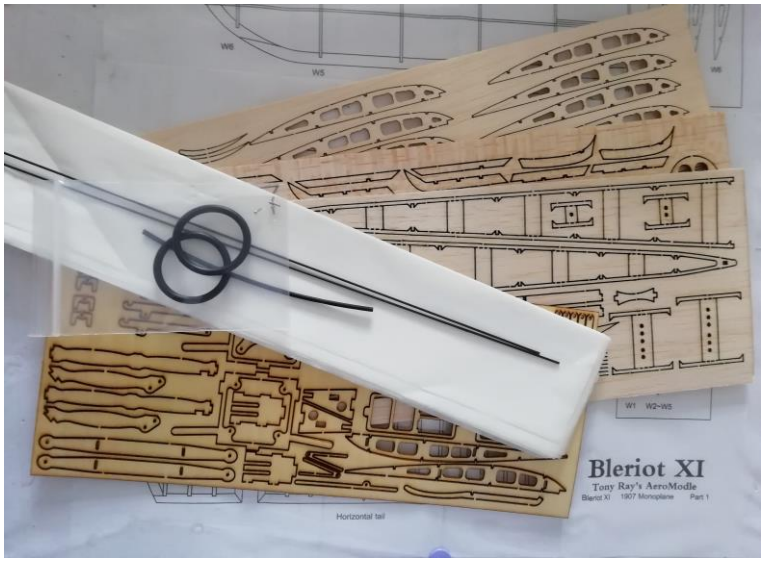
Tony Ray's Etrich Dove (Taube)

One of Tony Ray's Micro Aeroplanes

Additional build information from Steve Webb Models

◯ Etrich Dove/ Wing Span: 450mm /Average Flying Weight: 40g / Receiver: DSM2 Micro Receiver / Motor: 7mm Coreless motor / Servo: 1.7g micro servo / Prop: 5.5in or 138mm prop

Steve Webb Models



Mini Etrich Taube – Kit Inventory

- **Wood Parts :**
  - Balsawood Sheets *3
  - Basswood Sheets *1

- **Hardware Parts:**
  - Carbon rod *4
  - Micro screw *2
  - Heatshrink tube *
  - Mini Magnet *6
  - Micro Hinge Sheet*1
  - Rubber Wheel *2
- **Paper Parts :**
  - Installation plan drawings *2
  - Covering tissue *1

- **Required Electronics :**
  RC Transmitter with at least 4 channels; Motor: 8.5mm coreless motor with gearbox; Propeller:5.5inch or 138mmt; LiPo battery

Notes:

- **The Centre of Gravity of this model is very near the front. Please keep the battery as far forward as possible**
- **The fuselage is very narrow. Be sure to install the electronics before covering the model**

This is a small model but don't underestimate its complexity. Some prior knowledge would be helpful. Although it is suggested that this should not be a first build of a model aircraft, we've tried to point out any pitfalls and ease the way to making a successful model of the iconic Etrich Dove (Taube), the first aircraft to drop a bomb in combat, whether you want to fly it or build it as a static model. If you want to fly it, please make sure you take note of the strengthening where suggested. These suggestions are additional to Tony's, but have been ratified by him for additional strength.

Before you start

- Some items you may find helpful
  - A sharp, fine modelling knife or scalpel and additional blades
  - Fine nosed pliers or strong tweezers
  - A very fine cross head screw driver for miniature screws
  - A couple of clear plastic containers for holding small parts. Keep your clear plastic, takeaway food containers, they're ideal.
  - Pins and a small building board.
  - In the main I used thin cyano acrylate (super glue) for the well fitting joints and thinly spread aliphatic resin (yellow glue) for sheet to sheet bonds
  - A capillary tube extension for the cyano acrylate bottle to reach awkward glue joints
  - A small sanding board (make one by gluing 2 pieces of 1/16 balsa, 3inch x 1.25inch with grain crossed at 90deg. You can stick a different grade of sandpaper to each side to make a really handy small sanding block)

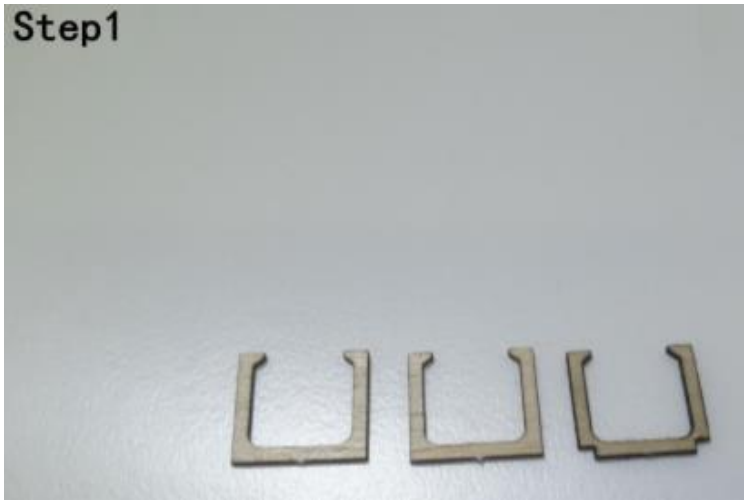
- Read through the notes in conjunction with the pictures in this build document.
- Check each “Step” before you start it. Carefully study the photos in the pictures
- Identify all the parts for each step and remove only these from the relevant sheet by cutting through the tabs in the laser cuts around each item. Use a plastic container to hold them until needed in the step.
- Any offcuts containing other pieces (like the centre of formers etc.) can be stored in another plastic container
- Remember, the parts are extremely small and leave very little room for recovery if you get things wrong. However, the standard of the kit makes it less likely that you will make that mistake in the first place.

  ALSO: You may need to build a simple jig to hold the fuselage flat while fastening the bottom stringers. I used spare wood pieces from a cheap “balsa bundle” pack available from your local hobby store. The jig is shown later in the instructions.

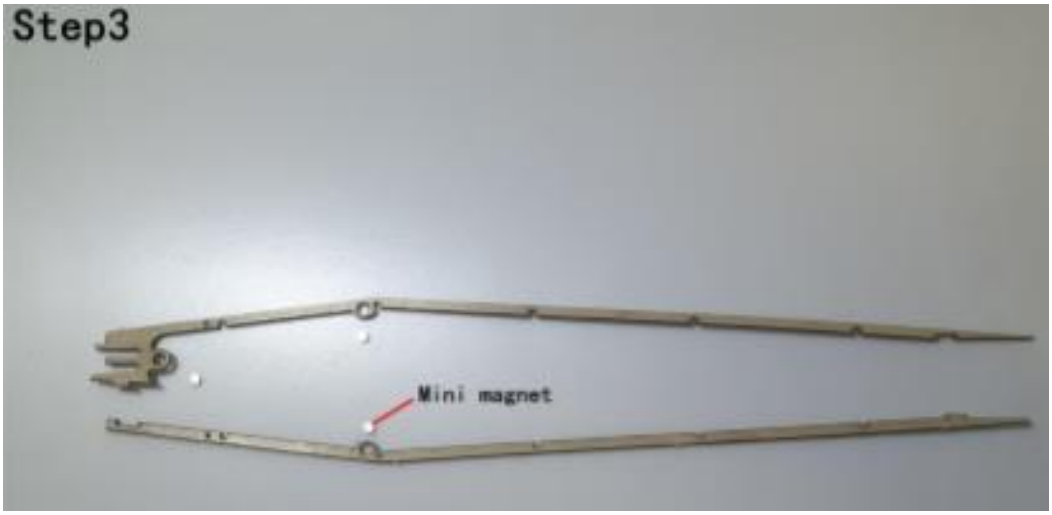
The build

Not all of the steps need clarification, this does not mean they aren't important. Make sure you check them as you go through the build.

