

THE ELECTRIC BLUES!

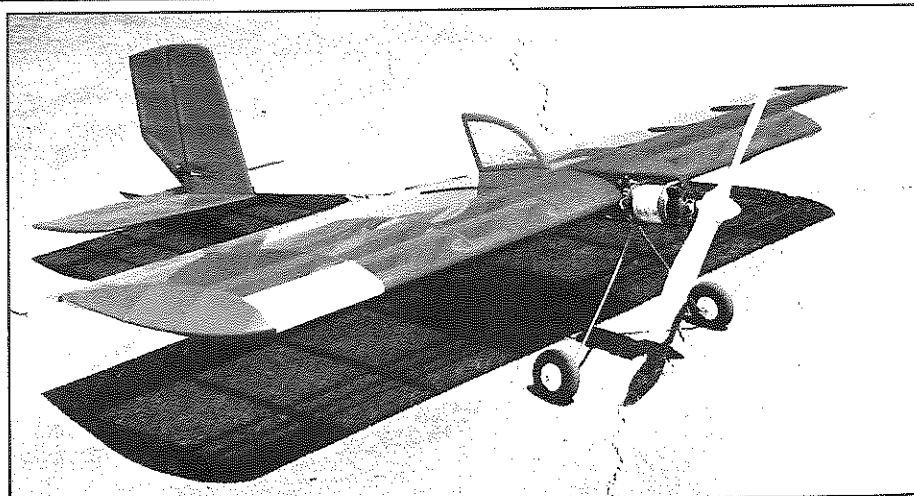
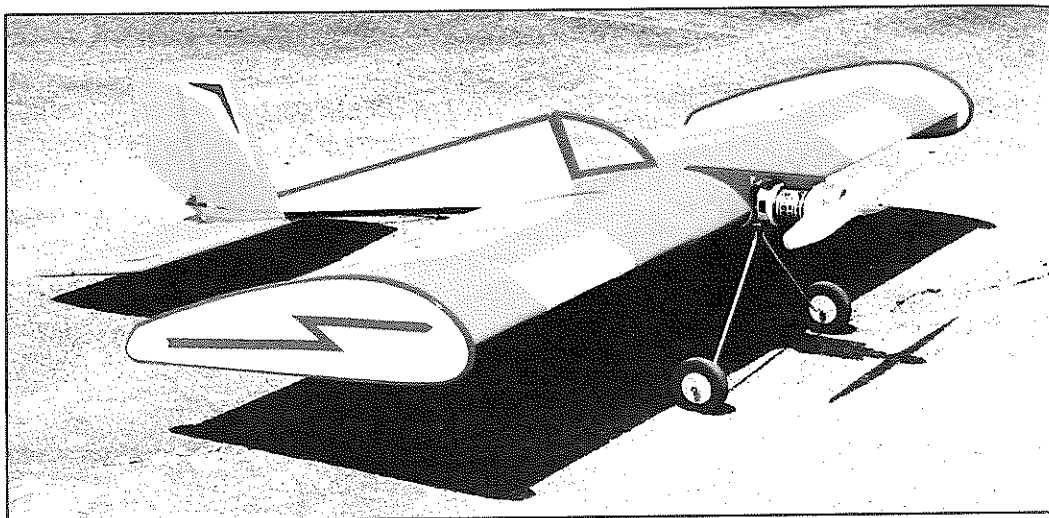
Got the "electric blahs"? Or are you maybe just tired of that tame sportplane or glider? How would you like to try an electric but want something with some real zip, something that's easy to build and won't cost an arm and a leg?

If the answer is yes then maybe you need the Electric Blues! It's highly aerobatic on low-cost motors and the wing hatch makes changing batteries fast and easy. Some may find the Blues' short wings, profile fuselage and motor hanging out in the breeze a bit homely, but I prefer to think of it as having "character." The stubby wing packs a lot of area and also allows the use of standard 36-inch balsa without splices. The Blues' main drawback is that it may ruin you for most other electric planes!

The Electric Blues is patterned after the "fun-fly" planes seen in recent years. Two versions are shown on the plan, the major differences being the airfoil and wingtips. I prefer the semi-symmetrical version with rounded tips. This airfoil was lifted from Bill Northrop's "Apprentice" from many years ago. The flat-bottom plane with tip plates also flies well, though a bit slower. All-up weight with a seven-cell 1400-mAH battery pack is 42-44 ounces.

