



WARBIRDKITS.COM

Assembly Manual for
Mikoyan-Gurevich MiG-3

Version 2.7 – 9 March 2008



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Materials

Kit Contents

This kit includes the following items:

- Laser-cut balsa, 13 sheets
- Laser-cut plywood, 1 sheet
- Laser-cut elevator horn, 1 each
- Vacuum-formed plastic canopy, 1 each
- Construction manual, 1 each
- Plan, 2 sheets
- Decals, 1 sheet

Builder-Provided Materials

You will need to provide the following materials to complete this kit:

- 1/16" x 4" x 30" Balsa, 3 sheets
- 1/8" x 1" Dowel, 1 each
- 1/2" x 24" Balsa triangle, 1 each
- 1/4" x 6" Balsa triangle, 1 each
- 1/16" x 12" Music wire, 1 each
- 3/32" x 12" Aluminum tubing, 1 each
- 1-3/4" Du-Bro spinner
- Aileron linkage (suggest Du-Bro Cat No 189 Aileron Horn Wire Ball Links)

- Elevator pushrod and quick-link
- Hinges (ailerons, elevators)
- Covering and paint
- 2 ounce Fiberglass cloth (wing reinforcement)
- Pair of super-magnets or bolt and nut (hatch hold-down)
- Motor, propeller and battery
- Radio gear: receiver, elevator servo, aileron servo

Power

The prototype was powered by a Mega 16/15/6 brushless motor, an 8 cell 1100 mAh NiMh battery, and an APC 8x4 prop.

If built light (17 to 18 ounces) a Speed 400 motor should provide sufficient power.

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Construction

Wing

The wing is a fully-sheeted spar-less design that achieves strength without unnecessary weight. The wing is designed to be permanently attached to the model's fuselage for structural integrity.

The wing consists of three panels: center, port and starboard. Each panel has a top skin and a bottom skin.

Wing Skins

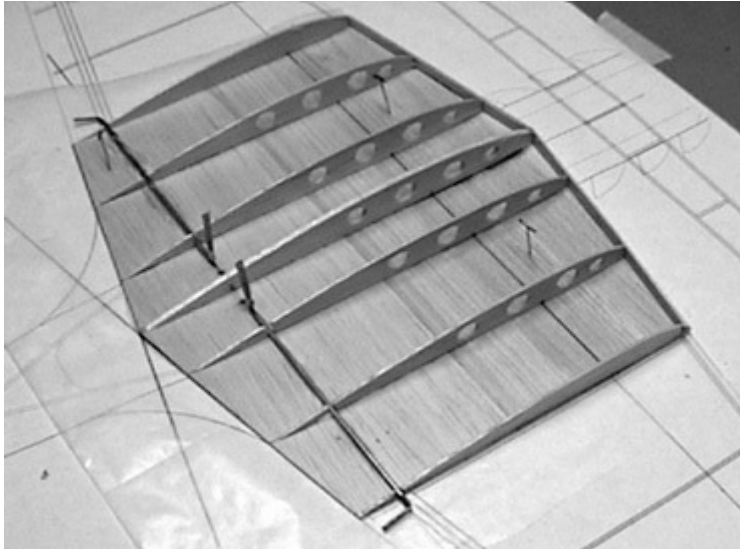
- Each outer section (left and right) lower wing skin consists of two laser-cut and etched pieces: forward and aft. The center section lower wing skin consists of three pieces. Gently clean up the mating edges of the skin pieces with 220 grit paper on a sanding block.
 - Lay the pieces of a wing skin on a flat board or table, with the outer surface up. Run a length of masking tape along the join line. Turn the assembled skin over, bend the joint open, and run a bead of wood glue down the joint.
 - Lay the assembled skin back down on the flat board – masking tape side down. Run a damp paper towel over the joint to remove excess glue. Place a sheet of wax paper over the assembled skin. Then weight it down with another board, books or what have you. Keep the weight on the skin until it is completely dry.
- While waiting for the bottom skins to dry, prepare the top skin material as follows. For each top skin, join two sheets of 1/16" x 4" balsa using the tape and glue method above.
 - When the bottom skins are dry, remove the masking tape from the joints.
 - Trace the outlines of the bottom skins onto the top skin material. Then cut out the top skins leaving about 1/8" extra material at the trailing edges.
 - Sand each skin as follows. Lay a skin on a flat board with the outer surface up, and sand it smooth with 120 grit paper on a long sanding block. Be sure to keep your sanding motion at a 45-degree angle to the joints and wood grain. Clean the skin with a tack rag.

Note: It should not be necessary to sand the inner surfaces of the wing skins. Just be sure to remove any excess glue.