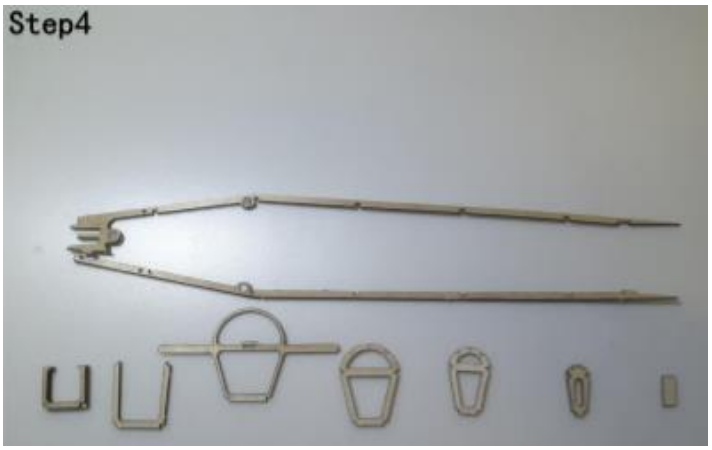
Part 1 – The Fuselage

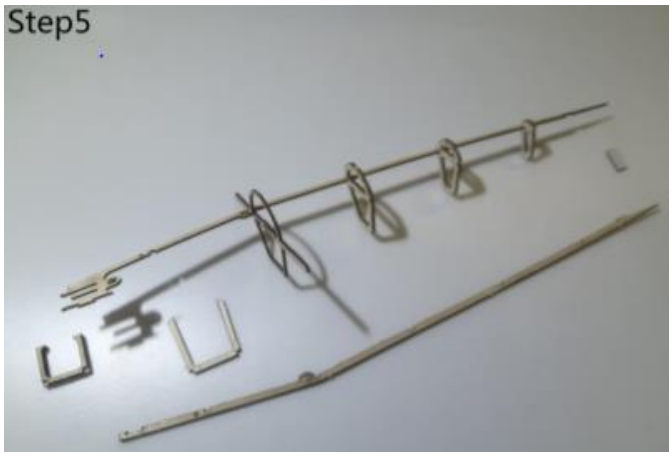


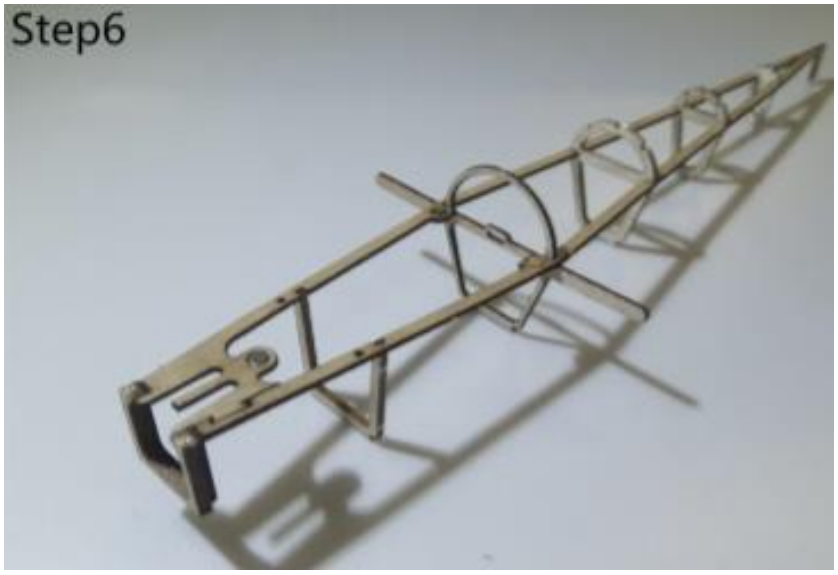
- **Steps 1 and 2**
  - identify and remove the 3 pieces of the fuselage front, 2 from balsa, 1 from basswood.
  - Glue these accurately together keeping the 2 balsa pieces together. As shown in step 2



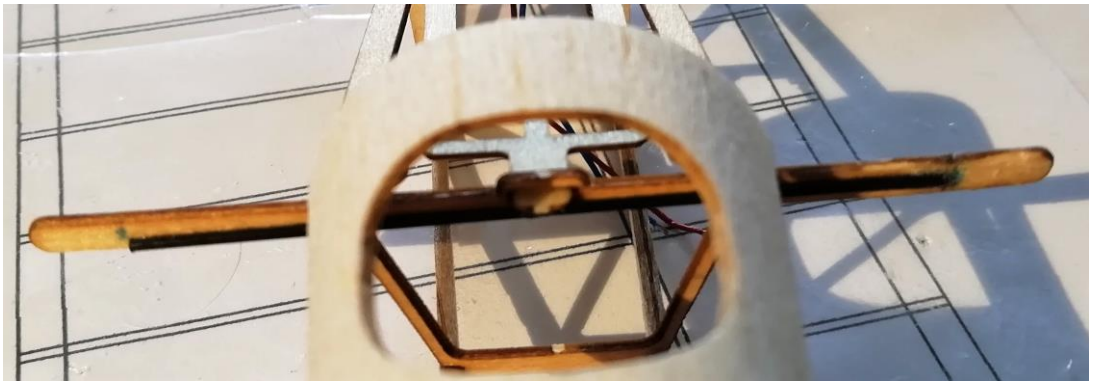
- **Step 3**
  - Remove the two side keels from the basswood sheet and push in the 3 mini magnets. Make sure that all have the same pole showing, it makes it easier when building the front top deck with the remaining 3 magnets.





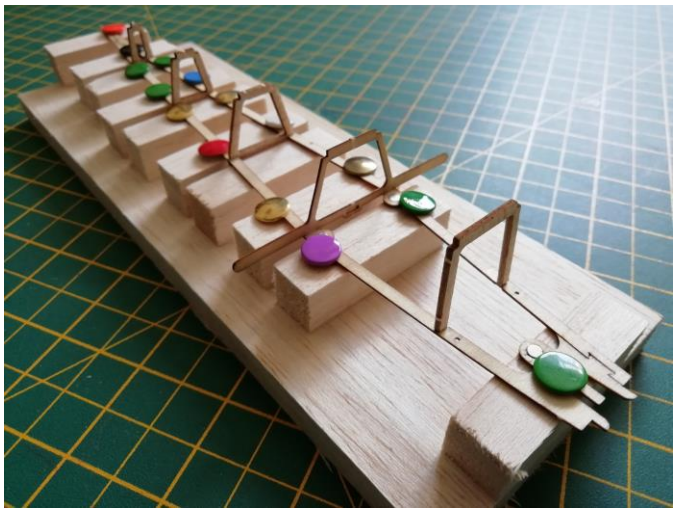


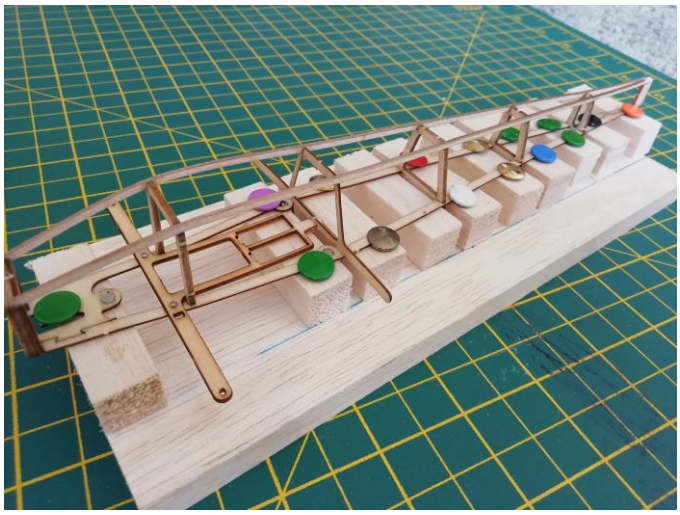
- **Steps 4 to 6**
  - Gather together all the pieces in step 4
  - FOR A FLYING MODEL
    - Strengthen the cross piece of the former with “arms”.
    - Cut a 55mm length of 1mm carbon rod and glue centrally across the “arms” both across and from top to bottom of he arm. Make sure not to block the central cut out. See photo below (taken later during construction}



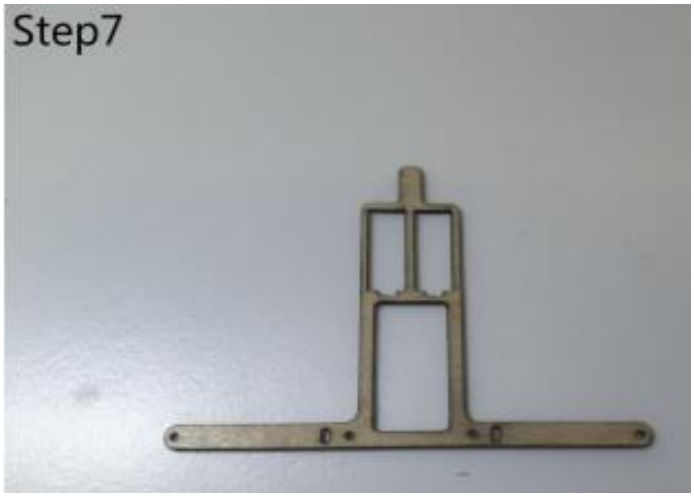
  - You can glue together the front of the 2 side keels at this point, there is enough flex in them for fitting the formers and it is made easier to fit them. Do not glue the formers at this stage.
  - When all formers are located in their relevant slots, glue the rear ends of the side keels together.

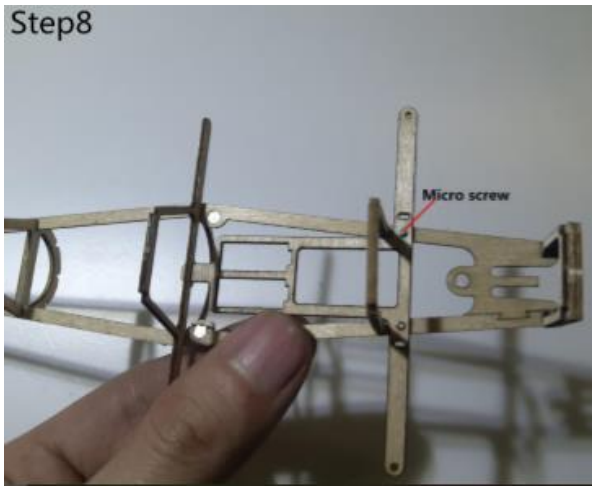
- **At this point you may find it easier if you use a jig.** A simple and fairly rough setup is shown in the following photographs.