POWER SYSTEM

There are any number of 05 motors that will fly the Blues, but the best combination I've found is a Trinity "Sapphire" 17-turn car motor retimed to operate in the

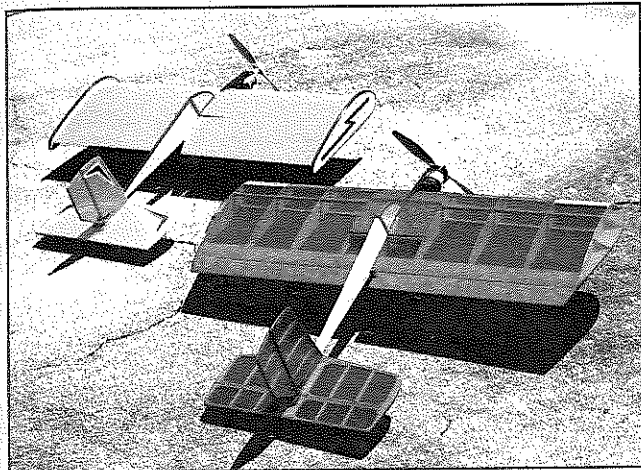


The two versions of the Electric Blues as developed by the author; the one with the yellow wingtip plates features a flat-bottom airfoil, the other has a semi-symmetrical section. Construction is so simple that it shouldn't take more than a few evenings to get one framed up and covered.

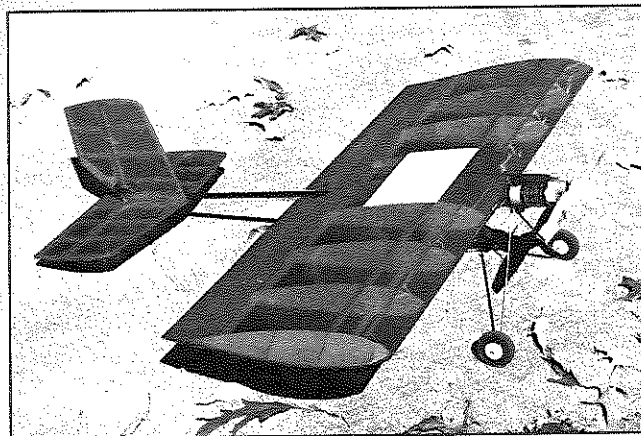
EDITOR'S NOTE: It was late last year that William Whitten approached us about doing a construction article on his Electric Blues design. When the package finally arrived in mid-May he apologized for taking so long; the respiratory problems that had plagued him for the past 10 years had lately become much worse, to the point where even the smallest task left him completely exhausted. How he managed to draw the plans and write the article, we can only imagine. But he persevered, and managed to keep his sense of humor despite his failing condition. In his cover letter he wrote: *When my time comes, it just so happens our family plot is in a cemetery just over the hill from one of our club's flying fields. Maybe I'll be able to pop over and haunt the fliers and rattle a few chains!*

At the age of 41, William's time came much too soon. He passed away on May 26, just ten days after we received his manuscript and plans. We at *Model Builder* are honored that William chose this magazine as the venue for his last creative efforts, and extend our sincere condolences to his family and friends.

Combine a hot geared 05 electric system with this lightweight aerobatic airframe and get ready for a wild ride! Features simple, conventional construction throughout, with your choice of airfoils and wingtip treatment.



This view illustrates the difference in the wingtip design—the rounded tip version with the semi-symmetrical airfoil is the author's favorite. The square-tip model sports an Astro 05, but William favors the less expensive Trinity "Sapphire" car motor with a 3.5:1 gearbox. Both models use a Futaba Attack-E radio with the MCR-4A receiver/speed control. Use a BEC setup to eliminate the weight of a separate receiver battery.



Without the faux fuselage and canopy the Blues looks just like a modern competition fun-fly model. The ship can be flown like this, but lacks the character of the "fuselage" versions. Fuselage also provides visual reference in flight. Radio and seven-cell motor battery are completely contained within the wing center section; access is via a top hatch.

right direction and fitted with a 3.5:1 gearbox. Astro's geared cobalt 05 also does well and the "War" series motors from Model Electronics should do likewise, though I haven't tried one.

In any case, I suggest you use only the new Master Airscrew "electric" wood props. I use an 11x7 with eight 1000-mAH cells and a 12x8 with seven 1400-mAH cells. I get close to four minutes at full power, with the eight-cell pack having a slight edge in performance. The 12x8 on eight cells gives extreme power but I doubt the Sapphire motor will take it too long. With the motor out in the breeze, it stays cool but be sure enough air flows through the wing to keep the batteries and speed control from overheating.

CONTROL SYSTEM

The controls are unusual in that I get up

to four "functions" from just two servos. The rudder is driven via pull-pull cables from the aileron servo. The elevator is also driven via pull-pull cables. If you want to try coupled elevator and flaperons, a Du-Bro mechanical mixer on the aileron servo can be driven by the elevator servo via a turnaround bellcrank forward of both servos. Flaperons will tighten up loops and make takeoffs shorter, but I'm not sure they're worth it. The plane won't spin with 'em, and when you make the ball joints free enough for mini servos to operate, the whole system gets a bit sloppy. You can always try the mixer and take it off if you don't like it.

