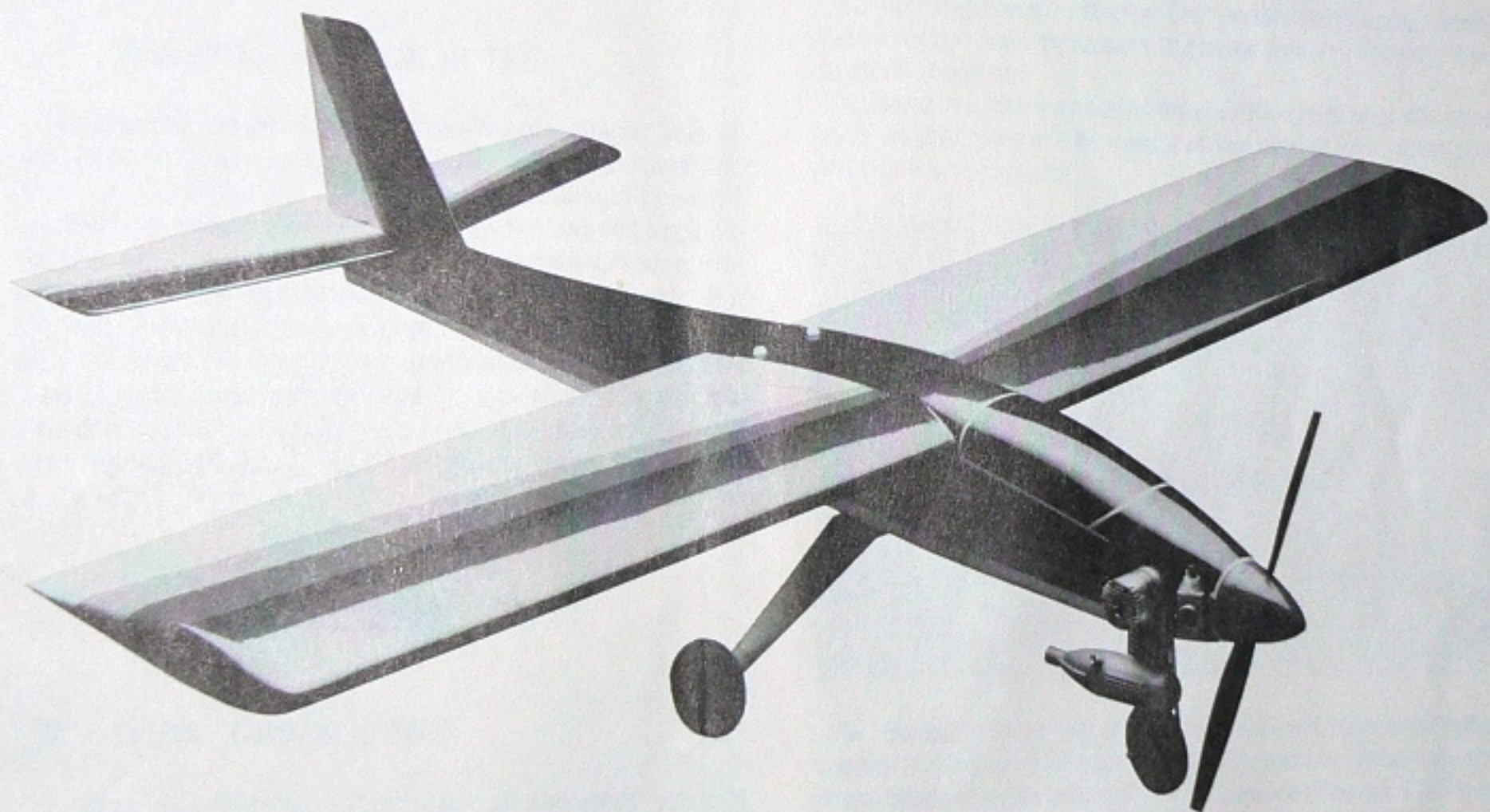




AIRTRONICS[®]

BUILDING INSTRUCTIONS



JETFIRE .40



INTRODUCTION

The Jetfire .40 is an excellent choice as either an advanced trainer or a sport model. The shoulder wing design and long tail moment provide solid and predictable handling while still being capable of aerobatics and sustained inverted flight. The semi-symmetrical airfoil gives the model a very broad speed range: with a hot .40 at full throttle the Jetfire will surprise you with its speed, but you can still throttle back and come in at a walk on landings. The tail skid in the kit wasn't originally there — we added it only after we tore the Monokote off our prototypes while dragging them in on landings! The structure is simple and strong, yet the use of the thick top block lets the nose of the Jetfire be shaped to a streamlined look and avoids that "box with a wing on top" look. Enough of the preliminaries, let's get on with the building!

All of the building notes and construction photos that follow were done by Jim Pearson, a very talented modeler and long time friend. We thank Jim for his help and are sure you'll agree he's done a first rate job.



PRE-CONSTRUCTION NOTES

Building the Jetfire .40 doesn't require any special tools or jigs, but there are several basic hand tools and materials required. First, you will need a good, flat building board. A warped or twisted board means a warped or twisted airplane. Tools required include a modeling knife, razor saw, razor plane, pliers, a small hammer, a square, a pin vise, and assorted drill bits. Clothespins, small clamps, and masking tape are useful when it comes to holding parts during assembly. You will also need sanding block and assorted grades of sandpaper. The type of adhesives are called out as they are used, and you will need regular and gap filling CAs, aliphatic resin, five minute epoxy, and finishing resin.

JETFIRE .40



WING CONSTRUCTION

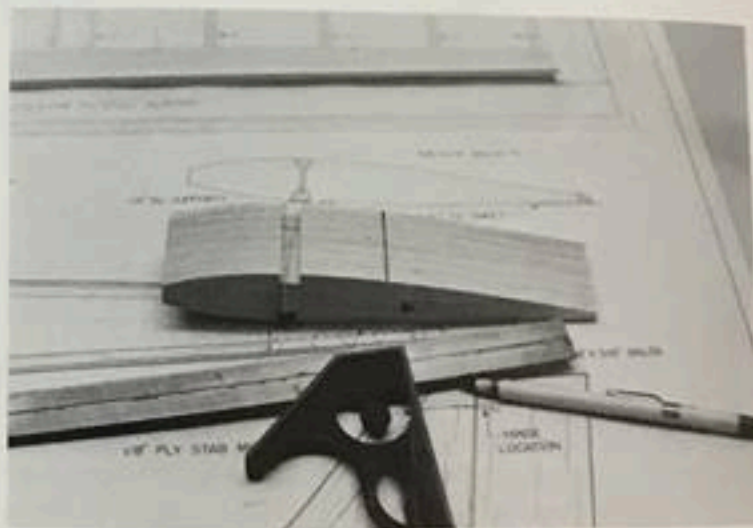
1. Prior to beginning construction on the wing, you will need a flat building surface of at least 60" if you intend to build the wing flat, or 30" from center line outward if you are going to use the hinged wingboard type of construction. For the construction shown in this booklet, we have used a flat building board to construct the wing and covered it with acoustical ceiling tile (Cellotex).

2. Tape or staple the wing plan to the building board, and cover the plan with wax paper to prevent the structure from sticking to it during construction.

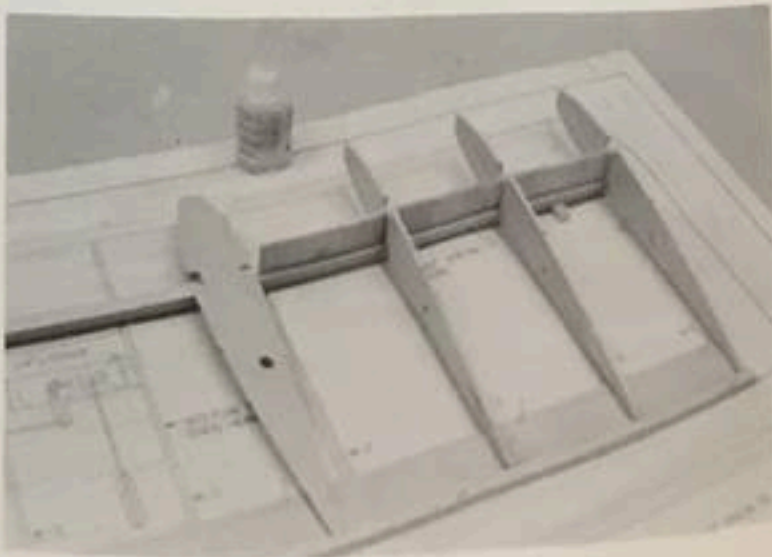
3. Actual construction begins by drawing a line across the top of the wing ribs to ensure that all ribs are installed top side up during construction. The ribs can be identified by matching them with the rib detail shown on the plans above the note "assembly method without a jig."