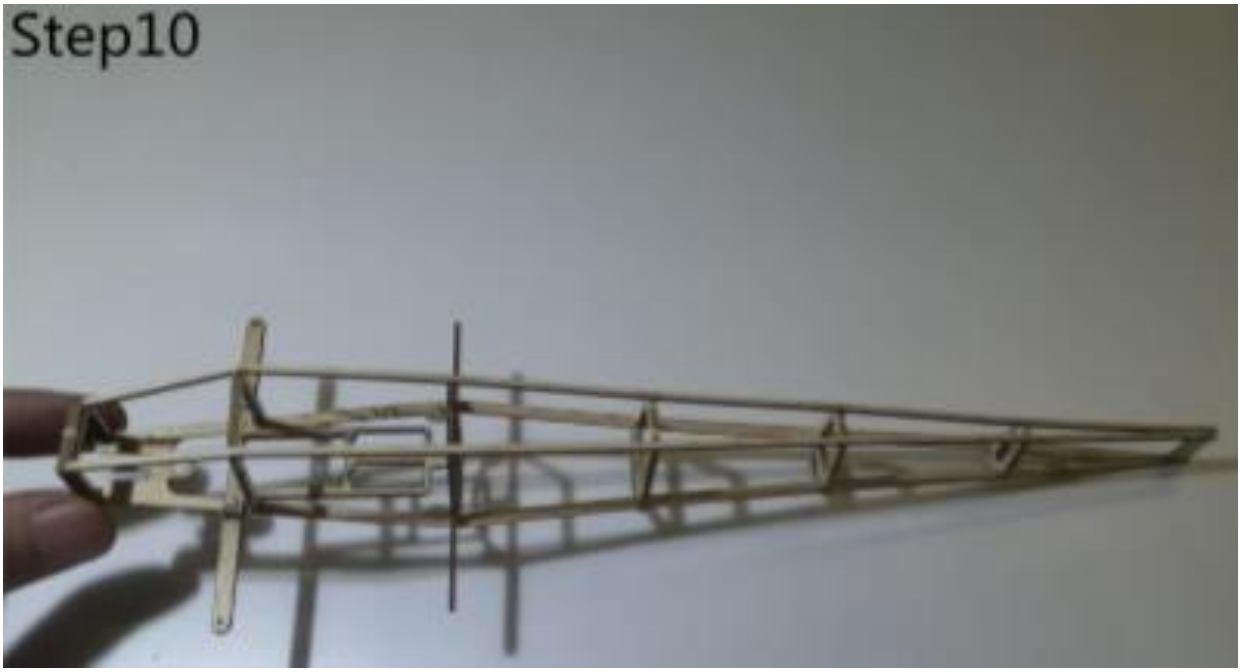


  - This jig is made from scrap balsa from a cheap “Balsa Bundle” pack
  - It is made with 12 x 12mm blocks cut to be wider than the fuselage. One block is glued on each side of each former. Leave enough clearance between them to allow you to glue the formers in place without them sticking to the jig. The blocks must all be the same height and thicker than the height of the formers above the side keel.
  - Build the fuselage upside down so the stringers fitted later can be glued in place. This ensures that the side keels remain straight. Drawing pins beside the keel strips are ideal to hold the frame in place
- **Step 6**
  - Glue the formers at right angles to the side keels. The tail post part is not square, one end is slightly angled. The square end goes to the top (nearest to the jig) with the longer side to the front. This results in a vertical tail post.

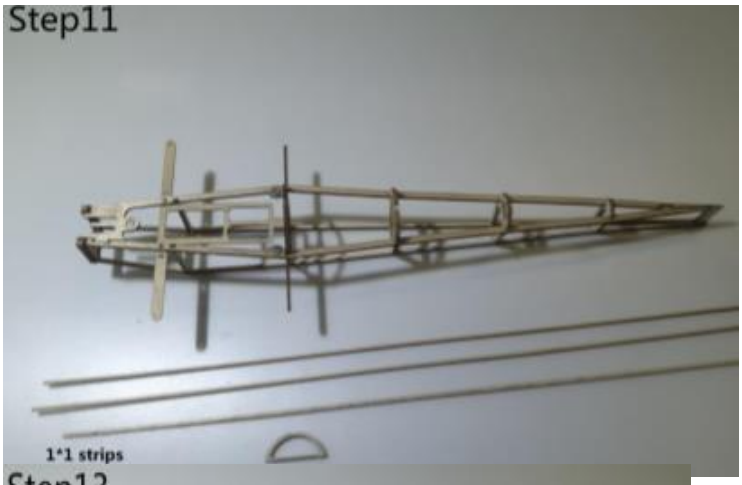


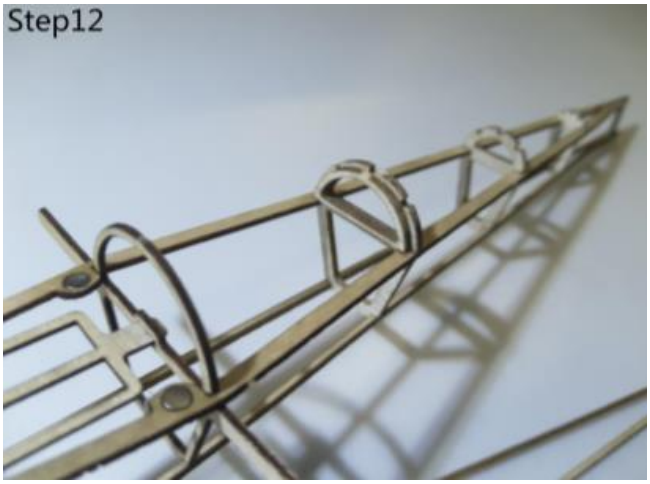


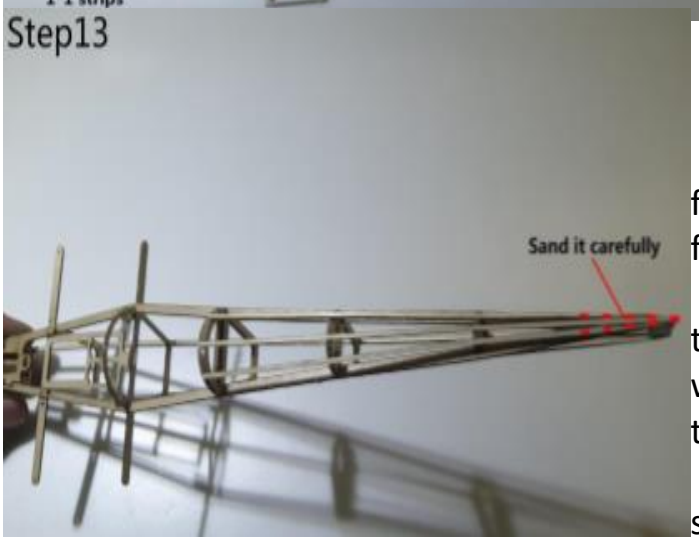
- **Steps 7 and 8**
  - While still on the jig (if used), remove the radio tray/undercarriage cross piece from the basswood sheet
  - Slide the tongue at the end into the slot in the front former and secure using the 2 micro screws.



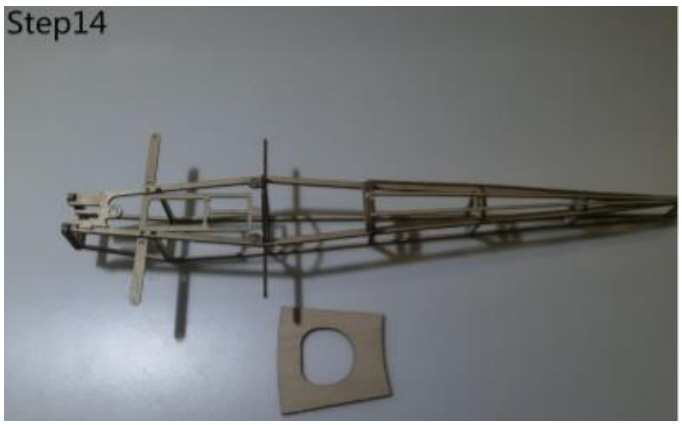
- **Steps 9 and 10**
  - Using 2 of the 1 x 1mm strips, glue the bottom stringers in place ensuring all formers remain at right angles
  -
- **Addendum**
  - Tony has agreed an alteration to the original construction so that the front of the model resists deformation. See the following photo, note that this was taken later in the asembly.
  - Insert 4 short lengths of 1.5 x 1.5mm balsa strip, diagonally as shown, into the first 2 bays either side of the fuselage.