CONSTRUCTION

Pick your balsa carefully. Look for stiff but light balsa except for the wing spars; use some good straight medium-hard stock

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Designed by William I. Whitten

WINGSPAN 36 in. with tip plates,
39 in. with rounded tips.

WING AREA 460 or 495 sq. in.

FLYING WEIGHT 42-44 oz.

WING LOADING 13.2-13.8 oz./sq. ft.
(tip plate wing)
12.2-12.8 oz./sq. ft.
(rounded tips)

OVERALL LENGTH 30.25 in.

AIRFOIL 15 percent thick
semi-symmetrical or
16 percent thick flat bottom.

RADIO Three channels required.

CONTROLS Coupled ailerons/rudder,
elevator, throttle. Optional
coupled flaperons/elevator.

POWER Seven-cell 05 electric.
Recommended setups

with seven 1400/1700 SCR cells:

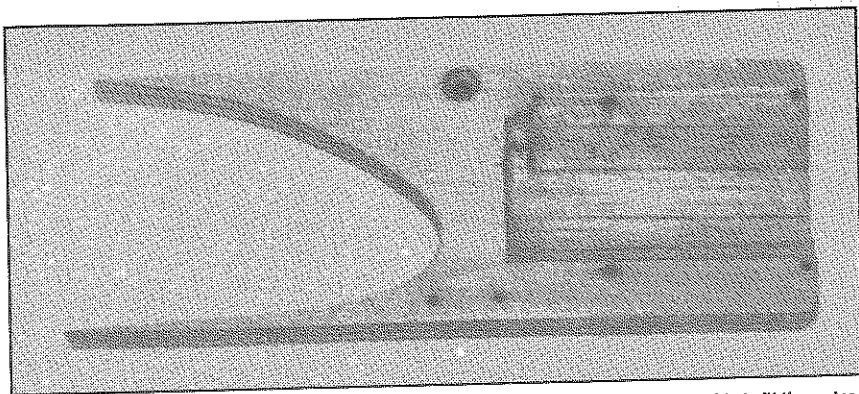
•Trinity "Sapphire" motor (retimed for
reverse rotation) with 3.5:1 gearbox and
Master Airscrew 12x8 electric wood prop.

•Astro Flight geared cobalt 05
(sport or FAI) with Master Airscrew
12x8 electric wood prop.

for them since there are no shear webs. Try to keep weight down wherever you can. I use thin CA for almost all of the construction, plus a little epoxy when joining the tail feathers to the boom and the motor mount to the wing.

Empennage: Get these out of the way first. Make sure all the joints are tight and don't forget the corner gussets. The slot in the stab for the vertical fin needs to be a nice tight fit on the fin. The tailboom will be epoxied into the fin/stab junction later.

Wing: Make two W-2 and six W-3 ribs from 3/32 balsa. Add the 1/8 balsa doublers to the tops of the W2 ribs as shown on the plan. Laminate an oversize W1 rib blank of 1/64 ply and 3/16 balsa (balsa/ply/balsa sandwich), then cut it to the W-3 rib pattern but without the spar notches.



The nose piece is a balsa/plywood sandwich cut to match the airfoil and carved out on one side to fit the motor casing.

Carefully cut the tailboom slot as shown in W-1; the boom should be a snug but not tight fit in the slot. Depending on your tailboom, you may need to trim the sides of W1 or even add a thin layer of balsa to get a good fit. The tail boom is a carbon fiber or fiberglass arrowshaft with a 1/4-inch I.D. (approximately 5/16-inch O.D.) and 18 inches long, including the part inside the center rib slot.

Once the slot is made, laminate a sheet of 1/64 ply to one side and trim to the rib outline, then do the same on the other side. Carefully sand and cut the whole thing to match rib pattern W-1. Use this as a pattern to make two W-4 half-ribs.

Pin down the bottom spar and the trailing edge sheeting over the plans, then glue the trailing edge stick in place. Glue the ribs in place, followed by the leading edge, top spars, hatch support and top trailing edge sheeting. Take the framework off the board and carve the leading and trailing edges to shape, then sand everything nice and smooth. Add the antenna tube and rounded tips if desired (note the triangle braces and filler pieces on the rounded tips). If you plan on using the tip plates, leave them off until the wing is finished and covered.

Next cut a piece of 1/64 ply for the center bays. Trim it to an exact fit before gluing. Glue it first to the top doubler spar, then wrap it toward the leading edge. Glue the ply to the tops of the ribs, then wrap it around the leading edge, wetting the ply if necessary. Wrap the ply under the center bay and glue it to the ribs and bottom spar. Sand the ply smooth and blend it into the balsa. Make sure the ply is glued well to each rib, especially the wide center rib as this joint holds both the motor mount and landing gear.