Wing Center Panel

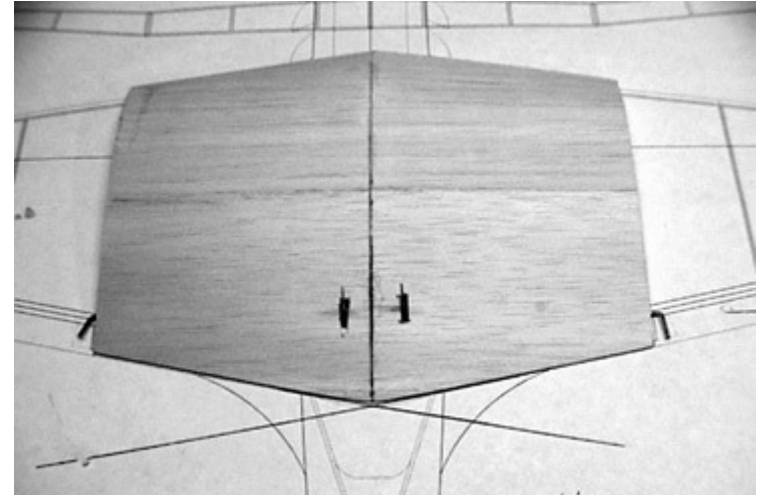
- Begin construction with the center panel. Pin the lower wing skin to your building board.
 - Glue the ribs to the bottom skin.
- Note:** Use scrap 3/32" balsa to pack the leading edge of the bottom skin up so that it is in contact with the full length of each rib.
- Glue the 1/16" sub-leading edge to the front of the ribs.
 - Fabricate aileron torque rods from 3/32" aluminum tubing and 1/16" music wire.

- Glue the torque rod tubes to the bottom skin and ribs.



- Sand the top of the trailing edge so that it tapers to about 1/32" width. This provides a gluing surface at the trailing edge for the top skin.
- Pin the center panel to your building board.
- Glue the 1/16" top skins to the wing panel structure. Let the glue cure thoroughly before unpinning the wing panel from the building board.

Note: The top of the center section must be sheathed in two pieces, one on each side of the centerline.



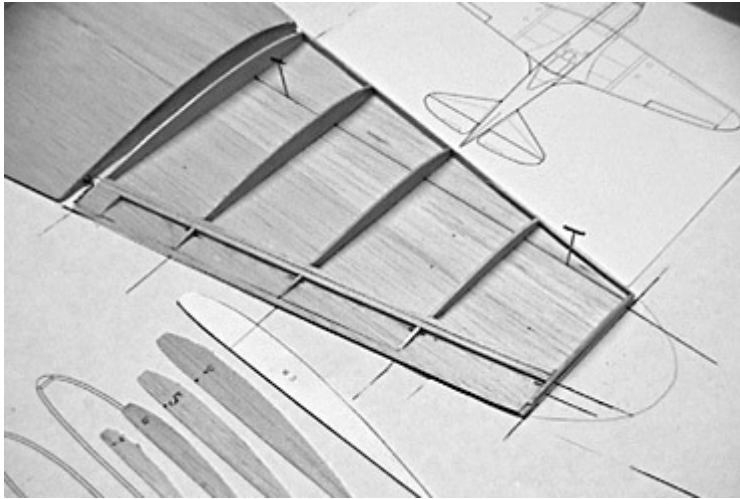
Wing Outer Panels

- Next construct the outer panels. Pin the lower wing skin to your building board.
- Use the laser-cut dihedral gauge to set rib W3 in position. When satisfied with the fit, glue it to the bottom skin.
- Glue the ribs to the bottom skin.

Note: Use scrap 3/32" balsa to pack the leading edge of the bottom skin up so that it is in contact with the full length of each rib.

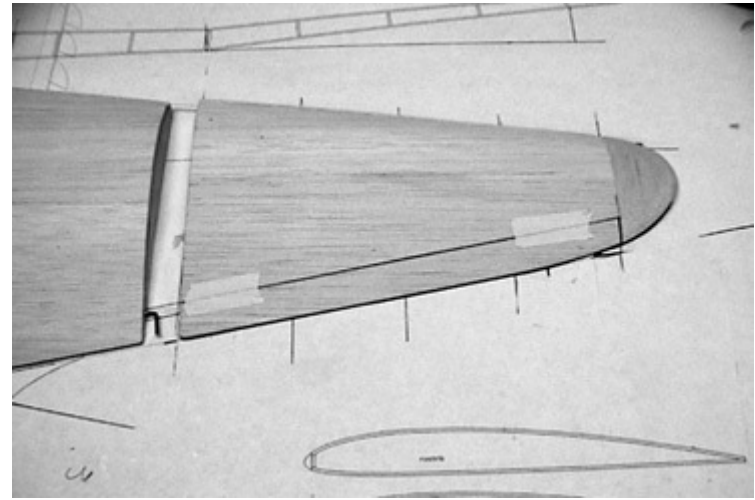
- Glue the 1/16" sub-leading edge to the front of the ribs.

