BY **JIM YOUNG**

MiG-17 Fresco

A Soviet swept-wing electric jet with great performance!

venducipsum, consecatem am sequunt, cuptas esecti omnis aut utem dolluptatem ressunt istibus cuptassum quia cus que con parum nonequaecum quiatus, sum harum lacesequam ra

My MiG-17 was designed around the Great Planes 56mm Hyperflow EDF unit and the Ammo 24-45-3790 brushless motor. This economical setup gives nice e-jet performance with a 4S 2200mAh LiPo battery pack. The outline is true to scale with the exception of larger ailerons and the position of the stabilizer to simplify construction. A fully detailed description of the MiG-17 build with a complete bill of materials is available online at ModelAirplaneNews.com/mig17. For those who want to build the model more quickly, a laser-cut short kit of wood parts is also available from me to speed construction. Information for ordering the parts is included on the plan.

TAIL FEATHERS

The stabilizer and elevator are made with sheet balsa laminated around a central core of thin plywood. The grain of the balsa should run parallel to the stabilizer's trailing edge. The plywood provides a "joiner" between the two stabilizer halves and slots for CA-type hinges. Taper the elevators and round the stabilizer's leading edge. Bevel the leading edges of the elevators, glue the control horns in place, and temporarily hinge the control surfaces. The rudder is laminated in a similar fashion with 1/8-inch balsa on both sides of the plywood core.

The fin is built up and slides onto the fuselage formers. Sand the front and rear of each rib to match the angle of the leading and trailing edges, then pin the ribs in place over the plans. Glue the leading and trailing edges in place, then glue V6 pieces in place using scrap plywood to set the gap between them. Glue the fin tips in place then shape the trailing edge and tip to match the ribs. Sheet the fin with 1/16-inch balsa. Remove the fin assembly from the board and cut the stabilizer slot opening in the sheeting between V3 and V4. Install the elevator flex cable as shown on the plans, then remove the building tabs from the ribs and sheet the other side. Cut the stabilizer slot in the sheeting and glue the stabilizer in place. Temporarily hinge the rudder and glue the control horn in place.

WINGS

Prepare the top and bottom wing skins and use the plans to cut the wing sheeting, leaving it slightly oversize at the leading edge and root. Bevel the top skin trailing edge to the line shown on the plans. Glue the balsa spar box top and bottom to the plywood spar box sides using two layers of scrap 1/16-inch plywood between the sides to ensure the spar will fit. Position rib R2 on the spar box and glue it in place up against the tabs. Slide ribs R1 and R3 on to the spar box and glue in place. Glue the outer spar box top and bottom in place and sand the outboard end to match the leading edge. Sand the front of each rib to match the leading edge angle, then pin the spar box assembly and the rest of the wing ribs in place over the plans. Glue the basswood rear spars in place, then glue R2A in place, making sure it is level with the board. Glue the trailing edge in place and sand the top to match the rear spars. Glue the basswood sub-leading edge in place and plane/sand it flush with the ribs. Note there is a slight bend in the leading edge at R4 and it should taper slightly outboard of R7. Glue the top sheeting in

place, and trim it flush with the leading edge.

Remove the wing from the board and using pinholes, locate ribs R2, R4, and R5 for the wing fences. Jig the wing upside-down over the plans, making sure it is properly pinned down and touching all of the jigs to set the correct washout, then glue the plywood servo hatch mount in place. Laminate the three-layer wingtip together, then glue it to the top sheeting. The top sheeting will bend to the wingtip, then sand the wingtip to blend with the ribs. Mark the location for the aileron ribs using the plans as a guide. Sand the aileron leading edge as shown on the plans. Glue the aileron leading edge to the top sheeting followed by the aileron ribs. Use pin holes to mark the corners of the aileron.

Plane the sub-leading edge flush with the ribs and glue the bottom sheeting in place. Use a pin to locate the servo hatch mounting holes. Use the plywood servo hatch as a template to remove the bottom sheeting. The aileron servo is mounted to the hatch. Glue the leading edge in place and sand it to shape. Cut the aileron free of the wing then glue the control horn to the end of the aileron. The ailerons are hinged along the top edge with the covering material. The sheeting at the wing roots will be trimmed to match the fuselage later. Now repeat the process for the other wing panel.