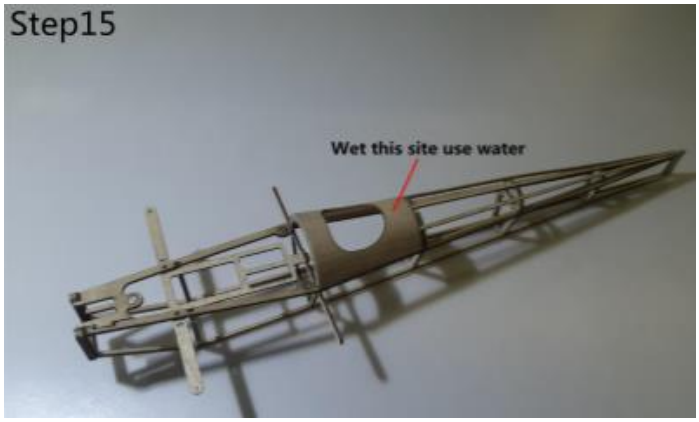




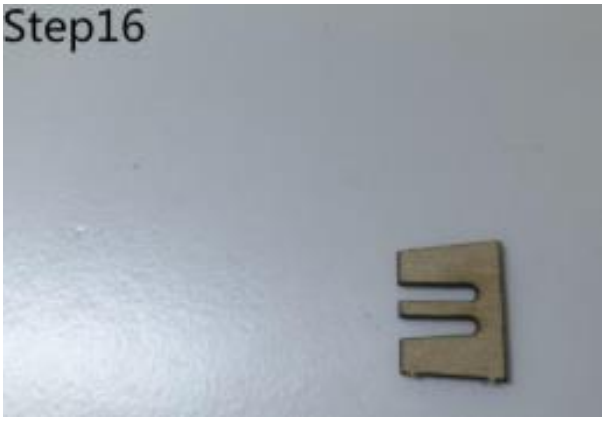


- **Steps 11 to 13**
  - Remove the D shaped balsa piece from the sheet and glue to the front of the former shown.
  - Fit the three 1 x 1mm stringers to the notches in the tops of the formers. Start with the centre one and do not overlap onto the D piece
  - Carefully sand the rear of the stringers to blend with rear fuselage



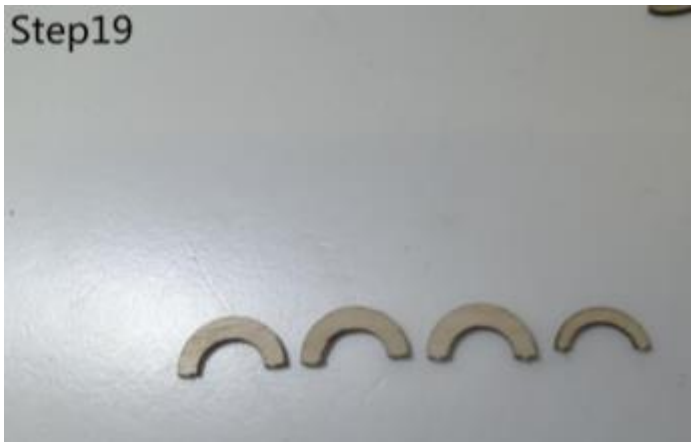


- **Steps 14 and 15**
  - Remove the rear cockpit deck from the balsa sheet and wet one side to help curving to fit. It helps to form the curve by rolling a round pencil or dowel over the dry side of the part, in line with the grain. You need to apply some pressure to induce the curve.
  - Glue this to the D piece and former as shown



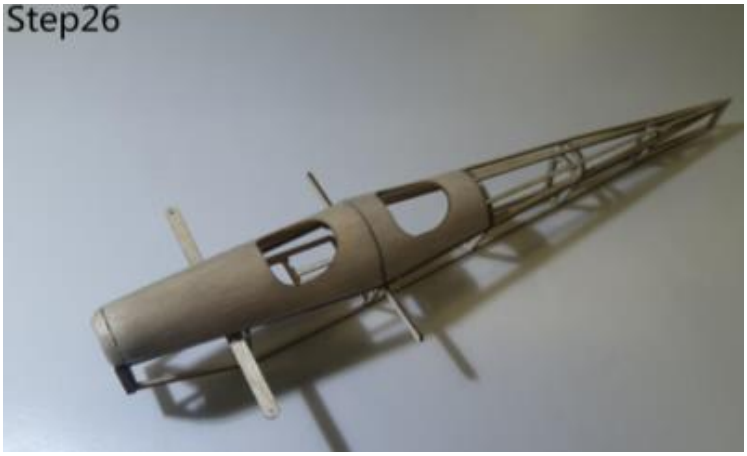
- **Steps 16 and 17**
  - Remove the motor mount doubler from the basswood sheet and glue to the front of the fuselage as shown
  - Make sure this is placed accurately as the gearbox assembly fits on to the middle tab and is a tight fit.

- **Step 18**
  - Remove front deck base from basswood sheet and press the 3 remaining mini magnets into it with all 3 showing the same pole upwards

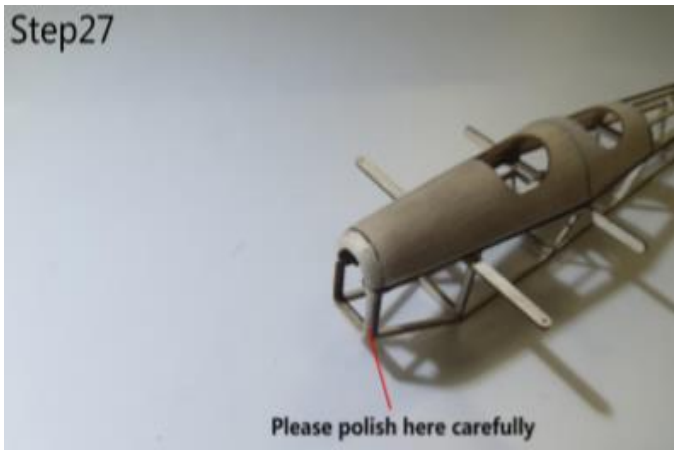


- **Steps 19 and 20**
  - Select the 4 cowl parts from the balsa sheet and glue together as shown

- **Steps 21 and 22**
  - Check the polarity of the deck base magnets against the top of the fuslage ensuring they all attract each other. Keep the base this way up while gluing on parts.
  - Remove the front deck formers from balsa and basswood sheets and glue on perpendicular to the front deck.
  - Glue on the cowl assembly.

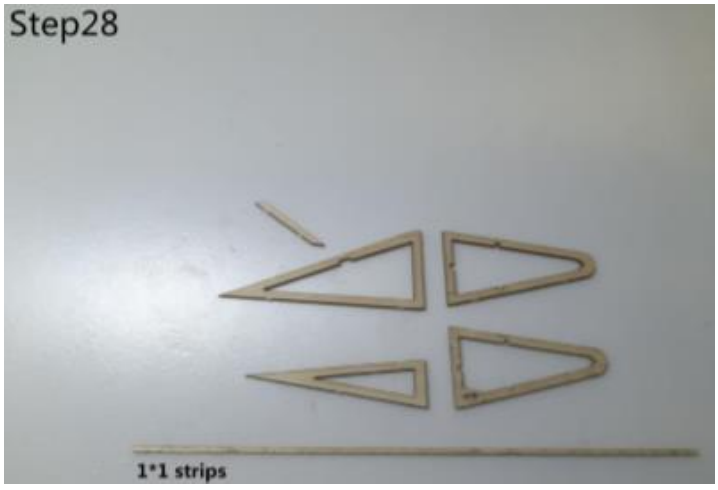


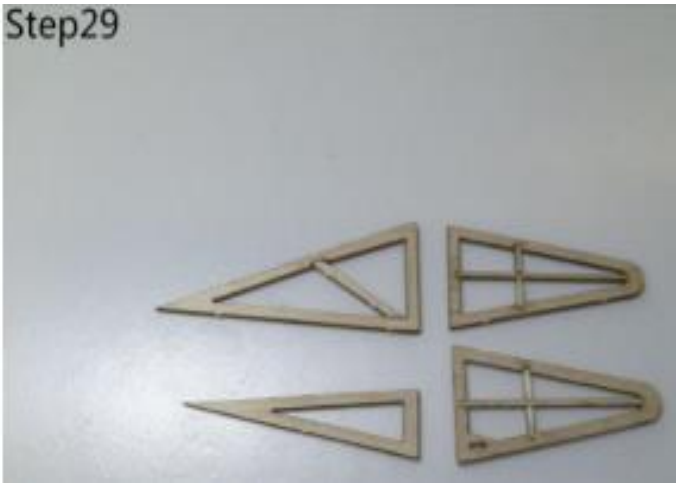
- **Steps 23 to 26**
  - Remove the front deck from the balsa sheet and wet. Roll with a pencil to help curve the sheet
  - Glue to the top of the front deck
  - Carefully sand the cowl to a rounded section.
  - Step 26 shows it in place on the fuselage

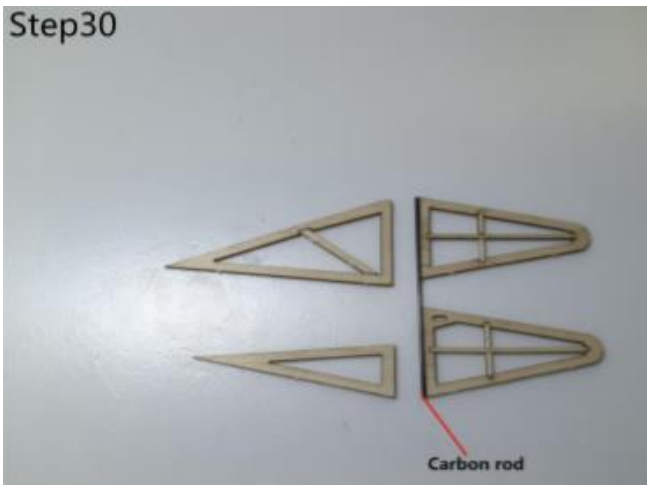


- **Step 27**
  - Sand the front of the fuselage to match the shape of the cowl.