- Glue the aileron hinge strips to the ribs and bottom skin, one on either side of the laser-cut separation line. DON'T glue the aileron hinge strips together.

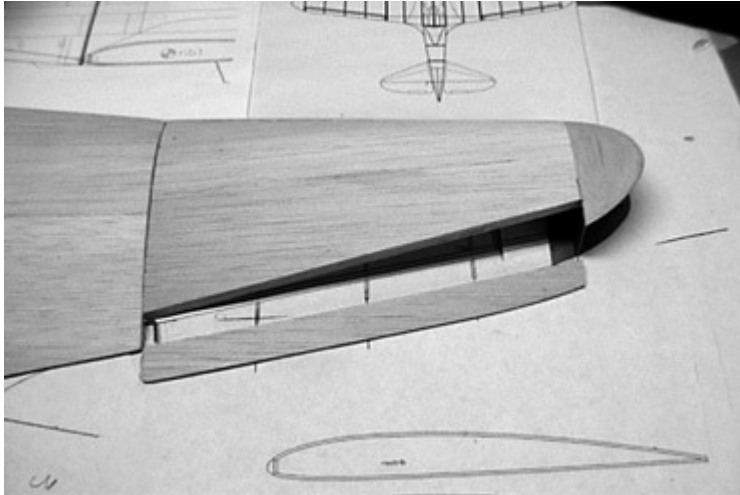


- Sand the wing panel structure so that the aileron hinge strips and crank blocks match the wing rib contour. Sand the top of the trailing edge so that it tapers to about 1/32" width. This provides a gluing surface at the trailing edge for the top skin.
- Pin the wing panel to the building board, using the laser-cut washout jigs to establish 1/8" wingtip washout.
- Glue the 1/16" top skin to the wing panel structure. Let the glue cure thoroughly before unpinning the wing panel from the building board.
- Glue the laser-cut wingtip to the tip rib.

- Shape the leading edge and wingtip of each wing panel to the shapes shown on the plans.



- Prepare to join the wing panels by pinning the center panel to your building board. Jig the outer wing panel so that its rib W3 aligns with the rib W3 on the pinned-down center section panel. Block up the wingtip 1-1/4" above the building board.

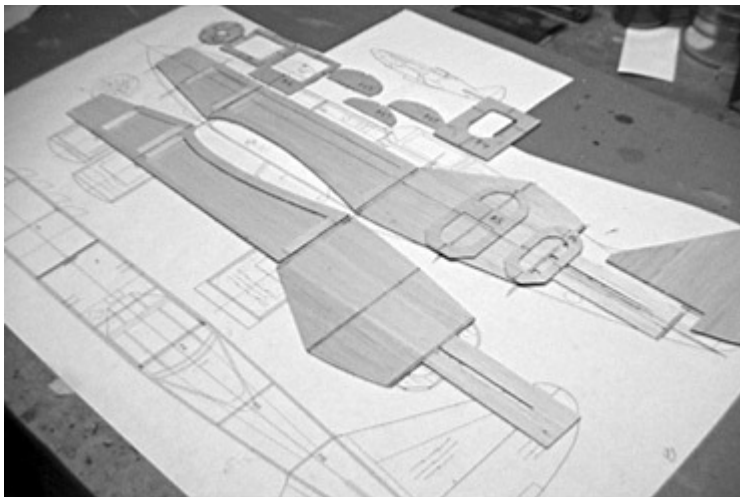


- Hinge the ailerons to the wing.
- Install the aileron servo and linkage in the wing.

- Glue the outer panel to the center panel. We suggest 15-minute epoxy for this joint. Be sure to get a good, even coverage of the W3 ribs for maximum strength.
- Glue the 1/8" laser-cut leading edge pieces to the wing.
- Sand the leading edge and wing tips to shape.
- Wrap the joint between the wing panels with a strip of 2.6oz fiberglass cloth. Soak the cloth with thin CA glue.
- Repeat with the other outer wing panel.
- Cut the ailerons free from the completed wing.
- Bevel the aileron leading edges slightly to allow for 3/16" movement both up and down.