FUSELAGE

Laminate the two F4 formers together using 30-minute epoxy and weigh them down under something flat to ensure a straight and strong wing spar. Use thin CA to glue a small piece of lightweight fiberglass cloth on both sides of formers F8 and F9 around the fin mounts. Laminate the top and bottom fuselage stringers,

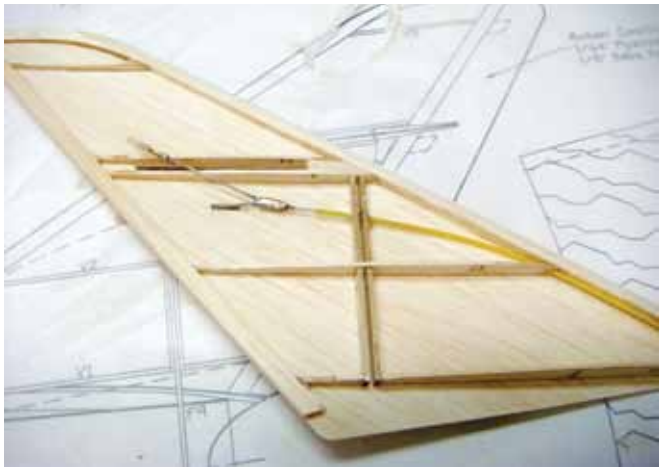
GEAR USED

Servos: Hitec HS-45 (hitecrcd.com)
Ducted Fan Unit: Great Planes 56mm Hyperflow EDF unit (greatplanes.com)
Motor: Ammo 24-45-3790 brushless motor
Battery: 4S 14.8V 2200mAh LiPo (two 2S 2200mAh NanoTech packs wired in series; hobbyking.com)

then assemble and balance the fan unit. Test run it and make sure all screws have thread-locker on them. Round the inside inlet edge of the fan shroud.

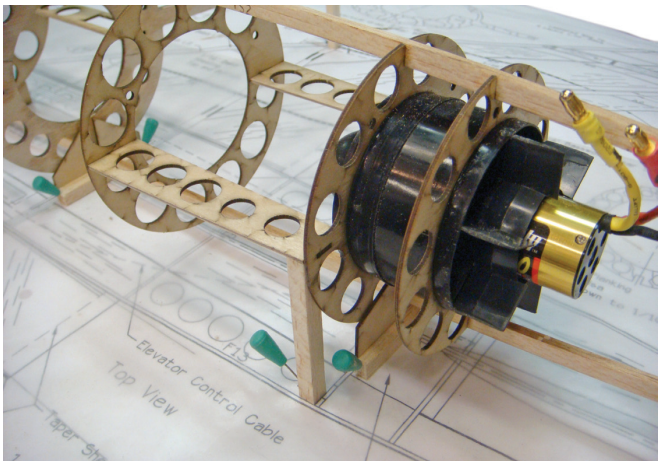
Glue formers F6 and F7 to the fan unit using the top and bottom stringers to position them. Use the marks on the former and mold lines on the fan to line up the formers. Dry assemble all of the fuselage formers (F1 to F9) to the top and bottom stringers. Add the servo and battery mounts, then jig the fuselage over the plans squaring each former to the building board. Use thin CA to glue the fuselage structure together. Glue the hatch formers to the top stringer using thin plywood to space them from F2 and F4. Glue the H1 hatch edges in place. There should be an 1/8-inch gap between these pieces. Slip wax paper between the hatch formers and F2 and F4.

The length of the inlet ducting breaks several rules of electric ducted fan design. I did several tests with various duct lengths and any effect on performance is negligible. There are considerable forces trying to collapse the inlet inward during flight, so ensure that the duct material is solid and has no cracks in it. Securely glue it to all the formers. Cut the front and rear ducts from 1/64-inch plywood. The edges of the ducts overlap and are beveled to provide a smooth duct. Insert the ducts in the fuselage and double check the fuselage alignment. Use the duct jig mounted to a dowel to hold it round as you glue the seam with thin CA. Install the outlet duct making sure F8 and F9 are aligned and square to the board. Fit the

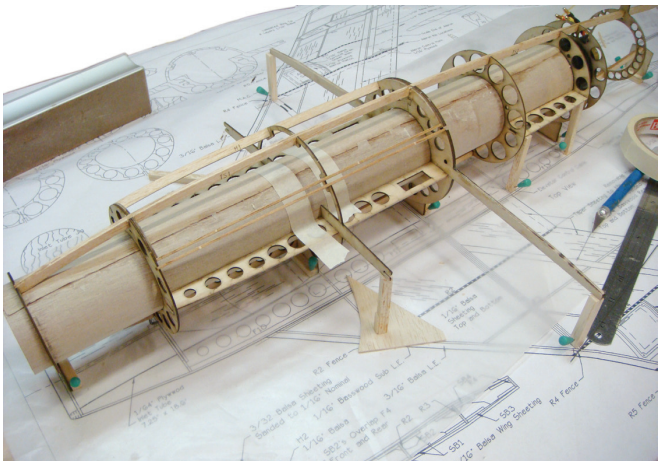


venducipsum, consecatem am sequunt, cuptas esecti omnis aut utem dolluptatem ressunt istibus cuptassum quia cus que con parum nonequaecum quiatus, sum harum lacesequam ra

