrol Enamels. The main colours are Dark sea grey and Dark Green for the top camouflage and Light Grey for the under surface. You'll only need three or four tins of each to finish the model.
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The squadron markings and decal were hand painted but I'm sure if you give the sizes to Lee at Pyramid Models, he could knock you out a set of vinyl decals.

For the prototype, I used some old 5300mah 4s lipos from 4-MAX. With these installed, the C of G position was achieved without any ballast. With a newer battery, the sizes and weight is likely to be less so some nose weight may be needed depending on your selection of battery type. What I would say is do not compromise the C of G position in any way! Make sure it is spot on and slightly forward (in front of the main spar)

FLYING

One of the great things about electric flight these days is the power that can be generated. This transposes into being able to turn much larger and more scale props. For the Mosquito, 4-MAX managed to match a 3-bladed 14"x7" prop with one of their 'softer' motors. The prop size is very near scale and the particular manufacture (Master Airscrew), also produced an opposite rotation version. As a consequence the mosquito has a balanced torque set-up so ground handling, take offs and flying is not compromised by the old problem of motor turning the same direction and causing the annoying screw-off / pull to the left….

Consequently you really don't notice you are flying a twin engine model.

The power set up from 4-MAX is a nice balance and is not over powered. The current draw even with the 3-bladed props, is quite low and during scale flying you're pulling around 30amps. I managed two 5minute flights and only used up 4000 of the 5300mah available so this really is an efficient set up.

The second outing for the model was on a much calmer day in late August and although the skies were grey and the definition of a camouflaged warbird could have caused orientation issues, the day was albeit a perfect for flying.

So having carried out some ground check, the Mosquito was taxied around the beautifully mown strip at Headcorn Aerodrome.

The model was fitted with a retracting steerable tail wheel made from a modified steerable nose wheel. The main wheels are quite well forward so the Mosquito's ground handling is impeccable.

So lining up the model into a very light wind, the throttle was gently opened and the model tracked straight and true with only minor rudder correction. After some 20meters and at full power, a small blip of up elevator was applied and she was away. A very small amount of elevator and aileron trim was needed to get the model to track straight and true.
Now anyone who has had the pleasure of flying a model Mosquito of any size will know that it has similar characteristics to a spitfire. It simply grooves……

Very simply it will hold trajectory and go exactly where you point it. The long fuselage and large tail plane really give this model a wonderful performance, although you will notice a very slight tendency fishtailing when flying cross wind, but other than that, she has impeccable manners.

The Mosquito is no slouch and you'll find she eats up the sky in a very scale like-manor Any manoeuvre a spitfire can do, the Mosquito will match with equal gusto, but with any war bird, scale flying is the order of the day. All I would say watch a real one flying on YouTube and emulate that.

So having only previously landed the model in a howling gale, I was keen to see what the mannerisms were like under calmer conditions. I decide not to deploy flaps and see just how slow I could lander her without flap assistance. I had dialled in 30% exponential on the elevator prior to the flight based on previous Mosquito experience. In short you will need a health dosing of elevator to flair the model out.
So bringing the model in low trajectory, the motors were slowly cut to quarter power. The model gently descended to some 2 foot before feeding increments of up elevator were applied to maintain level hold and then reducing power to effective tick over. The Mosquito held beautifully and slow with full up elevator applied to a greaser of a landing….The expo had done its job perfectly.

On subsequent flight, especially with a stronger head wind, landings required a little more control and additional power to keep forward momentum and elevator authority. I did find you had to fly the mosquito to the ground rather than just cutting the throttle to tick over and 'gliding' her in.

All in all this project has been a bit of a journey and although I would have loved an extra few weeks to do a proper scale job, I can't help being proud of what was achieved in the 4-month from start of design to what you see today….enjoy….

Specification

Wing Span- 72" (1829mm)
Length- 55" (1390mm)
Weight- 14lbs (6.36kg)
Wing area- 5.2 sq' (0.49m2)
Wing loading- 40oz/sq' (13.8kg/m2)
Motor- 2 x 1500w out-runner motors
Battery- 2 x 5300mah 4S lipo (one per motor)

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