- 4.** Use a straight edge and trim the four pieces of 3/32" x 1 3/8" balsa trailing edge sheet to 24" long.
- 5.** Pin the lower trailing edge sheet in place.
- 6.** Glue the 3/16" x 1/4" balsa trailing edge piece in position on the aft edge of the trailing edge sheet. Be certain that the 1/4" side is glued to the trailing edge sheet.
- 7.** Cut 10 spacers from scrap 1/4" square stock and position them over the plans to support the lower spars as shown in the detail on the plans.
- 8.** Sand the inboard ends of the spars to the proper dihedral angle so that they will fit tightly at the center joint when the wing halves are joined.



- 9.** Place the lower spars over the support blocks and glue the tip W-2 rib and inboard W-2 rib in place as shown on the plans. When installing the wing ribs, be sure they are square to



the work surface and that the aft edge of the rib is contacting the 3/16" x 1/4" balsa trailing edge stock.

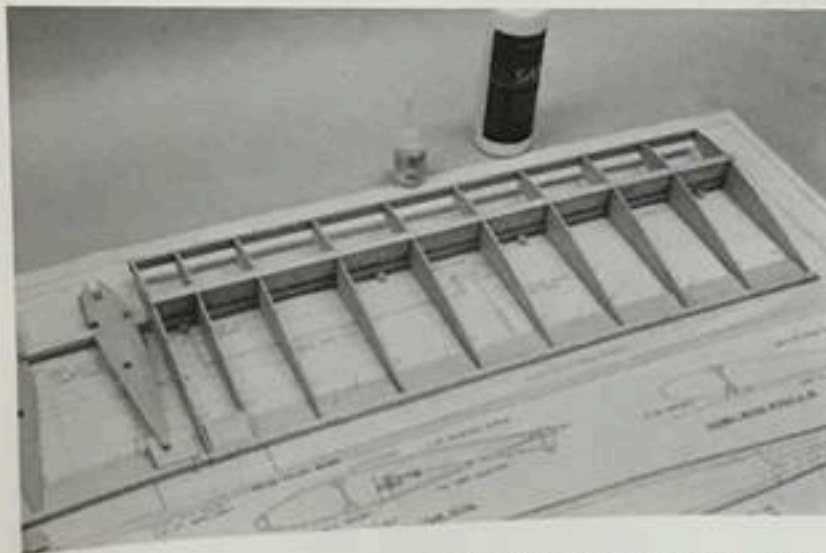
10. Using the shear webs as spacers, begin at the tip and install each rib and shear web, gluing each in place as you progress inward. Be certain to keep the ribs square front to back and vertical so the wing structure will be symmetrical when complete. Note that during this phase of assembly, an aliphatic resin cement is used on the end grain of each of the shear webs, and thick CA cement is used to glue the ribs to the spar and to the trailing edge sheeting. This combination of adhesives provides excellent strength and helps to reduce building time.

11. After all W-2 ribs are glued in place, cut one piece of shear web to match the dihedral angle. Glue this angled shear web in place and install the W-1 wing rib.

12. Cut the trailing edge filler blocks from the 5/16" x 1/4" trailing edge stock as shown on the plans. Trim 1/2" from the aft edge of the blocks so that they will fit flush with the top edge of the ribs when they are installed.

13. Glue the trailing edge filler blocks in place. When dry, taper the top of the 3/16" x 1/4" trailing edge to match the wing ribs, being careful not to change the contour of the ribs themselves.

14. Glue the 3/32" top trailing edge sheet in place and pin securely until dry.

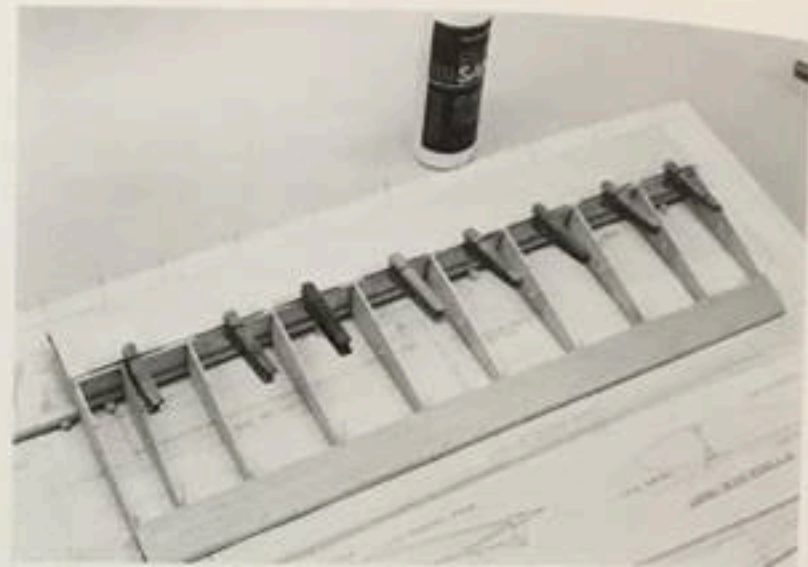


15. Trial fit the top wing spar in position on the ribs. Make certain that the shear webs are flush with the bottoms of the spar notches in the ribs. When satisfied with the fit of the spar, glue the spar in position using aliphatic resin and CA cement in the same manner as used for the bottom spar. Be certain that the end sanded to match the dihedral angle is in the correct position before gluing the top spar in place.

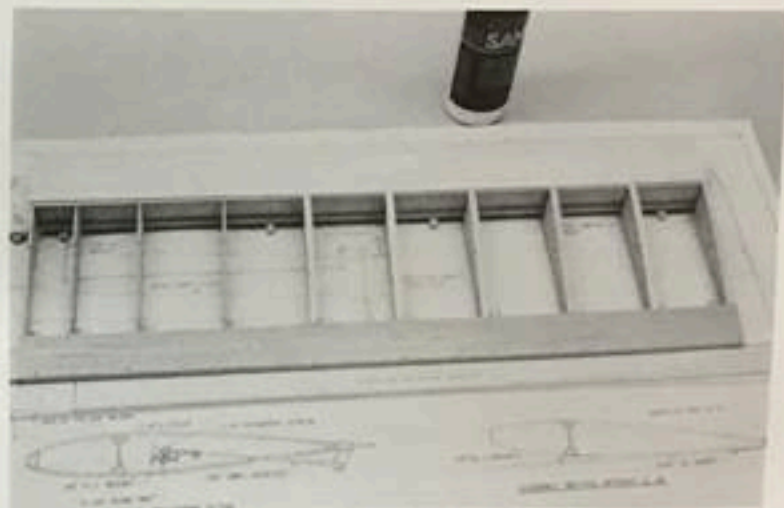
16. Glue the balsa leading edge in place, being careful that it is straight for its entire length and even with the top and bottom of each rib.

17. Mark the top spar with a line in the center of the spar so the leading edge sheeting can be properly aligned as it is glued in place. Here again, a combination of thick CA cement and aliphatic resin is used to attach the leading edge sheeting.

18. Run a bead of aliphatic resin cement down the center of each rib from the spar to the leading edge. Next, run a bead of thick CA cement across the top wing spar from center to tip. Do the same on the leading edge where the wing sheeting will be



glued in place. Working quickly, press the leading edge sheeting down against the wing spar, carefully aligning the trailing edge of the sheeting with the line in the center of the spar. Once the leading edge sheeting is adhered to the wing spar, work the leading edge sheeting over the ribs and ensure that it bonds properly to the leading edge.