venducipsum, consecatem am sequunt, cuptas esecti omnis aut utem dolluptatem ressunt istibus cuptassum quia cus que con parum nonequaecum quiatus, sum harum lacesequam ra



The Hyperflow fan unit is glued to two formers. The top and bottom stringers are used to set the proper spacing in the fuselage structure.



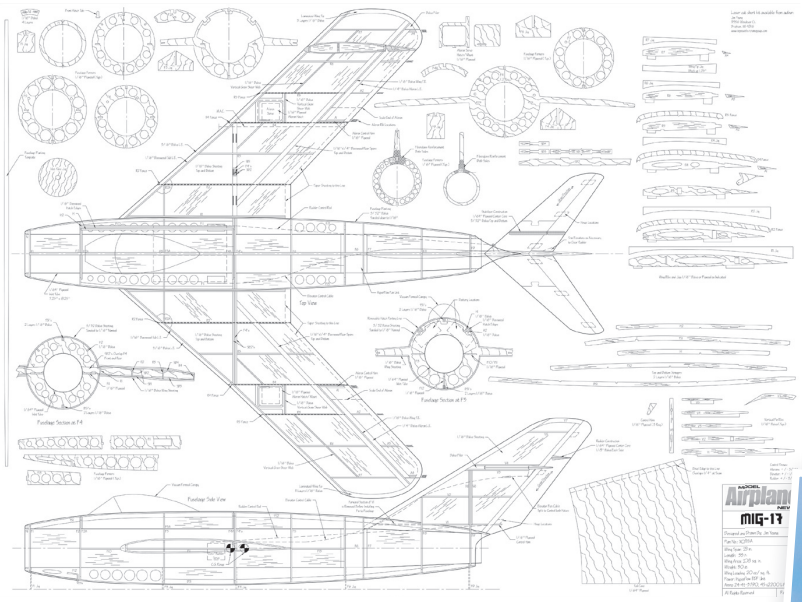
The inlet duct is formed from rolled 1/64-inch plywood. A jig is used to help hold the duct round while it is glued in place. The inlet duct wraps around fan unit.

tail assembly to the fuselage and when satisfied with the alignment, apply a liberal amount of 30-minute epoxy to make it permanent. Use the extra outer sleeve from the flex cable and 1/32-inch music wire for the rudder linkage. Install the motor wires and aileron servo extensions.

To reduce the amount of cutting and fitting, use the planking template to cut the balsa planks. Slightly bevel the edges of each plank before gluing it in place with aliphatic glue. Use CA to glue the planks to the formers. Plank the top of the fuselage as far as you can down each side. Cut partially through the planks around hatch so you can find it later on, then remove the fuselage from the board. Bend the music wire tow hook and epoxy it in former F12. Complete the planking and sand the fuselage smooth. Cut holes to match the aileron servo lead holes in the wing ribs and to clear the spar box. Cut the hatch free and add the forward pin and a rear locking mechanism. Trim the canopy to fit the hatch and then glue in place after covering.

FINAL ASSEMBLY

Slide each wing on to the spar and mark the wing sheeting with the shape of the fuselage. Trim the sheeting for a tight fit against the fuselage. Rib R1 should touch the fuselage at F4. When satisfied with the fit, apply 30-minute epoxy and slide the wings in place. Jig the fuselage over the plans and pin the wing tip jigs in place. Double-check the alignment and let everything cure overnight. Apply a small fillet around the root of the wing, the fin, and stab. Finally, sand the airframe and



MiG-17 Fresco | **XO215A**

Designed by Jim Young, this electric-powered MiG-17 is designed and built around the Great Planes 56mm Hyperflow EDF unit and is powered by an Ammo 24-45-3790 brushless motor. It features traditional built-up balsa and plywood construction and laser-cut parts are available from the author.

Wingspan: 28 in.; Length: 33 in.; Power: 56mm GP Hyperflow unit; LD: 3; 1 sheet; $16.95

To order the full-size plan, visit AirAgeStore.com

prepare it for finishing.