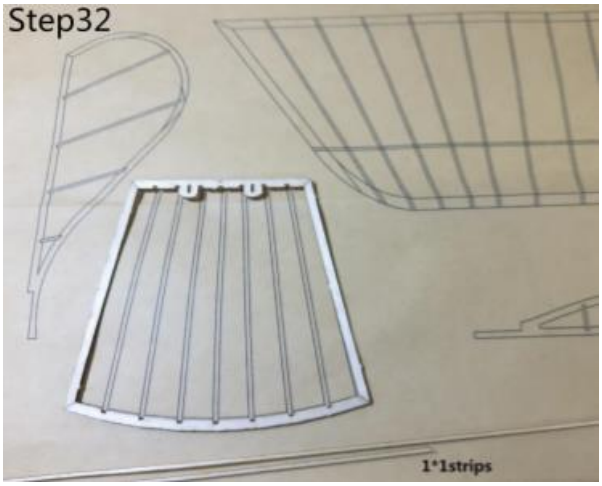
Part 2 -Tailplane and Rudder





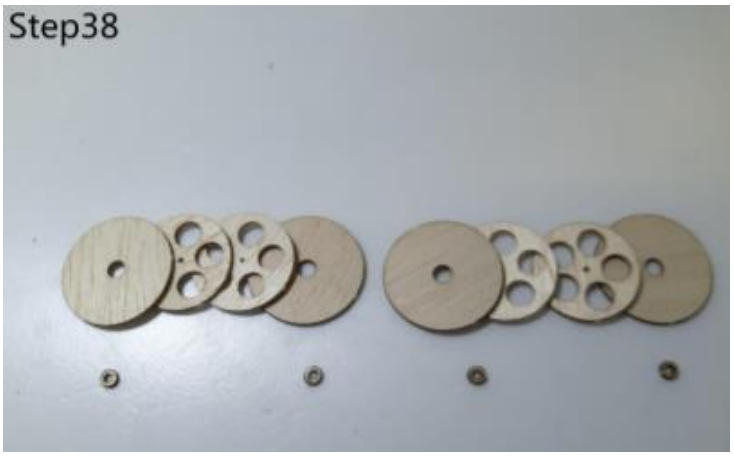


- **Steps 28 to 30**
  - Build over the plan if necessary
  - Remove the fin and rudder parts from the balsa sheet.
  - Using the 1 x 1mm strips, fit the cross pieces
  - Cut and fit the carbon rod to the front of the rudders

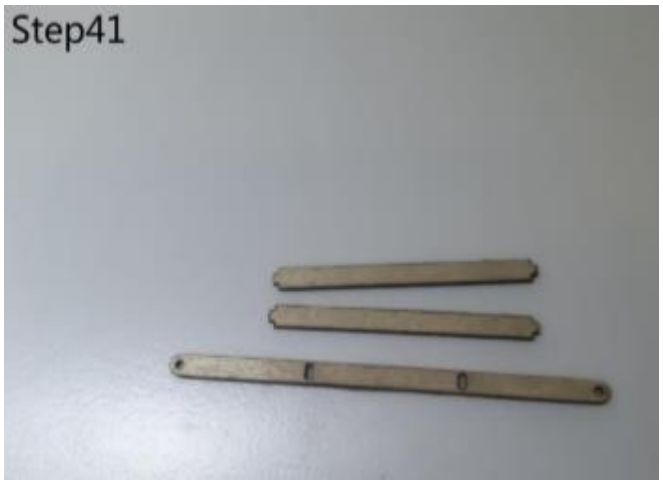


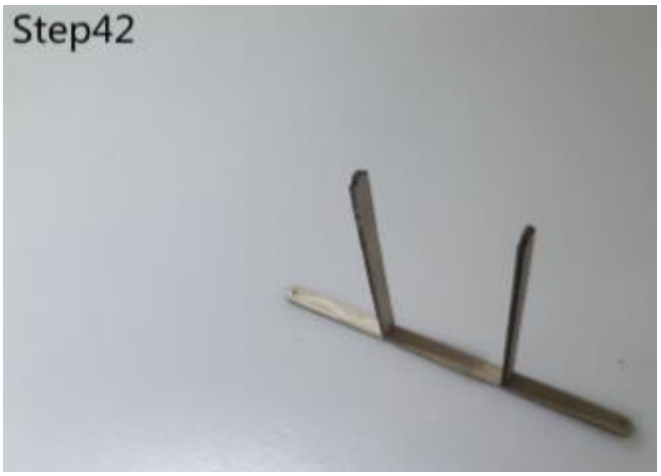
- **Steps 31 to 34**
  - Remove the elevator frame parts from the balsa sheet and glue together over the plan
  - Glue in the 1 x 1mm strips as shown
  - Make up the tailplane parts in the same way, as shown in step 34. The front triangles are complete parts removed from the balsa sheet.

Part 3 - Undercarriage

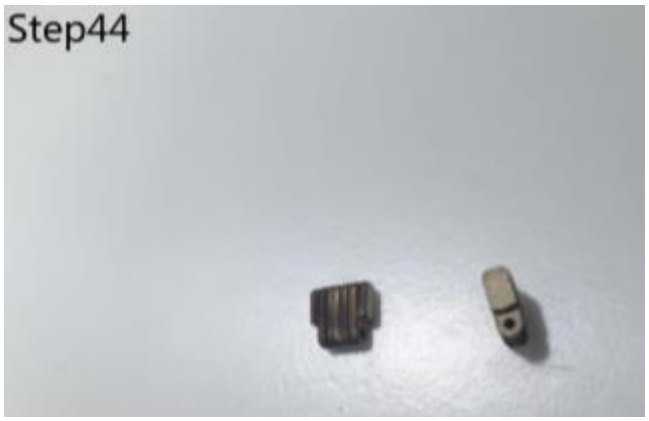


- **Steps 38 to 40**
  - Remove the wheel parts from the balsa and basswood sheets
  - Build each wheel by sandwiching the 4 pieces as shown, placing the grain at right angles on each layer.
  - When dry, insert the 2 small basswood collets each side of the wheels.
  - Carefully fit the tyres

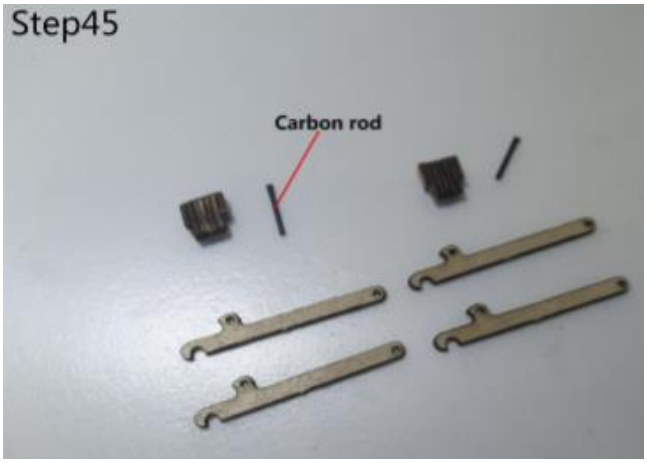




- **Steps 41 and 42**
  - Using the 3 parts shown, glue together at right angles. (Step 42 is distorted by perspective)

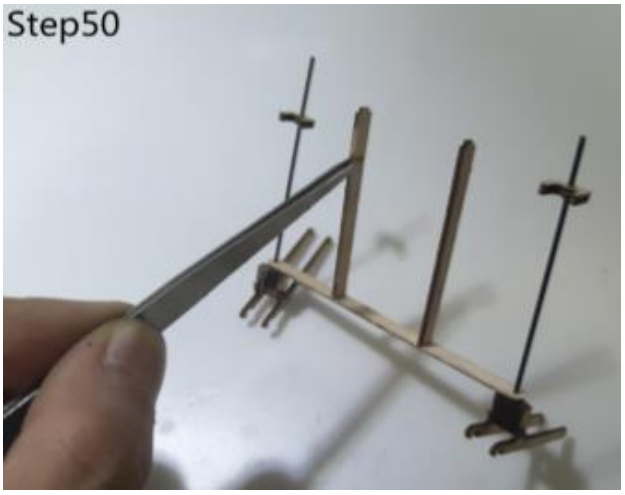


- **Steps 43 and 44**
  - lower suspension leg blocs. Select the 2 sets of 7 basswood parts.
  - Glue together in the order shown, ensuring that the slotted part is central and the shorter parts are at each side. Make sure the holes are accurately lined up