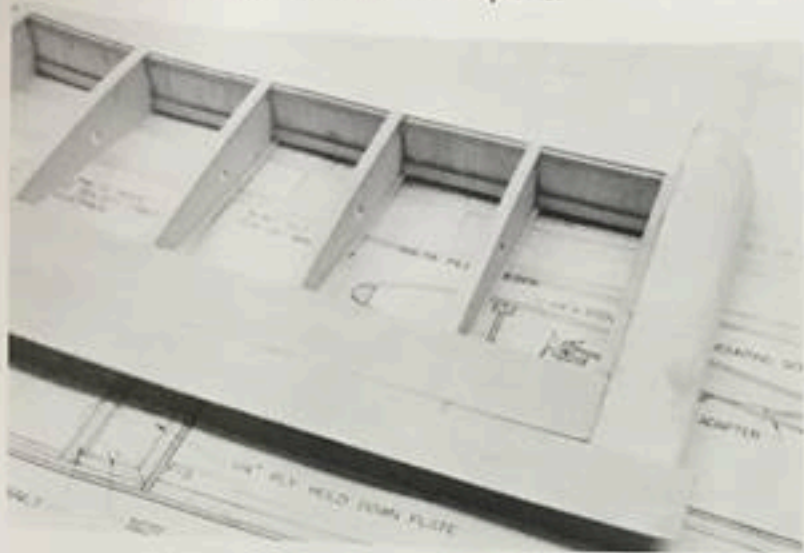
19. Install the 3/32" x 1/4" cap strips on the tops of the ribs as shown on the plans (install the cap strips on the last 6 wing ribs, aligning each cap strip in the center of the rib, except for the tip, which is glued flush with the outer edge of the rib).



20. Make the second wing panel in the same manner as the one just completed. Do not glue the center joint of the W-1 ribs and wing spars at this time. After the second panel has completely dried, block the tip up 1 1/4" and glue the two wing

28. Make the two aileron bell crank mounts and install the blind nuts using thick CA cement to secure the blind nuts in position after installation. Add the triangle stock reinforcements to the top side of the mounts.

29. Using the plans as a guide, rough carve the wing tip blocks to the sections shown on the plans.



30. Glue the wing tip blocks in position, carefully aligning the aft edge with the trailing edge sheeting. Tack glue the ailerons into position using a few drops of CA cement and continue to shape the wing tips using coarse sandpaper.

31. Temporarily mount the aileron servo in position. Locate the aileron control horns as shown on the plans and temporarily install the aileron bell crank mounts in their position. Make up the bell crank to aileron push rods from the threaded rod supplied and install.

32. Locate the two solder links in the hardware package. Trim the arm with the pin from one of the links and hook them together as shown on the plans. Clip the links onto the servo wheel.

33. Using the 1/16" wire provided in the kit, make a 90 degree bend in one end, allowing enough length to accommodate the snap keeper.

34. Assemble the aileron linkage as shown on the plans, and temporarily install the aileron linkage and bell crank into position in the wing. Make sure that the aileron bell cranks are in neutral position and mark the 1/16" wire push rod to the proper length. Remove the links from the servo wheel and trim the push rod wire to the proper length. Solder the link onto the push rod. Be sure the pin in the solder link is in the correct position so that it will go into the servo wheel when installed.



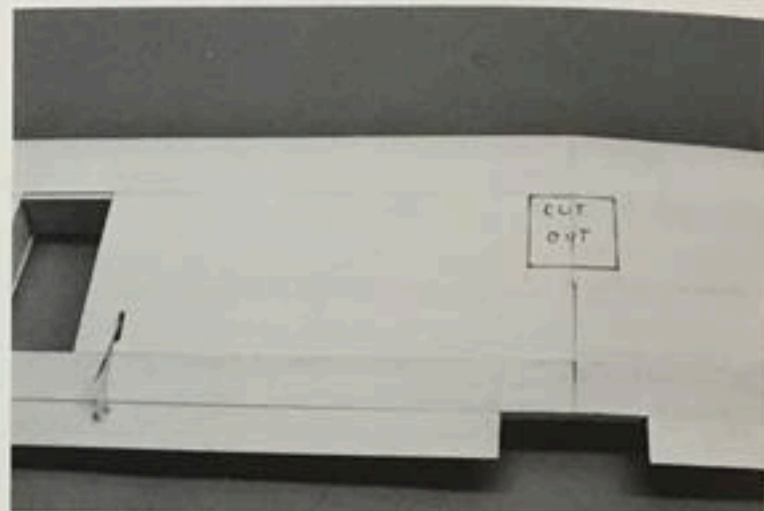
35. Use the same method to make the push rod for the opposite aileron.

36. Re-install all aileron linkage and push rods and attach to the servo wheel. With all pieces in position, carefully align the bell crank assemblies so that the push rods are not binding in the push rod guide holes, and glue the aileron bell crank mounts into the wing. Remove the bell crank to aileron push rod.

37. Install the 3/32" bottom sheeting out to the 6th rib, as shown on the plans. Mark the locations of the aileron push rod exits and cut out.

38. Install the remaining cap strips.

39. Rough sand the entire wing to its proper shape.



40. Mark the location for the aileron servo cut out on the bottom sheeting. Do not cut out at this time.

41. Mark the aileron hinge location on each aileron and wing panel as indicated on the plans.

42. Carefully break each aileron free from the wing, and shape the leading edge of the aileron as shown.

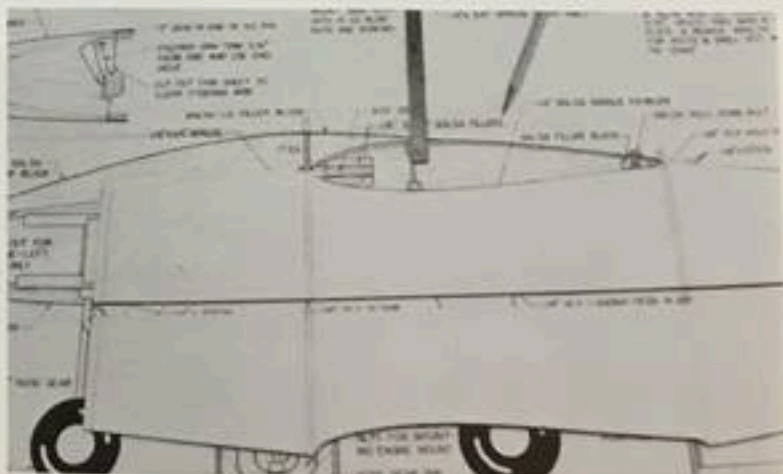
43. Notch the ailerons and wings to provide clearance for the hinges. Install the ailerons on the wings, and check for proper fit.

