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## **67" ZERO**

### **WINGS**

The wings are traditionally made over the plan. Cut and pin the forward main wing spar on to plan. Now fit all of the wing ribs remembering to angle the forward part of W1 to take account of the wing dihedral. Note that the wing ribs have jig tab fitted to the ribs to help you build a twist free wing. For reference, no washout was used in this model due to the wide tips and generous wing area.

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.

Add the wing spar WS1 and the rear part of W1

Now sand the top inner leading edge, spars and trailing edges flush with the tops of the ribs so the wing skin sits flush against 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 any overhang on the wing sheeting and trim the trailing edge between W1 & W6 to the exact profile as shown on the plan.

Now construct the other wing panel to the same point

The aileron and flap servo mounting bearers should now be recessed into wing ribs between W4& W5 and W8 & W9. 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.

Install the retract mounting plate UC1 & 2. The retract mount have been spaced and sized to accept the 120 size Eflight electric retracts.

Now sand the bottom inner leading edge, spars and trailing edges flush with the ribs. The wings should now be joined making sure the wing braces are secured with 30min epoxy.

Now fit balsa infill pieces between W1 & W2 at the rear to reinforce the wing bolt position. Where the wing dowels pass through the leading edges of the wing, reinforce the inner leading edge with scrap pieces of 3mm ply.

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. Remember to mark the positions of the retracts bearers and servo mounting positions with a pen as the sheeting is fitted.

Now trim the bottom wing skins flush around the perimeter. Now fit the outer leading edge, made from 12mm sheet balsa and shape this to the profile as shown on the plan.

Now cut out the wing tips from a sandwich of 6mm & 12mm balsa and then glue the tips on to W13. Roughly shape the tips and then finally sand to a smooth flowing profile to match the wing and as shown on the plan.

Make up each individual aileron as shown on the plan by cutting to shape the bottom skin first. Now trim and fit the leading edge. Now fit the aileron ribs (rear parts of the main wing ribs) and the aileron horn support block. Finally trim the top of the leading edge flush with the ribs and then enclose with sheet balsa and trim to shape as shown on the plan.

Make up the individual flaps from 2mm lite ply, as detailed on the plan.

Finally a 3" (75mm) wide strengthening glass fibre bandage should be applied around the joint and bonded with epoxy or PVA.

## **FUSELAGE**

The main fuselage side are made in three pieces as depicted on the plan FS1, 2 & 3.

Glue the parts together to make a left and right hand panel and mark all the positions of the fuselage formers.

As none of the fuselage formers are perpendicular to the fuselage sides, it is essential to use a jig of some description. Now throughout my aeromodelling exploits I will confess I have never used or owned a building jig and have always built by eye. So getting that little bit older and the eyes not as trustworthy as they use to be, I had decided a little help was needed! So I duly acquired a SLEC Ltd building jig and all of a sudden, life just go a whole lot easier.

The easiest way to begin is to tack glue F1 and F5 to one fuselage side at approximately the correct angle, and assemble this into the building jig. Because there is still movement in the joints, you can adjust the framework within the jig to achieve a true and square frame.

When happy, glue F1 & F5 to both fuselage sides and then add the remaining former

Now add the 6mm sq longerons to the top sides of the fuselage.

The fuselage can now be removed from the jig and the lower rear longerons fitted.

Now roll the lower parts of FS1 against F1, F4 & F5. You will have to wet the outer surface of FS1 to avoid the wood splitting. Finally add F2 into position.

Now sheet the forward top part of the fuselage between F1 & F5 using 3mm sheet balsa. Each side can be made up to form a single sheet cut approximately to size and shape. Make sure it overhangs the tops of all the formers. To fit the sides, start by gluing the bottom edge to FS1. Now curve the top fuselage side and glue these to the upper edges of F1 F3, F4, F5 and the top longeron.

You will need to wet the outside surface of the fuselage to aid bending. Be patient bending the wood and only apply gentle pressure. To avoid the top sheeting 'springing' apart, clamp the top edges from F1 to F6 using masking tape.

Using a razor plane, remove any overhang to bring the fuselage sides down flush with the tops of the formers F1 & F3 and the top of the longerons between F3 & F5. Note the slight change in direction of the top sheeting between F1 & F3. When happy this has been trimmed correctly, apply the top front decking using 6mm sheet balsa.