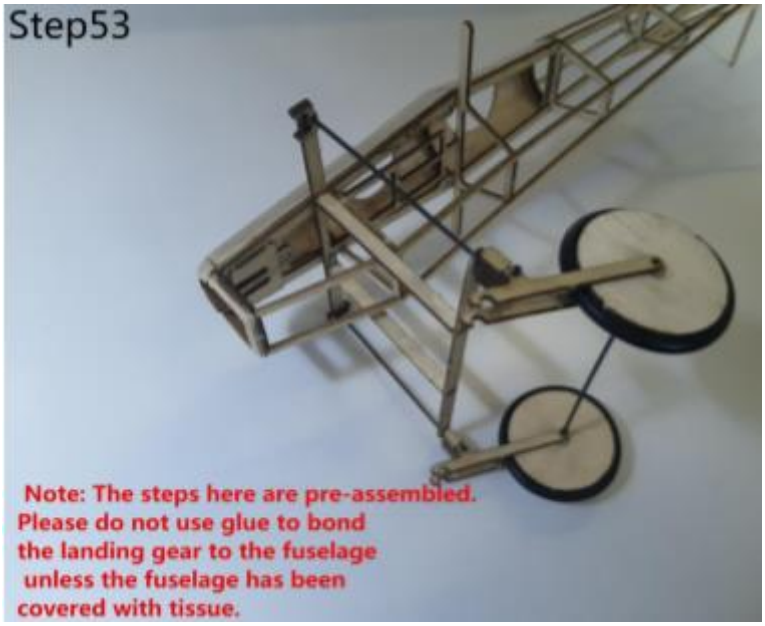


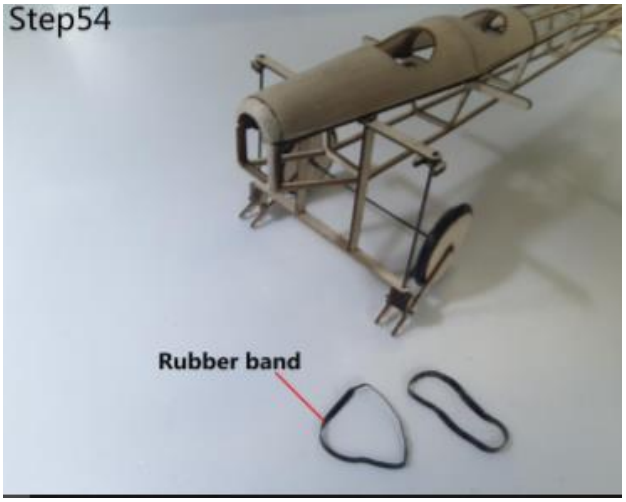
- **Steps 45 and 46**
  - Using the parts shown, make up the suspension swinging arms
  - Assemble as shown, making sure that you only glue the arms to the carbon rod and none gets into the hole through the blocks.
  - **TIP:** put a small piece of polythene with a pinhole in it, over the end of the carbon rod, between the arm and the block. This will help to stop any excess cyano acrylate glue running into the axle hole. The polythene can easily be removed when dry.

- **Steps 47 and 48**
  - Make up two top suspension blocks from the basswood parts
  - Ensure the holes are in line.

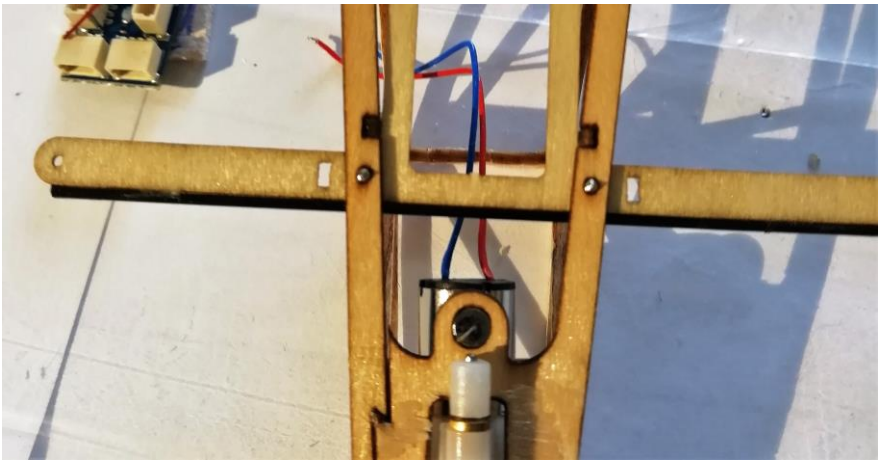


- **Steps 49 and 50**
  - Get together the pieces as shown. Cut the carbon rod slightly longer than needed to go into the bottom blocks and above the top cross member on the fuselage
  - Assemble as shown, gluing the blocks to the rods. Do not glue anywhere else yet
  - The top blocks need to be able to slide so they can be adjusted to suit your chosen rubber bands during the final assembly

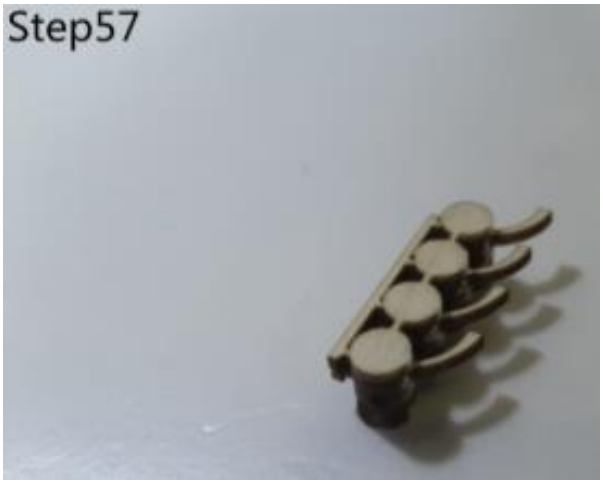




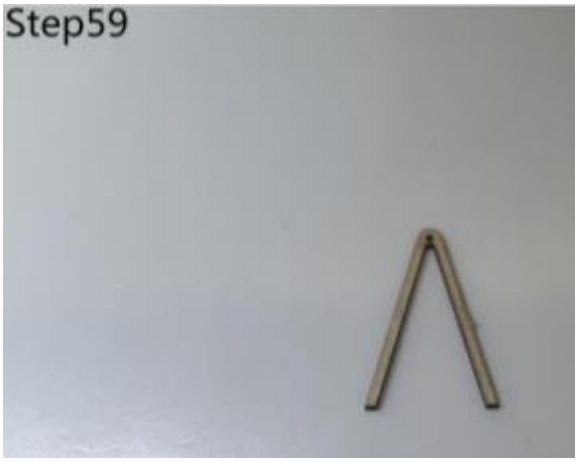
- **Steps 53 to 55 – complete these *after* covering the model.**
  - Fit the wheels between the swinging arms and glue the carbon rod to the arms only. Use the same method as for the swinging arm blocks.
  - Glue the undercarriage assembly to the top frame piece in the fuselage
  - Fit your chosen elastic bands, sliding the upper blocks to tension.
  - Glue the upper blocks.
  - Tony Ray has agreed a modification to the undercarriage for flying. Glue a piece of carbon rod across the front of top former for added rigidity. See photo

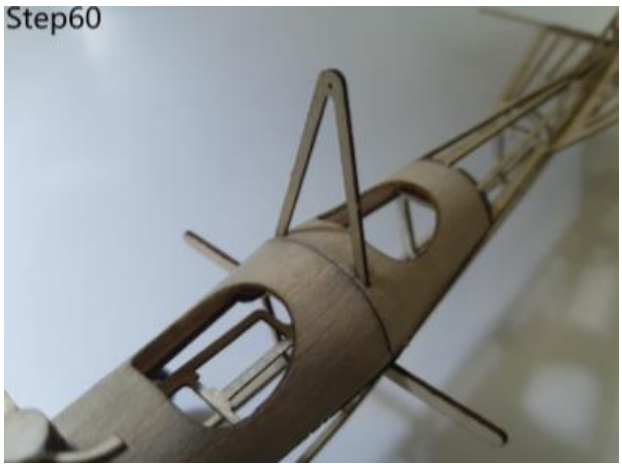


Part 4 - Engine



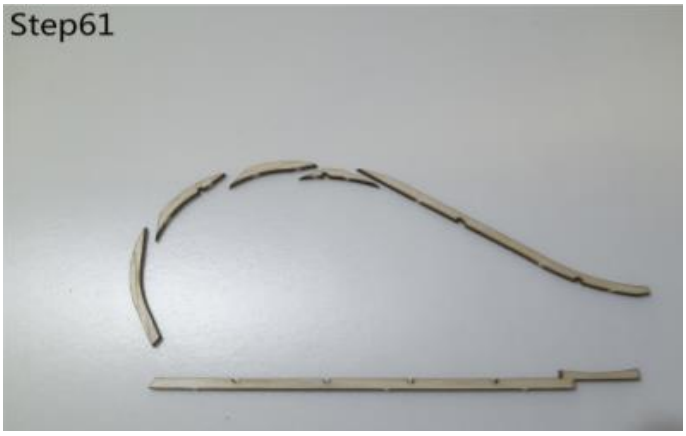
- **Steps 56 to 58**
  - Select all the 5 engine parts
  - Assemble in the order shown.
  - Do not glue to the fuselage until after covering