44. Set the wing aside at this time and begin assembly of the fuselage.

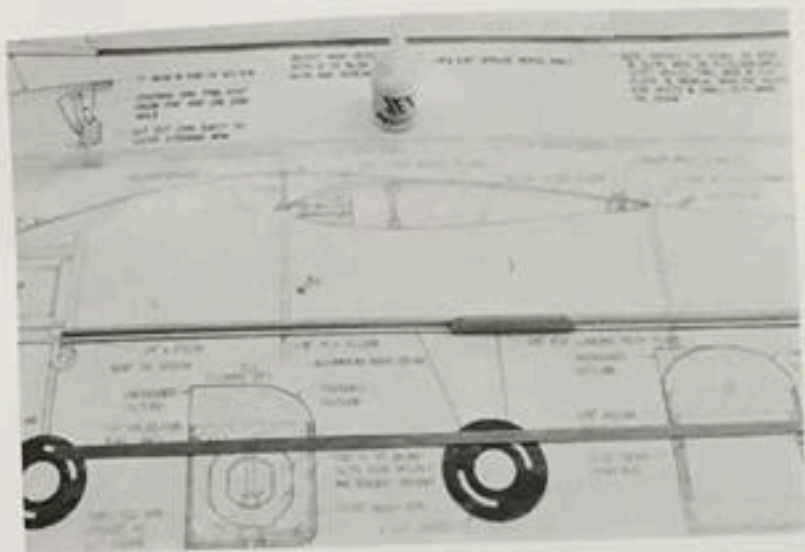


FUSELAGE CONSTRUCTION

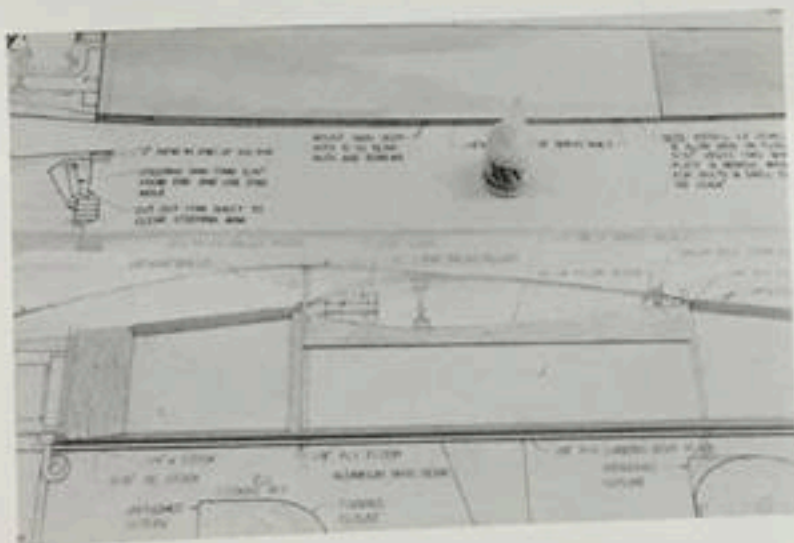
1. Lay the two fuselage sides on the plans and carefully transfer the bulkhead locations onto the fuselage sides. Be very careful that the lines are square with the bottom of the fuselage and that you make one left side and one right.



2. Using a piece of 1/8" plywood as a guide, glue the triangular stock to the right side, allowing a 1/8" space between the bottom edge of the fuselage side and the bottom of the triangular stock. This space is required for the fuselage floor, which will be installed later.



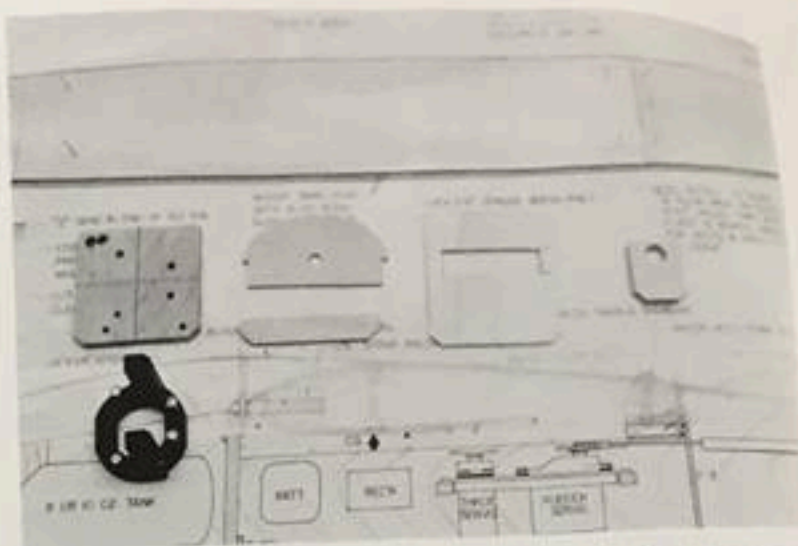
3. Install the remaining triangular stock, trailing edge stock, wing saddle doubler, and 1/8" x 1/4" spruce doubler.



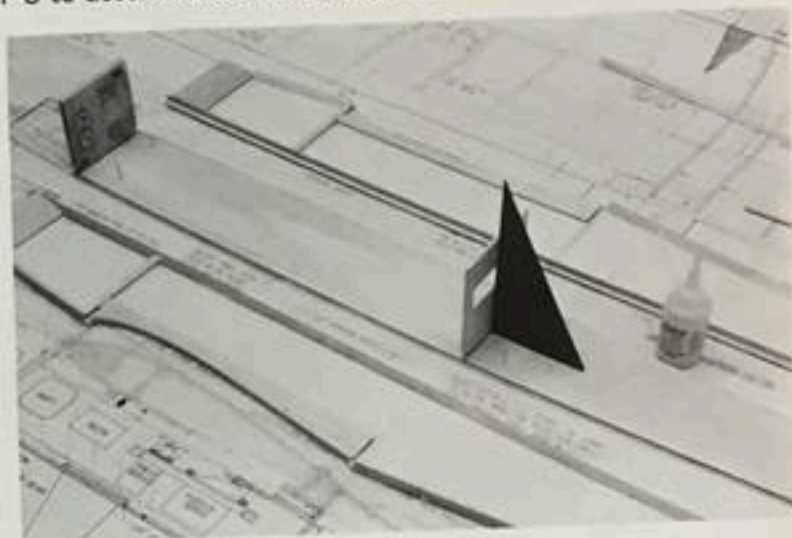
4. While the right fuselage side is drying, build up the left side in the same manner.

5. Place the 1/8" forward plywood floor section in place on the plans. Carefully align the 1/8" aft balsa floor with the forward section, pin these two items in place, and glue securely.

6. Locate the center of the engine mount by drawing lines on F-1 as indicated on the plans. These lines will correspond with the marks cast into the engine mount supplied in the kit. This will ensure that the engine mount will be in the proper position when the holes are drilled for the 6-32 blind nuts. Mark the location and drill the 1/8" holes for the blind nuts, for the throttle push rod, and for the nose gear push rod. Again, using the plans as a guide, drill two 1/4" holes for the fuel line exits.

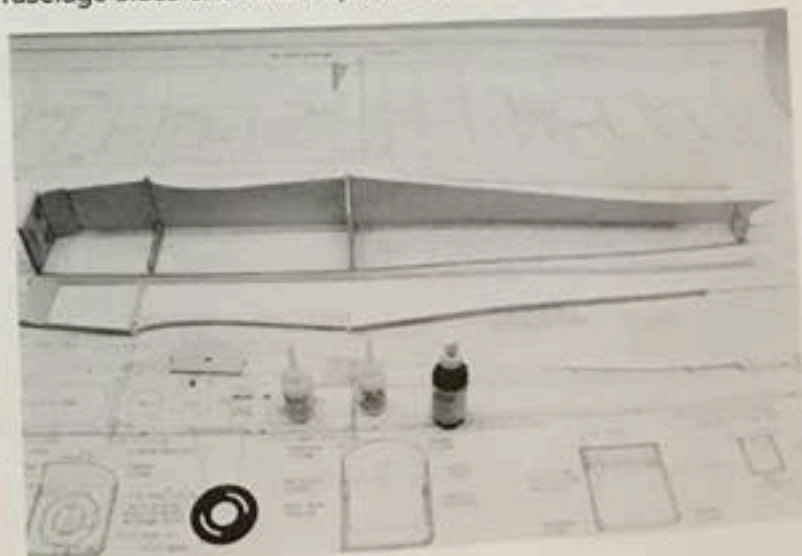


7. Remove the section indicated on the plans from former F-3 to accommodate the push rods.

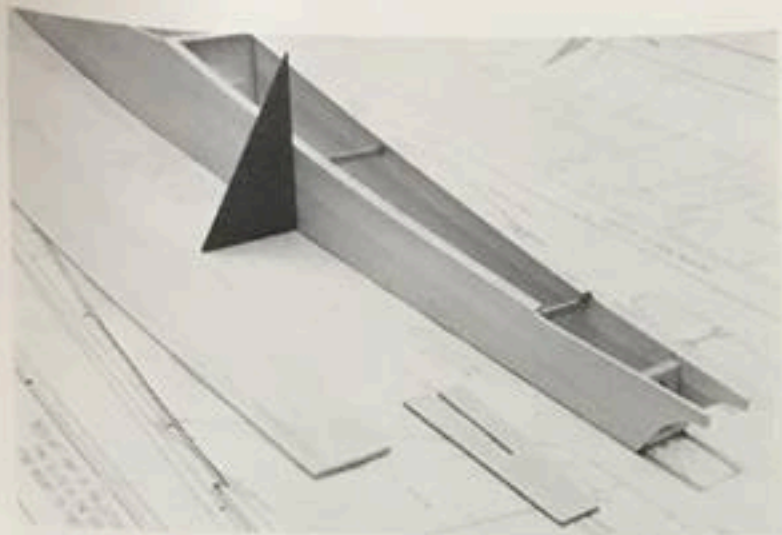


8. Carefully locate formers F-1, F-2B, F-3 and F-4 over their proper position on the fuselage floor. Use a square to be certain that the formers are 90 degrees to the floor. Glue in place using thick CA.