Add the bottom sheeting between F1 & F2

Now sheet the top rear fuselage and the lower rear fuselage using soft 3mm balsa in a similar fashion to the front section. As the curvature is slightly tighter at the rear, the balsa will have to be softer and wetter than before. Again, be patient bending the wood and only apply gentle pressure. On the prototype, I managed to sheet the complete rear fuselage in four pieces (two top and two bottom), but for ease you may wish to break it down into smaller pieces, say 25mm wide strips and plank the fuselage in a more traditional way.

Finally cut from 12mm balsa and fit the rear cockpit decking.

The fuselage can now be shaped using a razor plane and a 250mm long (or so) sanding block, taking note of feathering in the 4.5mm thick fuselage centre section into the 3mm side sheeting. Take your time over this as the effort spent here will only enhance the look of your finished model.

## **TAILPLANE & FIN**

The tailplane is made over the plan and built up-side down. Pin down the trailing edge which is made from 6mm sheet balsa. Now fit all the tailplane ribs. Because there is a small amount of dihedral, the spar will need to be 'kinked' slightly in the centre. This can be done with a hacksaw cut to the depth of 1.5mm at T1. Now fit the spar making sure it is not 'tugging' on the ribs and pulling them out of shape.

The inner leading edge strip (from 3mm balsa sheet) can now be applied. Use a straight edge on the top front edge of the ribs to keep them 'lined up' before gluing the leading edge into position.

Finally add the stub leading edge between the two T2's

The structure can now be removed from the plan and the top spar fitted. Now sheet the top and bottom surfaces of the tailplane using 1.5mm sheet balsa.

In order to fit the tailplane into the fuselage, a portion of the front sheeting between both T2's, needs to be removed back to the 'stub' leading edge as indicated on the plan.

Apply the outer leading edge of the tailplane and cut out the tips from 12mm sheet balsa.

The fin is made from soft 12mm balsa with a 6mm ply fin post to provide lateral security. The fin is then shaped to the profile shown on the plan.

The elevators and rudder are made in a similar fashion. First cut the centre 'core' from 3mm balsa to the profile shown on the plan. Now cut and fix the leading edge centrally to the edge of the cores. Now cut and fit 3mm wide riblets. The easiest way to make these is to cut strips of 3mm balsa to length, mark the position of the riblets on each side of the

cores before fitting the strips of balsa. To taper the strips to a triangular riblets, use a razor plane and sanding block and carefully 'feather' the ribs to the trailing edge.

Back to fuselage and cut out the tailplane profile in the sides of the rear fuselage and create the fin opening in the top.

Before fitting the tailplane into the fuselage, you will need to break the top fuselage sheeting joint at F8. By prizing the sheeting apart, this will allow the tailplane to slide through into position. Once happy with the position, glued in situ and the top fuselage sides reattached to F8

The separate rear trailing edge section of the tailplane that fits into the fuselage, can now be made over the plan using the rear parts of T1 and T2. The leading edge of this section will need a slot cut in order to recess the elevator torque rod.

When complete, this can be inserted (with torque rod in situ) and glued into position.

Trim the top rear sheeting to allow the fin to fit through and located into the tailplane. When happy glue the fin into position

The wing 'T' nut mounting plate can now be installed along with the wing retaining dowel into the wing. Drill the corresponding dowel holes in F2 and adjust to give a snug fit. The wing seat will need a little adjustment so it sits flush over it whole length.

When happy, centralise the wing and drill the wing mounting bolt holes. Add the retaining 'T' nuts to the plate and secure the wing into position.

Now cut out the ply wing fairings pieces from 0.8mm birch ply (a template is shown on the plan). With the wing fitted but loosened off, slide the ply fairing pieces into position between the fuselage and wing. When happy with the positioning, tighten the wing and glue them to the fuselage edges. Remove the wing and you should find the fairing will now stay in position at the correct angle. Finally check the joint is secure and add more glue as appropriate.

Now cut and fit the 3mm lite ply rear fairings linking the fuselage and the back edge of the wing fairing.

Using soft 1.5mm balsa, cut out to the profile (a template is shown on the plans) of the rolled fairing pieces. These pieces should be wetted slightly and then firstly glued against the fuselage before applying a concave roll, and gluing to birch ply and lite ply fairings edges. The nose piece of the fairing where it wraps around the wing leading edge, is made from solid balsa and shaped to blend in with the rolled sheeting.

Refit the wing and using 12mm balsa sheet, cut out the front under fairings and 'blend' this into the fuselage and wing.