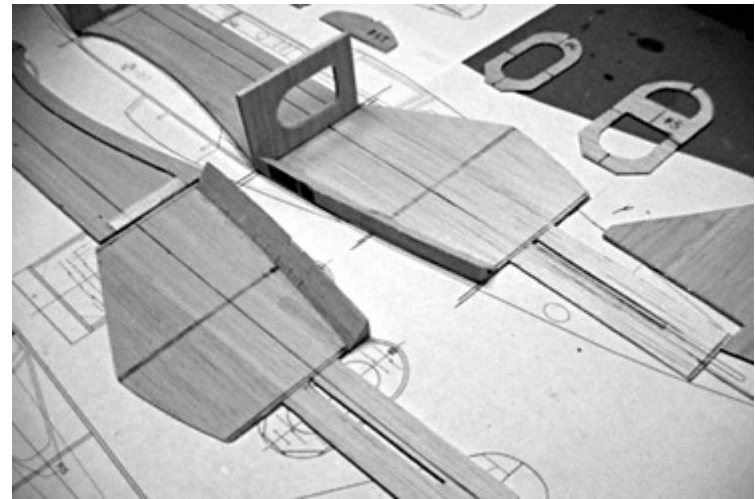
Fuselage

- First, determine how many spacer rings you'll need for your motor, prop adapter and spinner combination. Attach your motor to the plywood motor mount F1. Then set up the prop adapter and spinner as they'll be on the finished model. Adjust the number of spacer rings until you get a nice fit between the spinner and the spacer – about 1/16" is fine.
- Glue the 1/16" balsa doublers to the fuselage sides. Be sure to make a left and right side!
- Glue the fuselage top pieces to the fuselage sides.



- Glue F2, F3 and F4 to one fuselage side making sure they are perpendicular to the fuselage side.
- Measure a length of 1/2" triangle stock to fit the lower fuselage sides between F4 and F6. Cut slits about

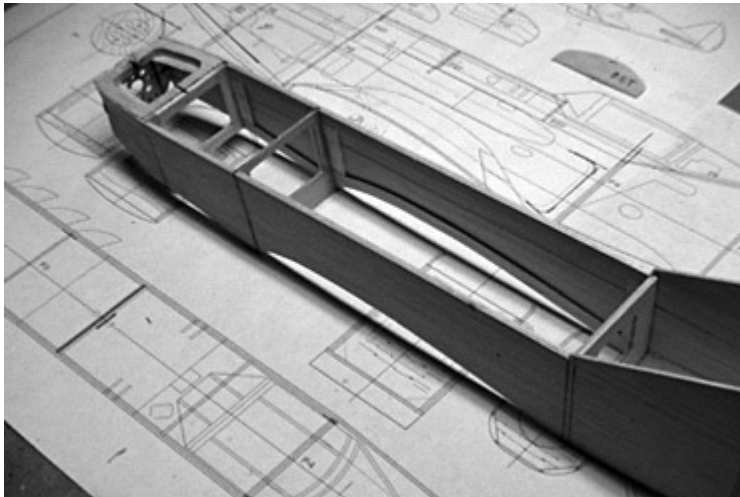
every 1/2" along the lower side of the triangle stick so that you can bend it to follow the curve of the fuselage. Glue the triangle stick in place.



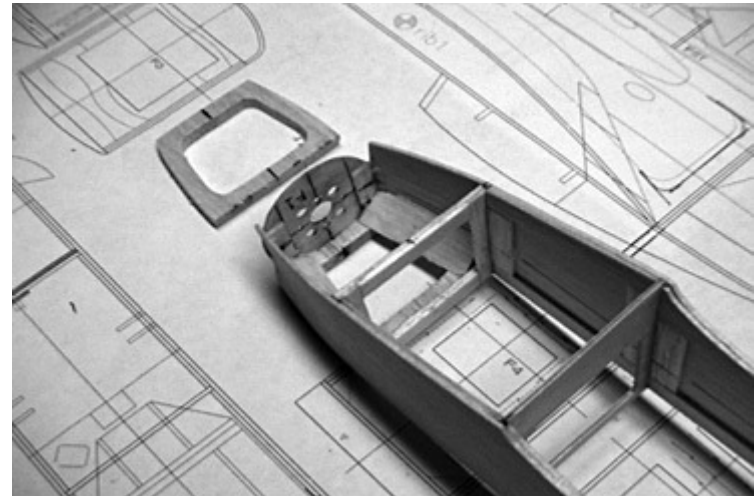
- Cut slits about every 1/2" along the inside of the triangle sticks. Cut in between the slits you made in the previous step. These slits will enable the triangle stick to bend inward when you pull the fuselage sides together at the rear of the model.
- Glue the other fuselage side to formers F2, F3 and F4. Make sure you keep the fuselage sides square and straight!
- Glue reinforcing strips of 1/4" triangle stock to F4 and the fuselage sides.
- Bring the front ends of the fuselage together, gluing them to the top 1/4" nose block.