9. With formers F-1, F-2B, F-3, and F-4 glued in their proper positions, place the right hand fuselage side in position over the fuselage bottom. Beginning at the nose, apply thin CA cement to the joint where the triangular stock on the fuselage side meets the fuselage bottom. Working a small section at a time, force the fuselage side against the fuselage bottom and glue in place. Be careful to get a good joint between the fuselage side and bottom, the entire length of the fuselage. Apply thick CA cement to the fuselage formers where they contact the fuselage sides and hold in place until the cement sets.

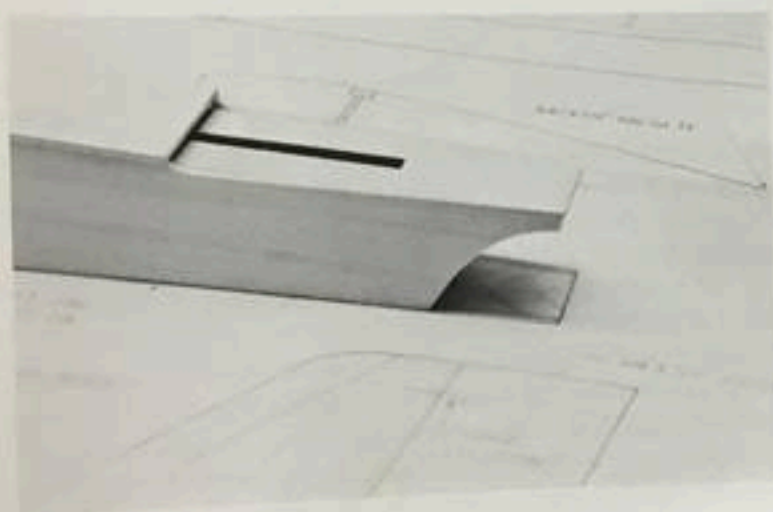


10. Install the left hand fuselage side in the same manner as the right, again taking care to ensure a good glue joint between the fuselage side and bottom.

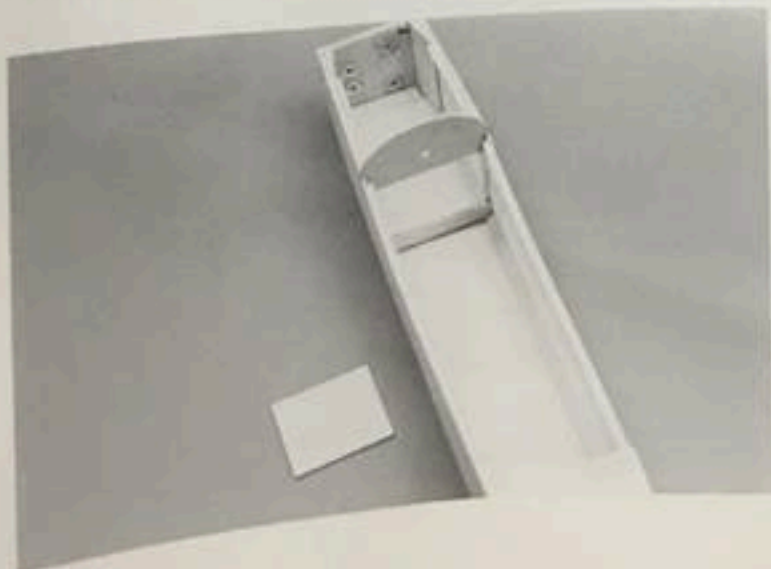


11. Prior to installing the plywood top on the aft section of the fuselage, be certain that the sides are square with the bottom and not bowed in or out. If the sides are not square, cut a small spacer from scrap and insert into the fuselage. This can be removed after the top sheeting is in place.

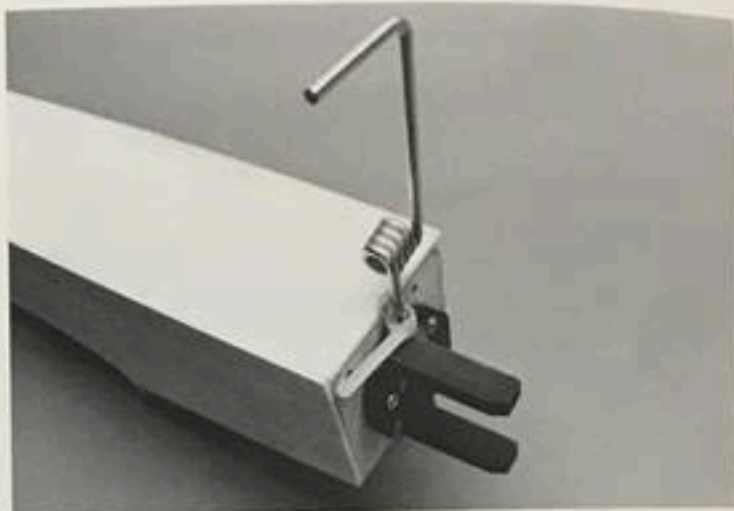
12. Using thick CA cement, glue the aft top sheeting in position. Add scrap 1/4" triangle stock to reinforce the stab mount to fuselage side joint.



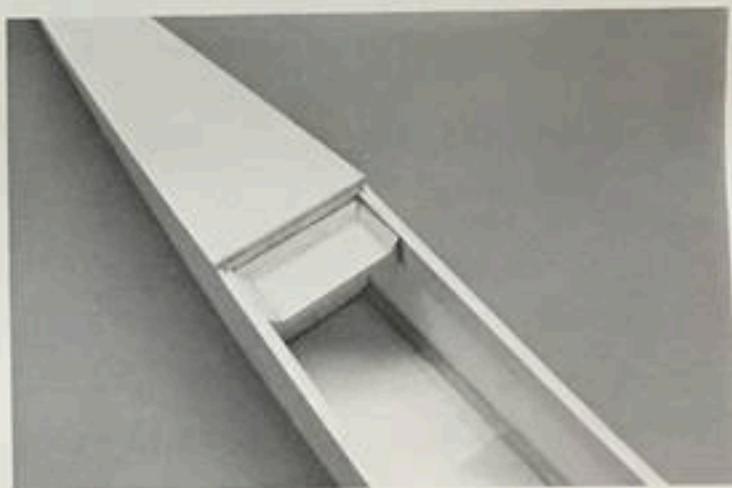
13. Glue the 1/8" plywood stab mount in place, being careful to ensure that it is square with the fuselage sides.



14. Install F-2A into position between the sides. Locate the position of the 1/8" plywood landing gear plate inside the fuselage floor and glue in position. The fuselage assembly can now be removed from the building board to complete the remainder of the construction.



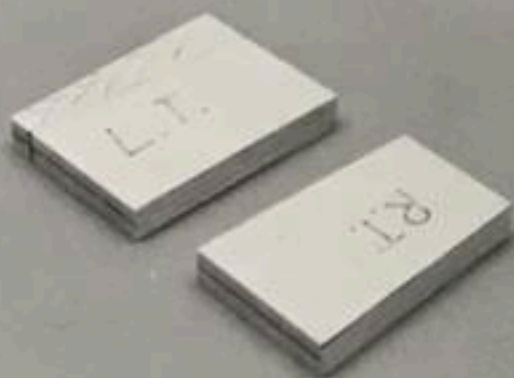
15. Install the engine mount on former F-1. Locate the steering arm in the accessories package and place it on the nose gear. Insert the nose gear wire into the engine mount and mark former F-1 in the area where it will have to be relieved to clear the steering arm. Remove the landing gear and relieve the area marked with a Dremel tool until adequate clearance is provided for the nose gear and steering arm when in position on the motor mount.