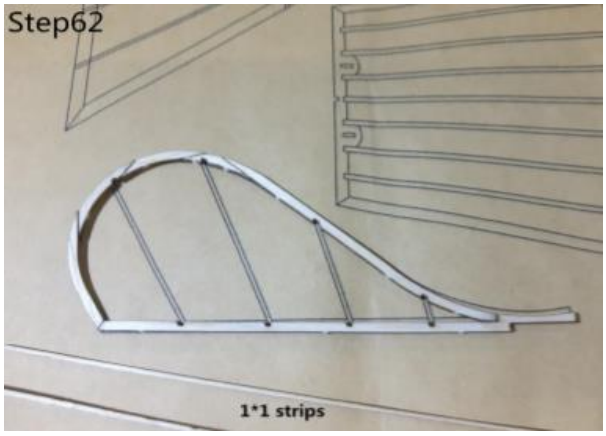


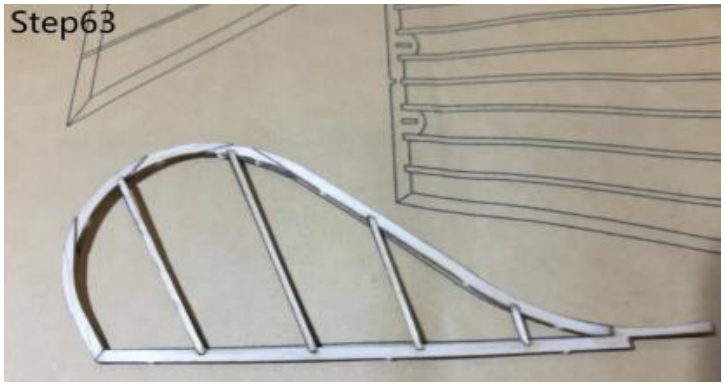


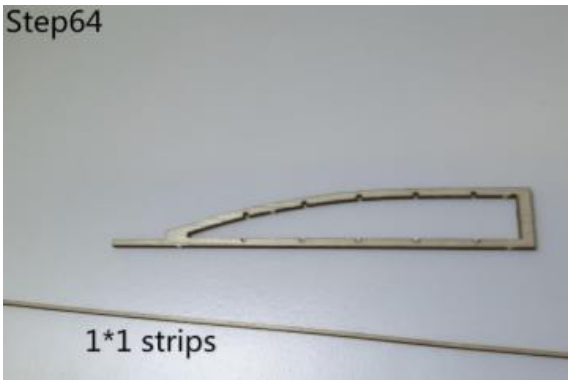
- **Steps 59 and 60**
  - Wing wire support – **glue in place after covering**

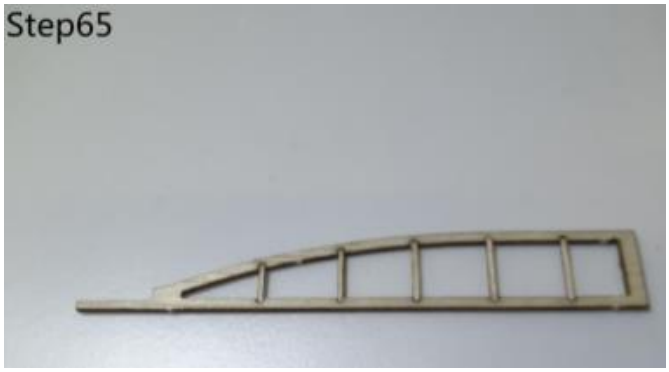
Part 5 - Ailerons

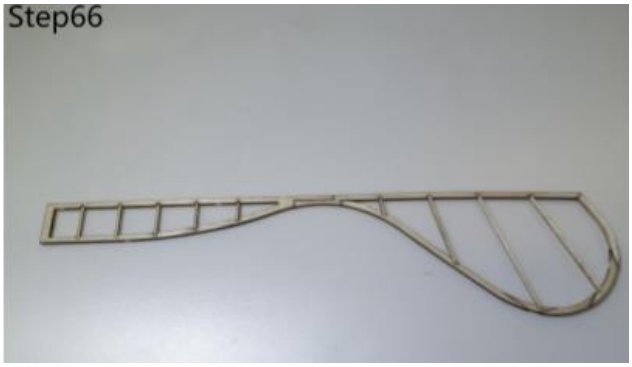


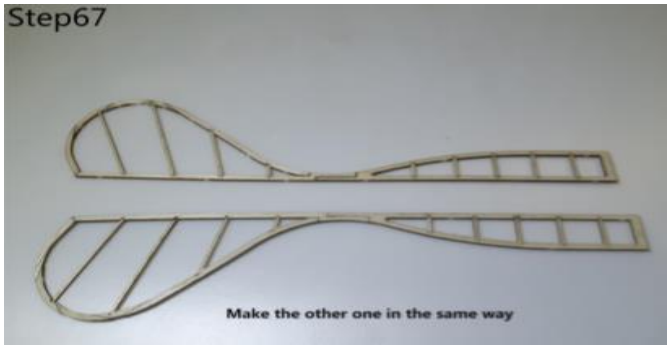


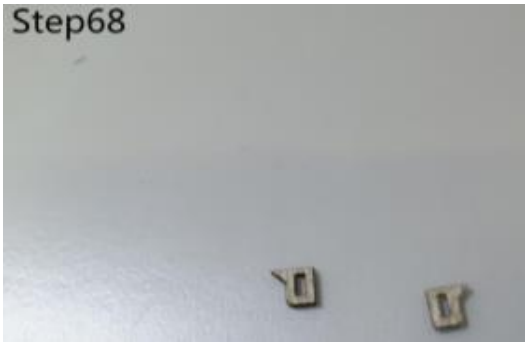


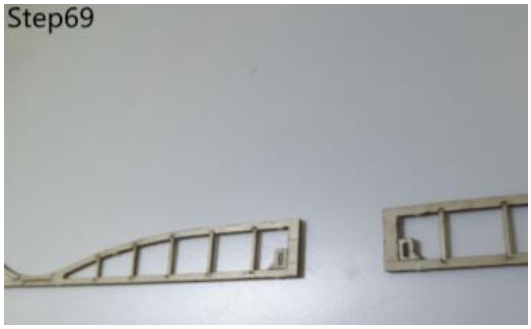






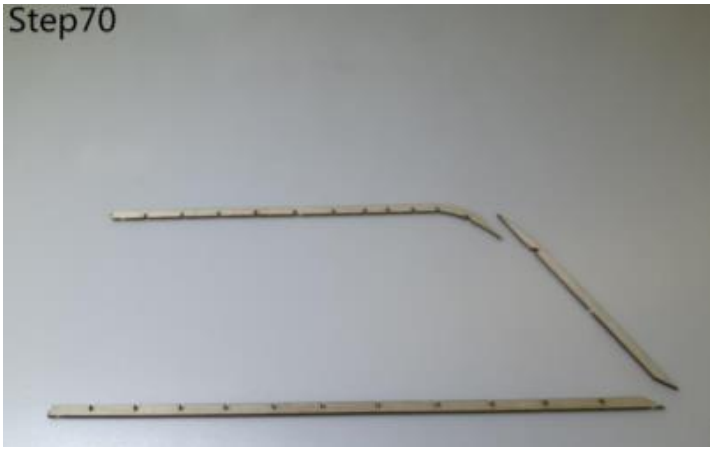


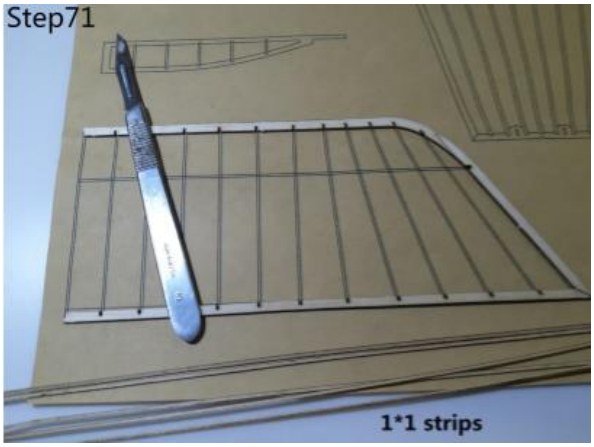




- **Steps 61 to 69**
  - Take the pieces of the aileron outer panel as shown
  - Pin over the plan and glue all the joints
  - Using 1 x 1mm balsa strip, cut the ribs to length and glue in place
  - Take the inner aileron part and pin to the board
  - Add the 1 x 1mm ribs
  - When dry join the 2 aileron parts ensuring that they are absolutely straight.
  - Add the aileron horns into the corner of each aileron, as shown

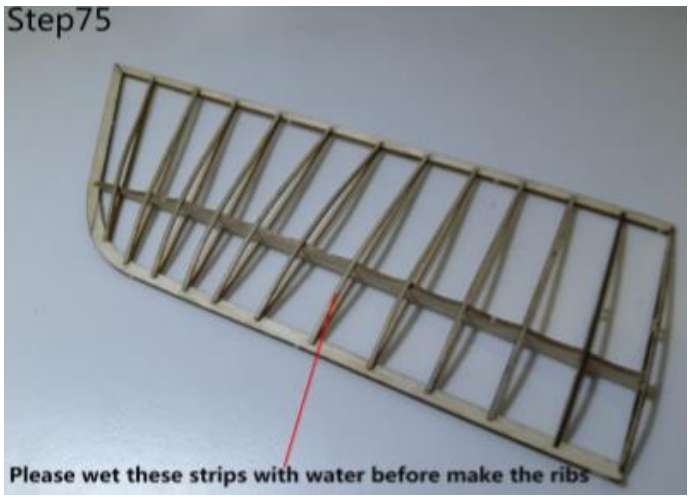
Step – 6 Wings





Wings

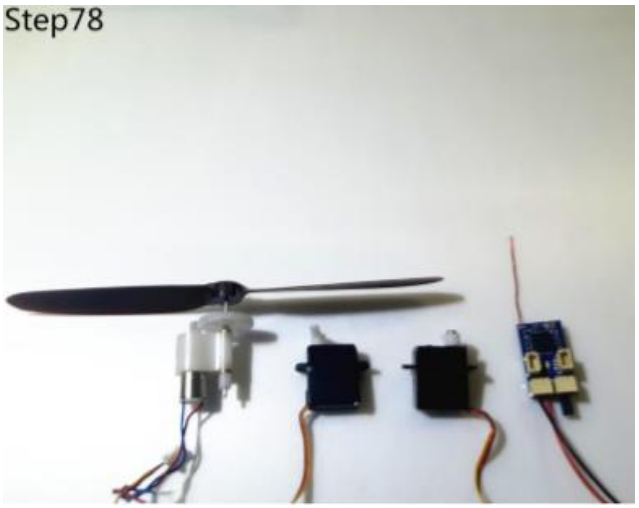
- **Steps 70 to 72**
  - Remove the leading and trailing edges and the tip piece from the balsa sheet
  - Pin to the board over the plan and glue the joints
  - Using 4 of the the 1 x 1mm balsa strips, start from the second slot in from the inner end and cut the individual strips to length and press into place
  - Check the assembly is correctly aligned and glue the ends of the strips in place