NOTE: Dab a weak solution of household ammonia on the fuselage sides to make them bend easily.

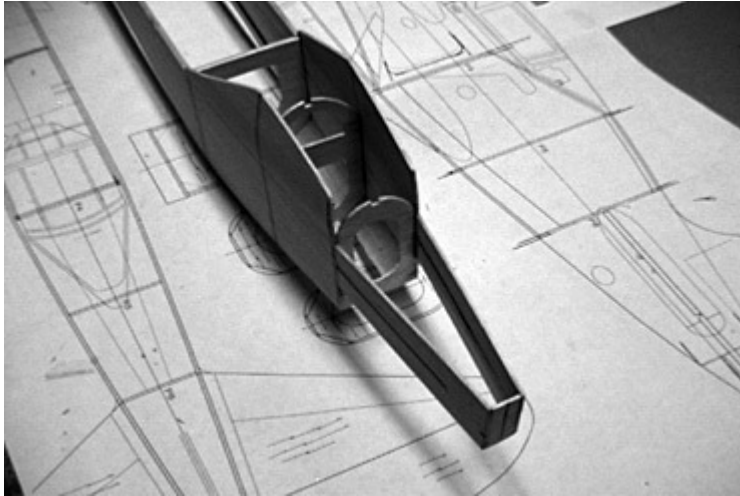
- Glue the motor mount F1 to the top nose block and the fuselage sides.



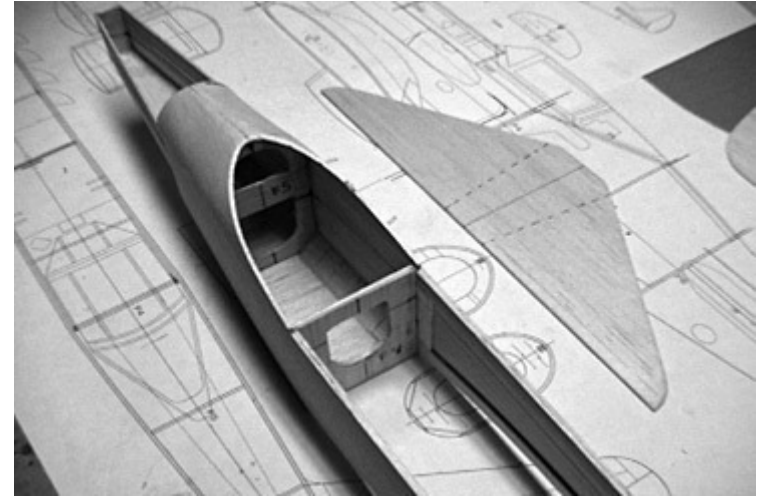
- Glue two pieces of 1/2" triangle stock between F1 and F2, against the 1/4" nose alignment piece.
- Fit the bottom 1/4" nose block flush with the bottom edges of the fuselage sides, between F1 and F2. NOTE - you may need to add scrap balsa to the rear of the bottom nose block to make it fit correctly.



- Pull the rear fuselage sides together and glue in former F7. Keep the fuselage aligned over the plan while you do this.
- Glue formers F5 and F6 in place.



- Glue a 1/8" square balsa stringer in the slots at the top of F5 and F6. (Make the stringer from scrap wood.)
- Glue the 1/16" cross-grain vertical stabilizer base in place between the fuselage sides, F6 and F7. The vertical stabilizer base goes on the top side of the fuselage, NOT on the bottom as shown in the next photo.
- Moisten the fuselage top sides with water and bring them together around the tops of F5 and F6. Glue the fuselage sides to the tops of F5 and F6.



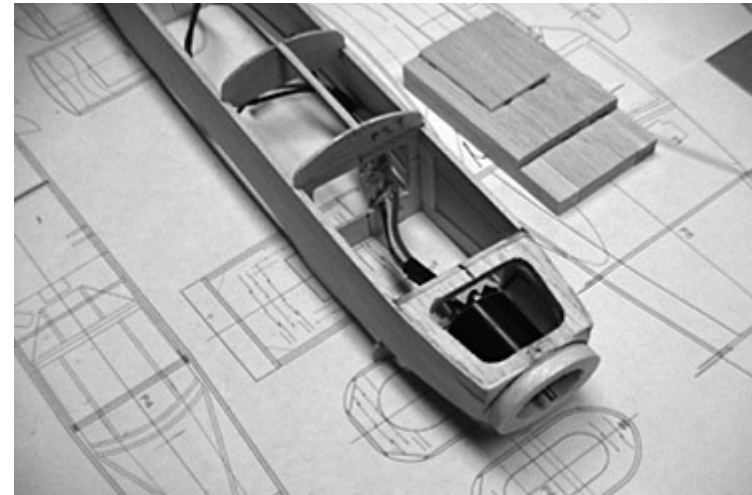
- Match the plywood and balsa FT2 parts together and drill where indicated for the 1/8" dowel hatch pin.
- Glue FT1 and the plywood FT2 to the fuselage.
- Build the canopy/hatch frame, but don't sheet it. See the scrap view on the plans for details.