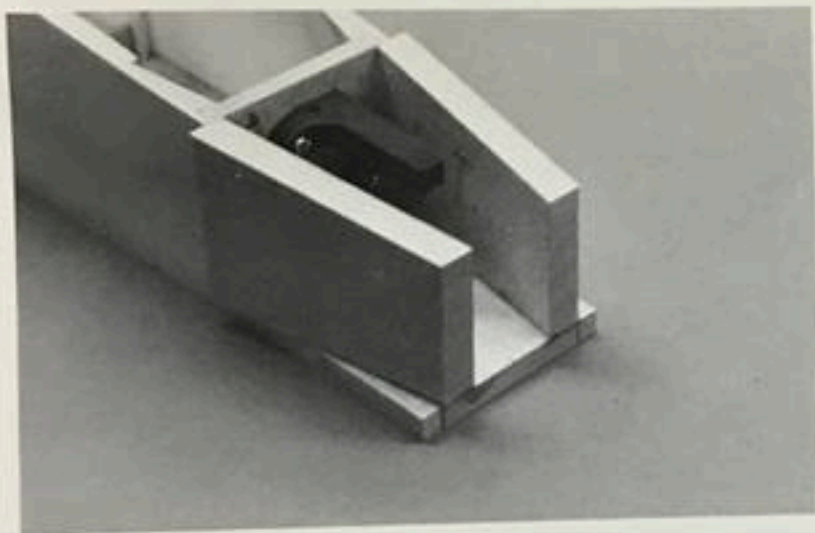
16. Shape the 1/4" plywood wing hold down plate so that it will fit between the two 1/8" wing saddle doublers. After achieving a snug fit, glue in place and add the 1/4" triangular stock to the top and bottom as shown in the details on the plans.

17. Locate the balsa blocks that will be used for making the engine cowl. Note that both side blocks have angled cuts on both ends. The bottom cowl block is square at both ends.

18. Glue the bottom block in place, making sure that it is flush and in line with the bottom fuselage sheeting.



19. Set the two side cowl blocks in position on the bottom block, and using a straight edge, transfer the angled line from the top fuselage surface to the side cowl blocks. Trim the excess material from the cowl blocks, being certain to make one left hand and one right hand block.



20. With the side cowl blocks in position as shown, glue the side blocks to the fuselage and bottom block using CA cement. When the cement has cured, carefully sand the top of the block to obtain a good match to the fuselage sides.

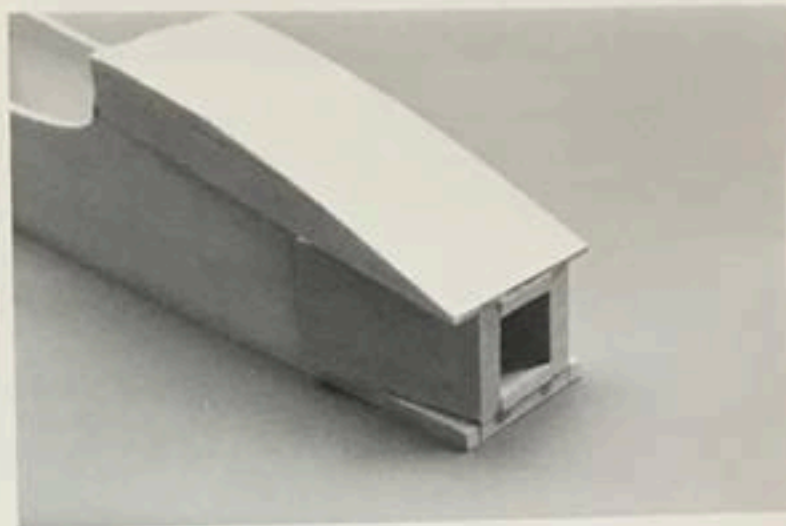


21. If a 10 ounce fuel tank is going to be installed, former F-2B will have to be relieved approximately 1/4" so the fuel tank can be inserted without restriction. (If an 8 ounce fuel tank is being installed, this step will not be necessary.)

22. Coat the inside of the tank compartment and the bottom surface of the top block with polyester resin to fuel proof the wood. Be careful not to let the resin get into the threads of the engine mounting blind nuts.

23. Install the top nose block on the fuselage, being certain to use adequate glue to securely fasten the block at all contact points.

24. Cut two pieces of 5/16" trailing edge stock to be used inside the cowling on the top and bottom nose blocks. Be sure the blocks fit tightly and are in the correct position, then glue in place.



25. With all the blocks securely glued in place, rough shaping of the fuselage and nose blocks can begin. Using a block plane and a sharp knife, round the corners of the blocks and bring them close to the sections shown on the plans. Don't final shape the blocks until after the spinner ring is installed.

26. Referring to the top and side views of the fuselage plans, carefully outline the area that will have to be removed to install the engine. A sharp exacto knife and dremel tool works well performing this job. Be careful not to remove too much material, making the engine opening unnecessarily large.

27. Keep removing material and trial fitting your engine until the engine easily slips into position on the motor mount. Sometimes it is helpful during this stage of operation to remove the carburetor so the engine will easily slip in and out during the fitting process.

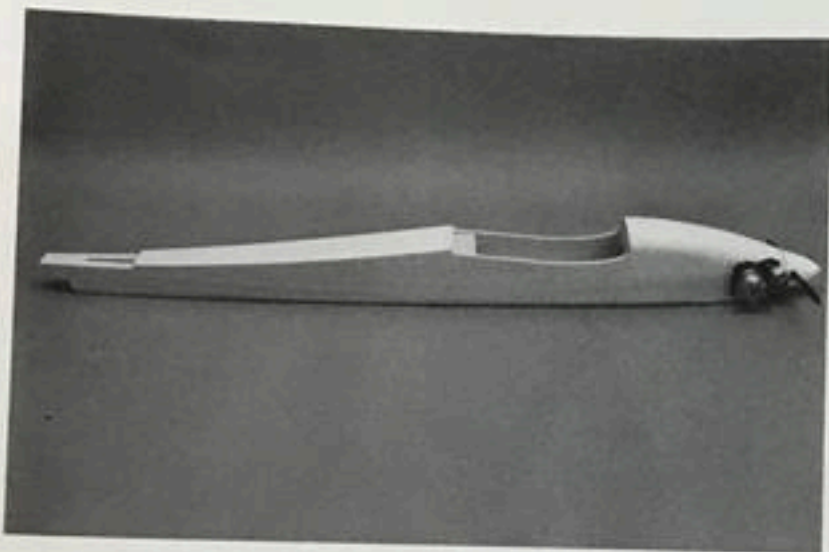
28. Once the engine will fit in position, securely mount it using all four screws. Next, place the plywood spinner ring on the front of the fuselage and slide your spinner into position on the crankshaft of the engine. If the spinner is contacting the spinner ring, the front of the fuselage will have to be shortened enough to allow adequate clearance between the spinner ring and the back of the spinner. Take your time during this step and ensure that you get a good fit between the spinner and the spinner ring. Allow approximately 1/32" clearance between the back of the spinner and the spinner ring.

29. After you are satisfied with the fit of the spinner ring, carefully glue it in place on the front of the fuselage.

30. Remove the engine from the mount and continue shaping the fuselage, referring to the plans for the proper shape.



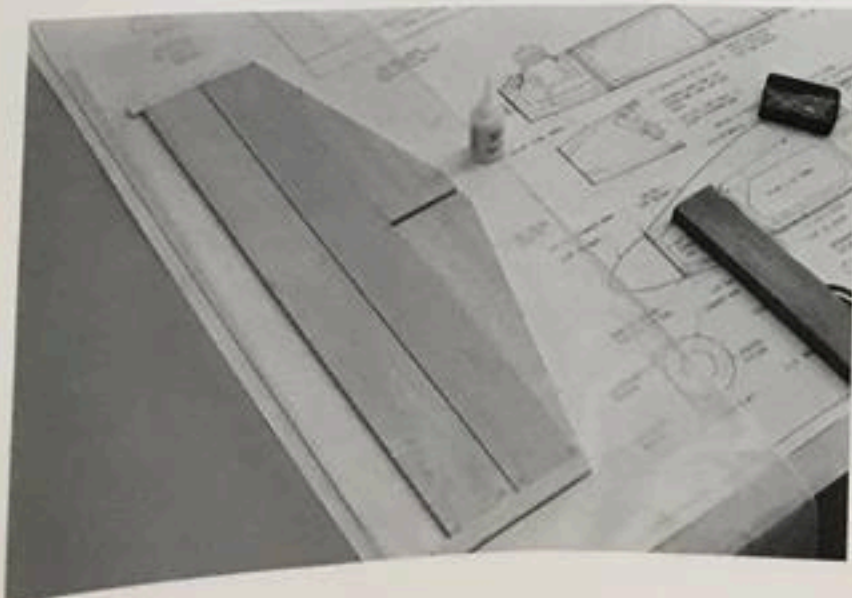
31. Re-install the engine and spinner back plate, then install the propeller and securely tighten it. Install the spinner on the back plate and check for proper fit before going to the next step.