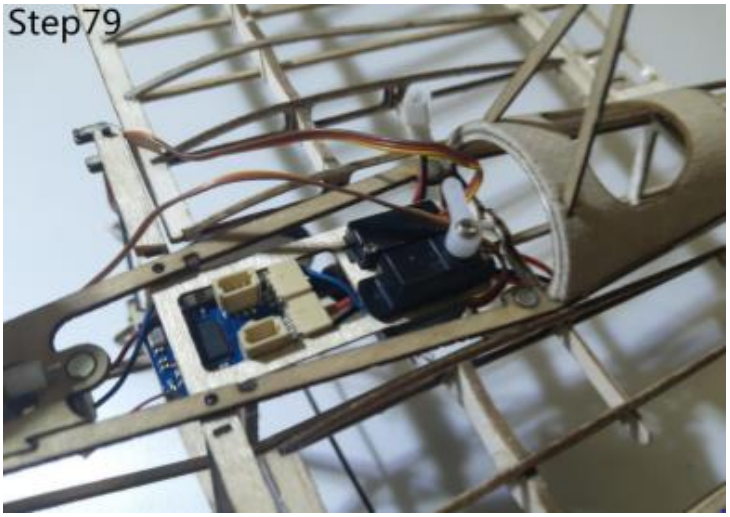


- **Steps 73 to 76**
  - Remove 2 ribs from the basswood sheet and the spar from the balsa
  - Carefully fit the spar into place over the rib strips and glue the end into the tip. You may need to widen the outer slots to allow for the angle of the rib strips, but be careful with the outer slot as there is not much wood left.
  - Locate and glue the basswood ribs over the inner locations, pressing carefully into place on the spar.
  - Glue the ribs making sure they are vertical.
  - Take another 4 1 x 1mm strips and wet them slightly
  - Cut each strip to length (they should match the ends of the lower strips)
  - Bend them carefully over he spar and glue in place.
  - Make the second wing the same way

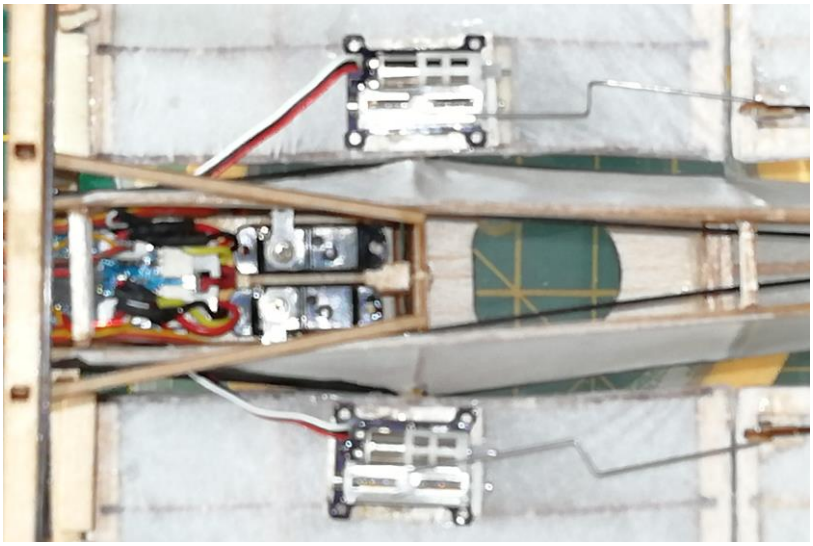
- **Step 77**
  - This step is included to show the alignment of the ailerons. They should be attached after covering with the supplied hinges

Part 7 - Electronics





- **Steps 78 and 79**
  - Illustrated is the typical fuselage installation using 1.7gm servos and a micro control board with the supplied motor. Fit these before covering.
  - Cover the model at this point and fit the control horns to the surfaces.
  - Attach the control surfaces to the fuselage and fit the pushrods to the elevator and rudder
  - If you strengthened the wing mount cross member with a length of carbon rod as described earlier, you will need to remove a piece of the inner rib, just enough to clear the carbon rod.
  - Attach the ailerons to the wings and make up the pushrods for them to suit your chosen servos.
  - Attach the servos to the wings so that with the pushrods in place and the servos centred, the ailerons are at the neutral position. See the photograph below of the underside centre section



Cover the model with tissue before final assembly. If you are new to tissue covering help can be found at http://www.ffscale.co.uk/comp8.htm

- Attach the undercarriage to the fuselage as illustrated in Steps 53, 54 and 55
- You can brace the undercarriage with 1 x 1mm strip from the base of the leg to the fuselage where it meets the next former back. See photo.

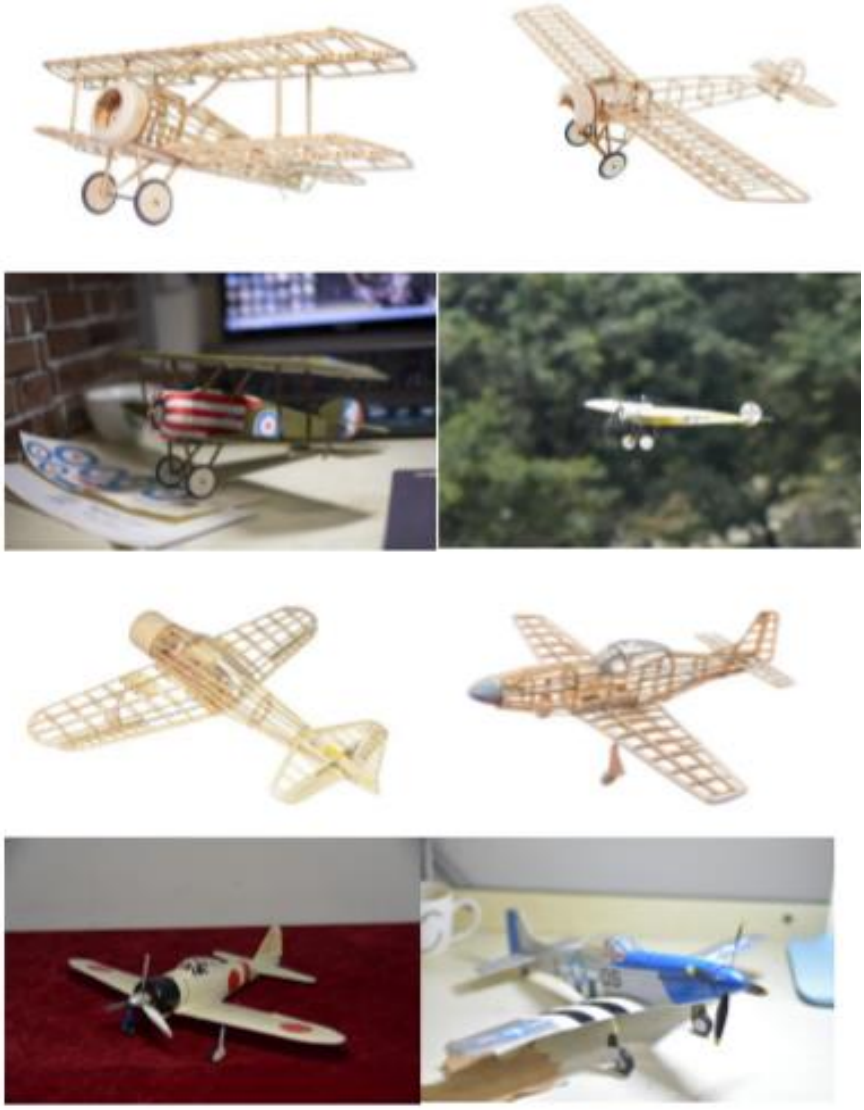
- Attach the wing to the fuselage, gluing it to the wing cross member
- It is possible to strengthen the wing attachment for flying by attaching to the rear edge of the upper undercarriage cross member

- **Step 80**
  - Be careful fitting the battery. It may be necessary to trim away some of the central top deck former to fit the battery snugly.
  - **Make sure** the battery does not foul the rear end of the propeller shaft when the top deck is attached

Photos of the completed model built while writing these instructions:

If you enjoyed building the Etrich Dove

Thanks for your support come from Tony Ray. He is a college student who's mad about micro balsa aircraft and continues to design traditional micro scale models making them affordable without compromising component and material quality. This gives an unparalleled building and flying experience.



Other Tony Ray models available from Steve Webb Models

- **Mini Sopwith Camel**
- **Mini P51 Mustang**
- **Mini Fokker EIII Eindecker**
- **Bleriot XI**
- **Fokker EIII Eindekker**
- **Coming Soon – Avro 504**