Build the bottom layer first, using two pieces of C1 on the sides, one C2 at the front, and one C3 at the rear.

Then build the top layer directly on the bottom layer, using two pieces of C6 on the sides, one C5 at the front, and one C4 at the rear.

Note: The plans show the use of a bolt to hold the hatch to the fuselage. Miniature "super magnets" are a good alternative hold-down.

- Attach the canopy/hatch frame to the fuselage using whatever method you chose (bolt or magnets). Lightly mark the fuselage sides to indicate the split between the two FT2 parts. You'll use this mark to cut the top sheeting.
- Sheet the fuselage top between FT1 and FT3. Alternatively, sheet between FT1 and the ply FT2, then between the balsa FT2 and FT3.
- When the sheeting is dry, carefully remove the canopy/hatch from the fuselage.
- Glue the two 1/4" balsa bottom blocks together, then tack glue them to the bottom of the forward fuselage.
- Glue the appropriate number and size spacer rings to the forward fuselage.
- Glue the two 1/4" balsa top blocks together, then tack glue them to the top of the forward fuselage. Add a small piece of scrap 1/8" balsa to the top blocks to bring them level with the fuselage top sheeting.

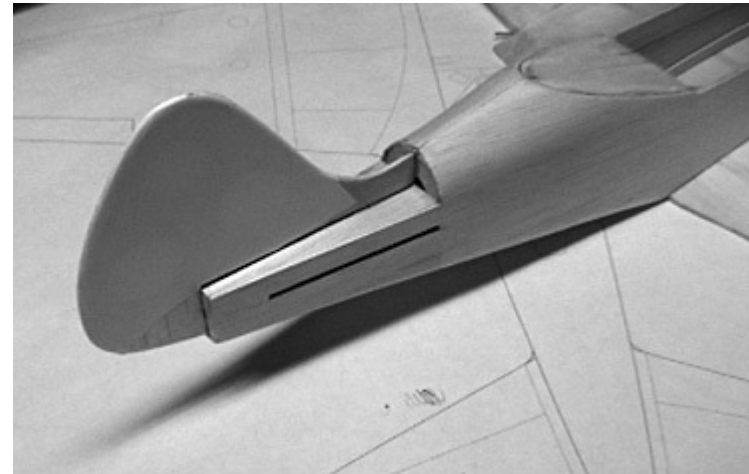


- Install a temporary spinner to aid in final sanding of the forward fuselage. Sand the nose to shape. Be careful to maintain the correct contour so that you don't sand through the wood.
- Remove the upper and lower nose blocks and hollow them to reduce weight. Glue the upper and lower nose blocks to the fuselage.
- Sheet the bottom rear of the fuselage with 1/16" balsa.
- Test fit the wing to the partially completed fuselage. Adjust the wing saddle as needed.
- Glue the wing to the fuselage. We recommend epoxy for this critical join.