32. Complete shaping the fuselage, rough sand the entire assembly, and set aside.

THE STABILIZER

1. With wax paper over the plans, pin the elevator and center section of the stabilizer in position. Glue and pin the two tapered leading edge sections into their proper positions. Next, glue and pin the two tip blocks to the horizontal stabilizer and to the elevator. When this assembly is dry, the elevator may be



parted from the stabilizer by using a razor saw, cutting the tip block where the two surfaces meet.

2. Use a razor plane to taper the elevator to an airfoil section. Using a sanding block, round the leading edge of the stabilizer, and carefully sand the entire surface to ensure that the assembly is smooth and flat.

3. Using the sanding block, round the tips to the shape shown on the plans.

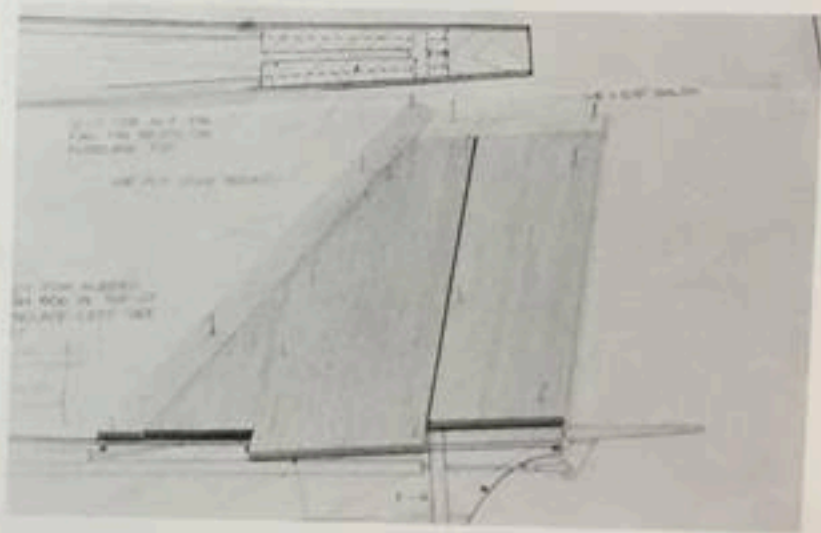
4. Use a razor plane and taper the leading edge of the elevator as shown on the plans.

5. Mark the location of the hinges on the elevator and stabilizer and temporarily install the hinges and elevator to check for proper fit.

6. Finish sand the entire assembly.

FIN AND RUDDER

1. Place the fin and rudder components over the plans in the same manner as with the horizontal stabilizer, and glue all components in place, leaving a small gap between the rudder and vertical fin.



2. When this assembly has dried, use the razor saw and cut the rudder free from the fin.

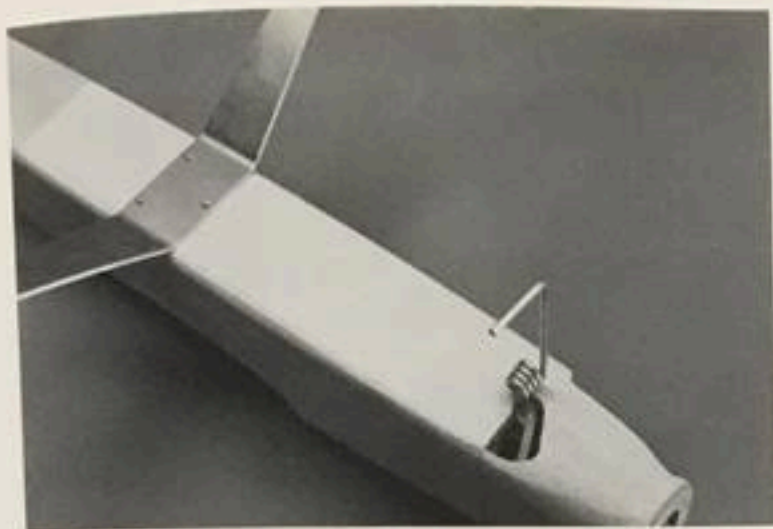
3. Use a razor plane and sanding block to shape these components in the same manner as with the stabilizer and elevator. When sanding the vertical fin, be careful not to remove too much material at the bottom where the center portion of the fin is inserted into the stabilizer and plywood stab mount.

COMPLETING THE AIRFRAME

1. Carefully mark the location of the main gear on the bottom of the fuselage.

2. Locate and drill holes for the 6-32 blind nuts for securing the main gear.

3. Install the main gear.



4. Using the plans as a guide, mark the location of the hole for the steering arm and nose gear cut out.

5. After the hole is cut in the bottom nose block, trial fit the steering arm and nose gear to ensure that all parts have clearance for operation.

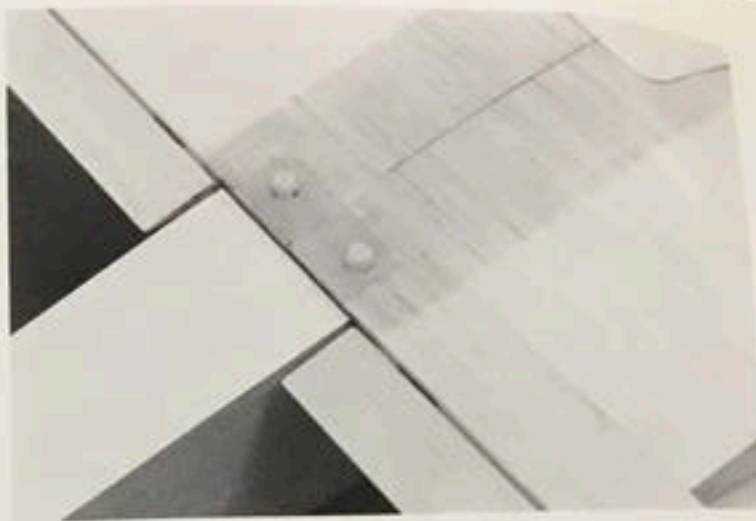


6. The 3/32" plywood inlay in the top of the wing sheeting for the wing hold down bolts should be installed at this time. Use a sharp blade and carefully cut the exact size hole in the top sheeting that is necessary to accept the 3/32" plywood insert. When satisfied with the fit, glue these two pieces into position and allow to dry. With this accomplished, the wing hold down bolt holes can now be located and drilled.

7. Carefully align the wing on the fuselage, being certain that it is square with the fuselage, and drill the two 5/32" holes through the trailing edge and wing hold down plate as indicated on the plans.

8. Remove the wing from the fuselage. Tap the holes in the plywood plate for 10-32 hold down bolts. Drill out the wing holes to 3/16" to provide clearance for the wing bolts.