Trim the VAC form cowl as required. I have put some exhaust stack detail on the plan if you want to add a little further detail. For securing the cowl, make up four hardwood blocks and glue these to F1 at 90deg centres. The cowl can be fixed with 2mm screws.

## **COVERING**

It's up to you when you fit the canopy, but cockpit detailing and fitting could be done before cover. The Zero is approximately 1/7th scale and to provide that little more authenticity, ACE pilots have made a bespoke WW2 Japanese pilot, just for this model. These will be available through TND Ltd.

The prototype was covered using white Easycoat from J Perkins and using 600 carbide paper and wire wool, the shiny surface was removed ready for painting

## **FINISHING**

Fit all the control surfaces with pin hinges and secured with glue and pins. Fit all the servos and the all the control horns. For the elevator and rudder pushrod control rods I used on the prototype 10mm dowel and 3mm x 200mm pushrod ends (shorten as required).

The battery access hatch is created in the nose just in front of the canopy. I used some hatch catches from SLEC Ltd to secure this. The battery tray is fitted at an angle to allow for a better withdrawing access.

The prototype markings and type is based on A6M2 Zeros based at Rabaul, New Britain, in November 1942. For the main colours I used a very light grey across all surfaces with dark green flecks on the top surfaces, produce from a 'fine finishing' modelling air brush.

For the decals, these were simple enough to be painted directly on to the model but you could just as easily use red and yellow solar trim across the fin.

## **FLYING**

Now there's an old saying that if it looks right it will fly right and with the Zero, you can pretty well guarantee its going to be a very stable platform with that large wing and broad wing tips.

Well the first flight occurred back in July 2016 without cowl or canopy. In fact it really didn't resemble a Zero at all.

I decide to test the model in pretty poor conditions, grey skies and the wind was gusting up to 30knots; all generally very unpleasant. Now any modeller of sound mind wouldn't have even bothered to get the model out the car but this day was the only opportunity I had for the next few weeks. Not the ideal reason to test fly but a reason anyway!

So on opening the throttle she leapt into the air in no more than a couple of meters and climbed skywards like a homesick angel....Once the model was trimmed she felt quite stable even though the gusty conditions were visibly knocking the model in all directions. Flying the model downwind I can only describe as a cheek clenching experience. I would go on to say the model wasn't flying....it was just being carried along! However, it did prove that although the aileron response had albeit disappeared, the model didn't tip stall and remained controllable. After 4 circuits of madness, enough was enough and I brought her in for a landing, where she promptly hovered to a stop.....not quite a vertical

landing but very close. If this flight proved anything, it showed the model was very resilient.

The second outing for the model was in its finished state and final colour scheme. The day was much calmer, with clear skies and good sunshine; albeit a perfect for flying.

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

The model was fitted with a simple steerable tail wheel linked directly into the rudder. The main wheels are quite well forward so the Zero'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 20 meters and at full power, a small blip of up elevator was applied and she was away. Almost instantly the throttle was backed off by 40% or so and she was still climbing away, albeit in a much more respectable pace.

The undercarriage was retracted and the model just came to life. By the first turn everything felt right about this model, the power, the stability; a real pussy cat and pretty darn perfect. A very small amount of elevator and aileron trim was needed to get the model to track straight and true.

The model I have to say installs great confidence and the feeling that one can pretty well do anything with this model. She has a lot of characteristics similar to that of a Harvard and for that reason, she is a dream to fly.

The electric set-up supplied by 4-Max was designed to turn a 16" scale 3-baded prop and as a consequence, has immense power and more that is really needed if you hit the target weight of 9.5lbs. If you do go overweight, don't worry, this set is still good for and extra couple of pounds in weight!

Anyone building the zero will not be disappointed with the flying performance, but as this is a scale model so producing a scale flying performance is the order of the day. The model will perform most manoeuvres expected by a single engined WW2 fighter. Barrel rolls and loops are a delight, but the model excels at a low fast past, pull up into a half roll and reversal.....brilliant. Landing the model feels very smooth and predicable.

With the flap deployed, the nose will rise so be aware of this. I have now dialled in about 5degs of down into the elevator, mixed on the flap switch. Once on the ground and rolling out, keep a little up elevator fed in and she will stay on her wheels without a problem.

Using the 5000mah 6S pack as supplied by 4-Max, I managed two 7-minute flight and another 2-minute check flight on the same charge and still had 20% capacity in the pack.....pretty amazing.

There are no real vices with this model...it goes where you point it and does what you ask of it...you real couldn't ask for more.

ENJOY.....