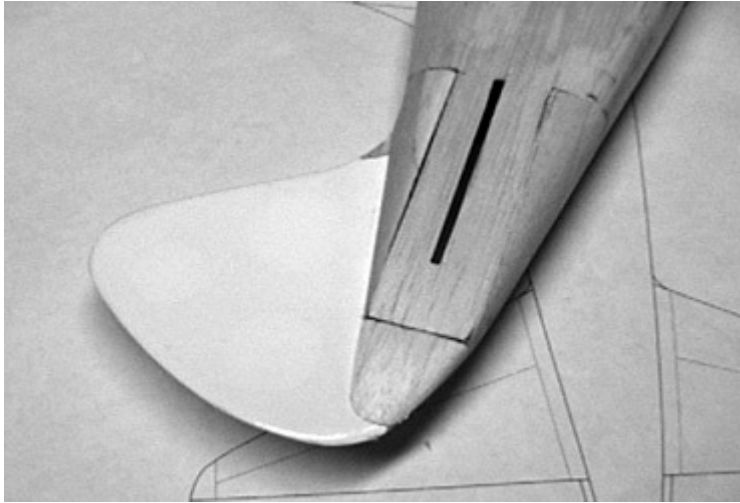


Empennage

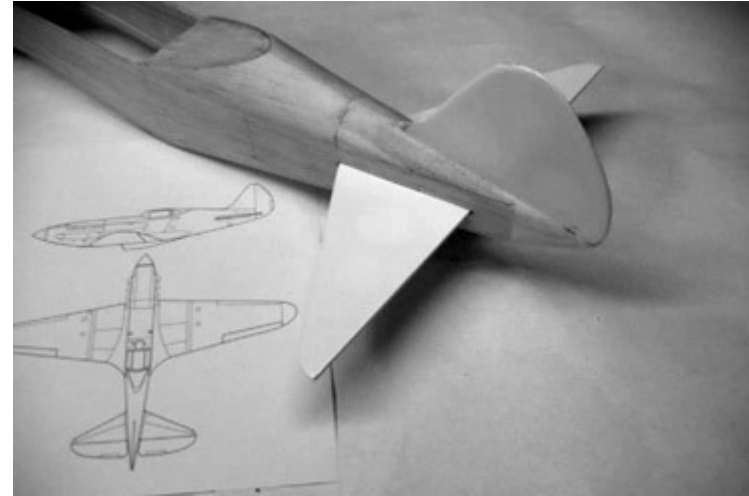
- Glue the fin and rudder pieces together and sand smooth.
- Align the fin and rudder to the fuselage, and glue them in place.



- Tack glue the vertical stab filler pieces in place on either side of the fin.
- The laser-cut lower fuselage blocks are incorrect. Please download the new tail block detail sheet for revised patterns.
- Tack glue the lower fuselage filler blocks and rudder fairing blocks in place.
- Shape the filler and fairing blocks. Then remove and hollow them. Glue them back in place.



- Test fit the horizontal stab in the fuselage. Adjust the slots until the horizontal stab is aligned with the wing. Make sure that the horizontal stab is set to 0 degrees incidence with the motor thrust line.
- Glue the horizontal stab to the fuselage.
- Make an elevator joiner from a length of 1/16" music wire.



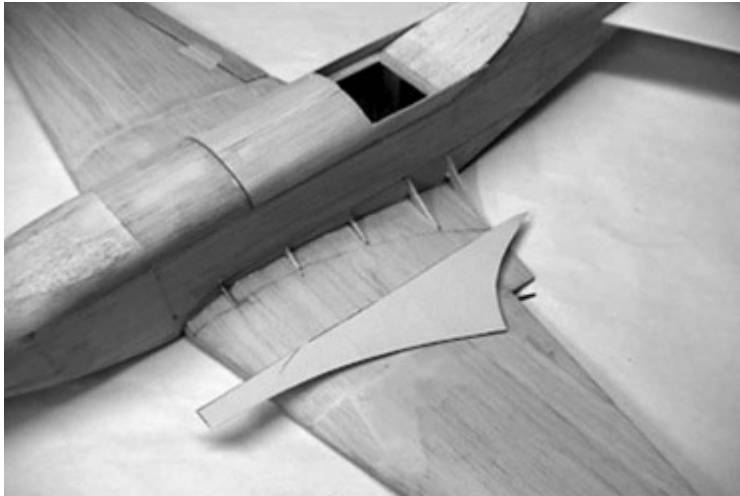
- Insert the elevator joiner in the fuselage slots. Then use your choice of hinges to install the elevators.

Detailing Your Model

- Mark the outline of the wing fillet on the fuselage sides and top of wing.

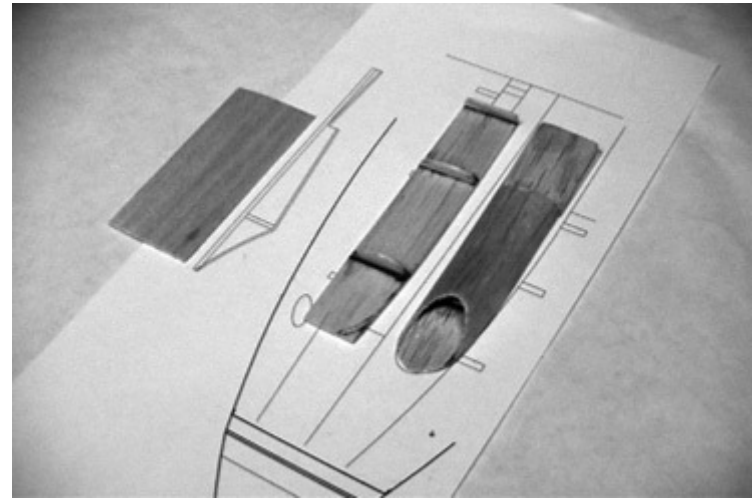
NOTE: The fillet positions shown on the plan are incorrect. Move the fillet positions about 3/8" toward the rear of the fuselage.