9. Wrap the center section of the wing with fiberglass cloth at least 3 1/2" wide and secure to the wing with resin.



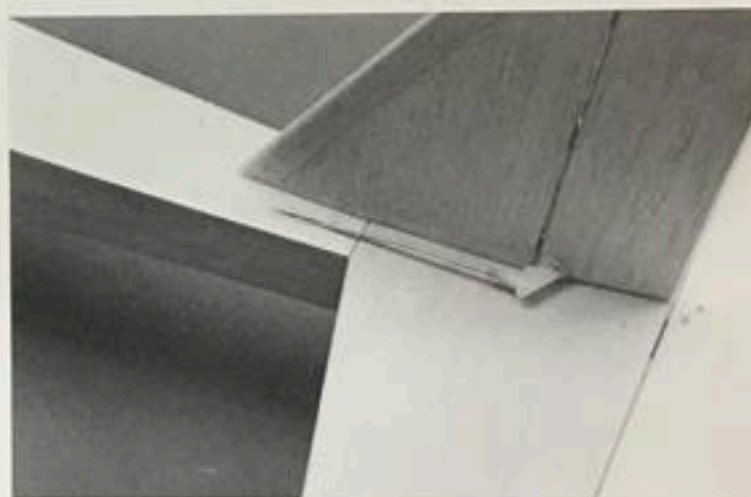
10. After the resin has cured, lightly sand the surface of the glass and apply a second coat of resin. After this has cured, the entire wing can be given its final sanding.

11. Using a sharp knife, remove the glass cloth covering the wing hold down bolt holes and the leading edge dowel hole.

12. Cut the servo mount rails to the proper length, position them as shown on the plans, and glue in position. For added strength, a U-shaped bracket made from 3/32" scrap balsa can be glued to the servo rail where it contacts the fuselage side.

13. Install the servos in their proper position.

14. Assemble the rudder and elevator components and temporarily pin them in position on the fuselage.



15. Referring to the illustrations on the plans, cut a slot in the top of the fuselage for the rudder push rod exit.

16. Using the plans as a guide, cut the rudder and elevator push rods to the length shown, and drill a hole approximately 1" deep in each end of the push rod to accept the threaded metal push rod material provided in the kit. Carefully cut to length and bend the metal push rod as shown on the plans. Glue the metal push rod end into the dowel with CA or epoxy cement, being sure to rough the surface of the wire rod with sandpaper first.

17. Attach the push rods to the control surfaces as shown on the plans, and check to see that the push rods move freely without any binding. When satisfied with the push rod installation, pin the rudder and elevator straight. Thread a clevis onto the threaded rod provided and snap the clevis onto the appropriate servo wheel. Mark the end of the threaded rod

where it will be inserted into the push rod, allowing approximately 1" of the wire to extend into the push rod. Cut off the wire and glue into the 1/4" dowel.



18. Install the throttle push rod material in position as shown on the plans. Be careful to position the push rod material as low and as far to the right side of the fuselage as possible so the push rod will not bind against the fuel tank when installed. To secure the push rod to the side of the fuselage, fabricate a small block-type clamp that will fit snugly against the outside of the push rod, and hold it securely to the side of the fuselage when glued in place.

19. Locate the threaded brass coupler in the hardware package, and solder it to the braided inner throttle cable. Attach one of the nylon devices to the end of the threaded coupler, and attach to the throttle servo arm. Trim the cable to the proper length and use a solder link to attach the cable to the throttle arm.

20. Check the throttle cable action for smoothness and freedom of binding and correct any problems now.



21. Again, using the plans as a guide, install the nose gear steering push rod, which is comprised of Nyrod inner and outer material. After mounting the outer Nyrod material to the fuselage side in the same manner as described for the throttle, fabricate the inner Nyrod tubing ends by using a piece of the threaded push rod material and placing a Z-bend as close to the threaded portion of the rod as possible. Screw the threaded rod into the inner Nyrod and attach to the steering arm.

22. Attach the other end of the push rod to the servo wheel. At this stage of installation, be certain that the rudder and nose gear are both functioning in the proper direction, and make whatever adjustments are necessary at this time.

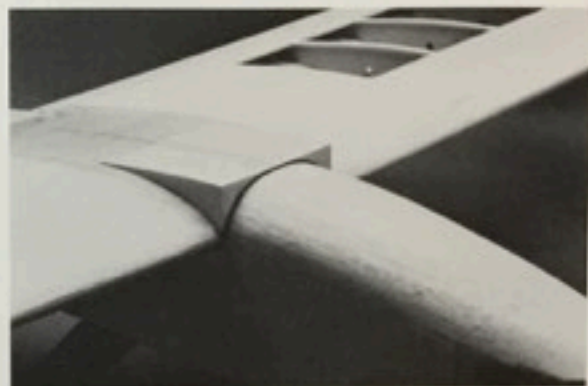


WING LEADING EDGE FILLER BLOCKS

1. With the leading edge dowel in place, secure the wing to the fuselage, using the two 10-32 wing hold down bolts.

2. Locate the two balsa leading edge filler blocks and place them in position on top of the wing. Lightly sand the two filler blocks where they will be joined together in the center to allow the filler blocks to match the dihedral angle of the wing and glue together.

3. When satisfied with the fit of the filler blocks on the wing, hold the filler blocks in position and outline the shape of the nose block where it meets the leading edge filler blocks.



4. Remove the filler blocks and carefully trim and sand to match the balsa nose block and to carry the contour smoothly onto the top of the wing. A little extra time in fitting this block to the fuselage/wing will add much to the overall beauty of this model.



5. With the wing still securely bolted in position, take a piece of scrap balsa and fit it to the gap left behind the trailing edge of the wing where it meets the top of the fuselage. Cut to size and glue this filler block into position. This completes the basic structure of the aircraft.



COVERING AND FINISHING

The secret of the performance of this size model is light weight. Resist the urge to pile on super finish with many coats of primer. In our opinion the only way to finish your Jetfire .40 is with one of the plastic film coverings. Properly done, this will provide a beautiful finish with minor weight increase. Carefully follow the directions supplied with whatever film you choose.

Begin by inspecting the entire airframe for dings or nicks. These can be filled with plastic balsa or spackling compound. Give everything a final sanding with 400 wet-or-dry paper; you can't get it too smooth.

Before starting the covering, remove the tail surfaces and ailerons. Vacuum the whole structure, especially around the ribs and inside the fuselage. Balsa dust not only gives a rough finish, but can prevent proper adhesion of the film. It is helpful to finish up by going over the surface with a tack rag to remove all remaining dust.

It will help to remove the bellcrank-to-aileron pushrods when covering the bottom of the wing, but be sure to re-install them before covering the top.

It is also easier to cover the wing and leading edge filler blocks before gluing them together. After both pieces are covered, place the filler blocks in position on the wing and mark their outline with a felt tip pen. Cut out the covering under the blocks and glue them in place with thick CA.



FINAL ASSEMBLY

1. Slit the film covering for the hinges in all the control surfaces and install the hinges. Check to be sure the hinges are properly aligned and move without binding.

2. Cut away the covering on the fin and stab where they pass through the fuselage. Epoxy the fin and stab in place, making sure they are square with respect to each other and the wing.

3. Install the nose gear and main gear. Install the axles in the main gear and mount the wheels, using wheel collars to hold them in place.

4. Assemble your fuel tank according to the manufacturer's instructions.

5. Prior to installing the fuel tank, trial fit the tank into the compartment and decide how much foam rubber will be needed to support the fuel tank on all sides. Don't forget this important step or you may have undue fuel tank problems.

6. Take a piece of fuel line approximately one foot long and push each end of it into the two holes in the firewall (from the engine compartment side), equally dividing the fuel line between the two holes.

7. Fit the fuel line onto the fuel tank outlets and carefully push the tank forward at the same time as you pull on the fuel line. Be careful not to pull on the fuel line too hard as you may pull it off of the fuel tank outlet or cut the fuel line. As the tank is pushed into place, install the foam rubber on each side, bottom and top.

8. When the fuel tank is in position, cut the fuel line, leaving adequate length for hook up to the carburetor and for the fuel tank vent line.

9. Mount the engine, spinner and prop.

10. Assemble the wing and fuselage. Check to be sure the plane balances on the spar as shown on the plans.

11. Check the lateral balance of the plane. A slight tilt is acceptable, but if the wing is excessively out of balance, weight should be added to the light tip.

12. Inspect the entire model one last time. Check the operation of the controls and be sure that they move the proper amounts and in the correct direction.

This completes your Jetfire .40. All that's left to do is go out and fly! Good luck and may you enjoy your Jetfire for years to come.