Any of the iron-on films should be fine for this little jet. Fiberglass finish and paint is also an option, but keep in mind the 30-ounce target weight. I used Hitec HS-45 servos all around. To provide cooling for the speed control, use thermal epoxy to bond it into a hole cut in the inlet duct. A receiver with end pins is required to fit under the hatch. A pair of 2S 2200mAh LiPo packs are wired in series and positioned to balance the model as shown on the plans. Set up the control throws as shown on the plans, paying particular attention to the elevator throws.

IN THE AIR

To keep the MiG-17 light, the landing gear was omitted in favor of bungee launching. If you don't have a bungee launcher, I recommend the Great Planes Bungee Launch Set. With about 20 paces of tension on the bungee, throttle up and release the MiG from shoulder height. It will accelerate quickly with very little drop while on the bungee. I strongly recommend that for the first few flights you climb to altitude and do some tests at half-throttle and apply full up-elevator. The high tail position of the MiG can cause the stabilizer to be blanketed by the wing with too much up-elevator. If you have too much elevator the MiG will start to tumble. If this happens, reduce power and get the nose down (hence the need to do this at altitude) and gently pull out. Switch to low rates and repeat the test. Reduce the elevator throw as necessary.

With the light wing loading, full power is not needed for mild aerobatics. The stall is gentle and straightforward. Loops, rolls, point rolls, and inverted flight are all within the capabilities. With the center of gravity set as shown, inverted flight requires just a bit of down to maintain level flight. When the throttle is pushed, the MiG accelerates quickly and the vertical performance is awesome! The recommended power system will easily push the MiG at 90mph. You better make sure your eyeglass prescription is up to date, because it gets small fast.

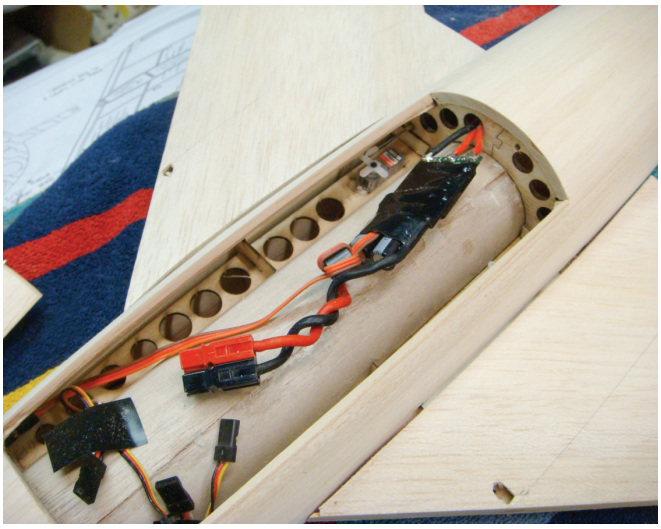
Landings are straightforward and the MiG can be slowed down. Keep the wings level in final and use the rudder for course corrections. With the anhedral wing, it is easy to catch a wingtip.

PHOTO BY DAVID HART

THE FRESCO

The Mikoyan-Gurevich MiG-17 (NATO code name "Fresco") was a follow-on to the more famous MiG-15, one of the first successful swept-wing jet fighters. It was designed to fix any combat problems found with the MiG-15. The result was one of the most successful jet fighters prior to the introduction of true supersonic aircraft. The MiG-17 is longer than the MiG-15 and was the first Soviet fighters to use an afterburner. A total of 8,000 MiG-17s saw service from the early 1950s through the 1960s and it was used by 20 countries. Today, there are approximately 30 privately owned MiG-17s in the U.S., with several pulling airshow duties and giving RC modelers options for color schemes.

One of the more striking civilian airshow teams is the Black Diamond Jet Team operating out of Lakeland Linder Regional Airport in Lakeland, FL. The Black Diamond Jet Team operates seven jet aircraft: two MiG-17s and five L-39s, all painted in arctic camouflage. Though there are several show pilots on the team, Captain Dale "Snort" Snodgrass, USN (Ret.) pilots the lead solo MiG-17 and Commander Mike "Buick" Eberhardt, USN (Ret.) pilots the opposing solo MiG-17. The Black Diamond Jet Team flies approximately 70 demonstrations throughout the year.



Once the fuselage is planked, the hatch is cut free and the edges are faced with 1/16-inch basswood. A simple spring mechanism holds the hatch cover in place.

Micro balloons and epoxy are used to form a small fillet around the canopy, wing, fin and stabilizer joints. The laminated plywood wing fences have small spikes on them to help key them into the wing.