- Glue the fillet formers to the wing and fuselage.
- Test fit the 1/32 balsa fillet sheets. When satisfied with the fit, glue them in place.

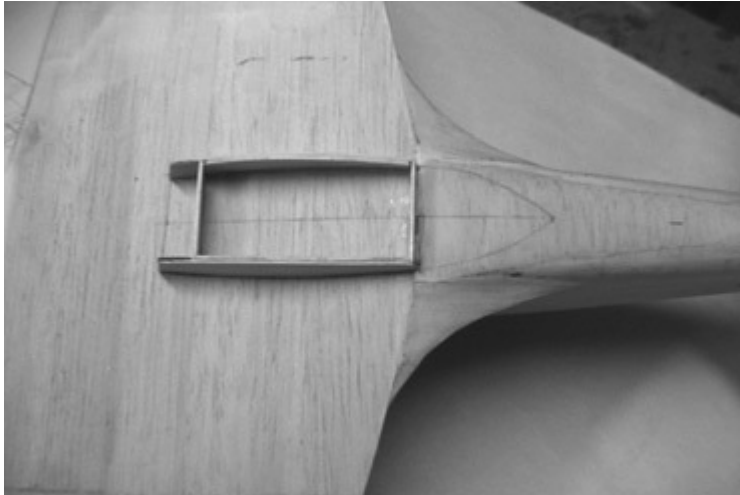


- Add the desired scale details, such as exhausts, air scoop, etc. See the plan sheets for more information. Download the revised scoop plans from our web site.
- The side scoops are distinctive features of the MiG-3. To make them, first cut a 1/16" balsa base. Then add the three small half-round formers. Finally, wrap

a moistened 1/32" balsa sheet over the formers. When dry, slice the front end of each scoop at an angle to create an oval-shaped opening. Glue the finished scoops to the fuselage.



- Build the under-wing radiator scoop from the provided 1/16" balsa parts, and sheet with scrap 1/16" balsa.



- Use a sharpened 1/4" diameter brass tube in a Dremel™ tool to dig the gun troughs. Install 3/32" aluminum tube "guns".
- Trim the vacuum-formed plastic canopy and glue it in place.

Finishing Your Model

- We suggest covering the entire model (except the canopy) with 1/2-ounce glass cloth and finishing resin for maximum strength.
- Apply a light coat of primer – just enough to fill the weave of the glass – and sand most of it off.
- Paint and decorate the model as desired. See the attached 3-view for details on markings and panel lines.

- Finally, seal the entire model with a coat of Krylon Satin Crystal Clear.

Decals

CAUTION: You must seal the decals before immersing them in water!

The decals included in this kit are printed with Epson DuraBrite™ inks on the best inkjet water-slide decal paper available. Follow the steps below to achieve a great looking set of markings on your model.

- Seal the decals with several thin coats of Krylon Crystal Clear™ spray varnish.
- Make sure the surface where the decal is to be applied is smooth and glossy. Matte surfaces will permit tiny air bubbles to be trapped between the surface and the decal, thus spoiling the decal.
- Cut out and trim all the markings that you plan to apply in this session.

NOTE: The "Motherland" decals include a set of Cyrillic letters lightly outlined in black. Cut the letters out along the black outlines, so that you are left with white letters.

- Dip the decal in a bowl of warm water for about 20 seconds. Using your fingers, **gently** try to slide the decal off the backing paper. As soon as the decal slides, slide it off the backing paper and onto the model in the desired position. Use a rag or old t-shirt to gently blot excess water from the decal. Allow the decal to dry.

TIP – If you leave the decal in the water too long, the ink will run. Practice with bits of decal cut from the copyright notice.

- If you ruin your set of decals, you can download a set from www.warbirdkits.com. Print them on self-adhesive label material or decal material.

Alternative Color Schemes and Markings

There are many different color schemes and markings available. Here's an excellent resource for MiG-3 paint and marking schemes:

<http://mig3.sovietwarplanes.com/mig3/mig3.html>

Visit the MiG-3 page at www.warbirdkits.com to download some alternative markings and extra scale details.

Weight and Balance

- The prototype weighed in at 20.5 ounces ready to fly. A range of 17 to 21 ounces all up weight should result in a great-flying model.
- The model should balance as shown on the plans. For the first few flights, you may want to move the balance point forward about 1/4" - better a bit nose-heavy than a bit tail-heavy!

HELP!

If you have questions or need more help with assembly of this kit, drop an email to tom@warbirdkits.com.