Cut or drill the air holes in the underside of the wing and in the trailing edge, plus the hole for the tailboom and two for

the servo output shafts. Pieces of sharpened brass tubing will cut clean holes with little splintering.

Ailerons: Take a full length of 3/8-inch balsa triangle stock and glue it to a full length of 1-1/2 inch shaped trailing edge stock. Sand smooth, then cut it in half and trim each piece to fit the wing.

Motor and Landing Gear Mount: Laminate pieces of 3/16 balsa and 1/32 ply into a ply/balsa/balsa/ply sandwich. Cut it to the appropriate shape and sand the edges smooth. Mark where the motor is to go and carve and sand out a half-round recess to fit the motor. (You can also just glue on pieces of balsa triangle stock, but it doesn't look as nice.) Drill the holes for the landing gear and brackets and the motor straps. Wick a bit of thin CA around the outer edges and the holes to harden the balsa, then sand smooth. Sand the airfoil cutout so it matches the wing center section.

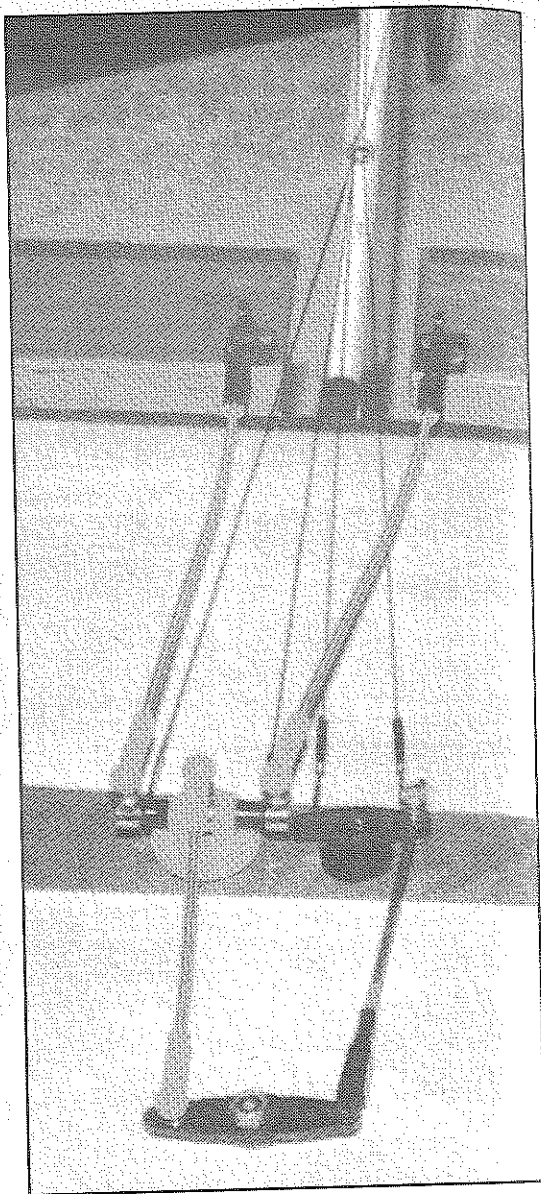
Faux Fuselage/Canopy: This is just for show so make it as light as possible. On one plane I used pink foam covered with low-temp film; on the other I used some very light balsa. The foam is hard to cover so I suggest the balsa. You could also use 1/4-inch square balsa sticks. Use the shape shown or change the profile to resemble some other plane. You can even leave it off if you want, but the Blues look a bit naked sitting there with nothing.

Landing Gear: Simple—just a piece of 1/8-inch wire bent to shape. Trial fit the gear on the mount, then unbend it enough to get it back off until the mount is finished and on the plane. Use a pair of the 2-inch Dave Brown electric wheels. For rough grass a larger size may be needed, but keep 'em light. The thin L.G. wire may seem a

bit spindly but it does the job. If it bends in a hard landing just bend it back for the next flight.

FINAL ASSEMBLY

Cover your Blues with one of the lighter plastic films. Make sure you iron the covering down to each rib and spar rather than just around the edges—this wing is light and needs the extra rigidity. I suggest using bright, contrasty colors; I like transparent colors as they are easier to see on



View of the bottom of the wing reveals the ingenious linkage setup that provides coupled ailerons and rudder and coupled elevator and flaperons, using only two mini servos. Pull-pull cables are used for the rudder and elevator. The elevator/flaperon coupling can be deleted by omitting the turnaround ballcrank and the Du-Bro mechanical mixer. Both control systems are detailed on the plans.

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dull days. (You do understand that some part of the color scheme must be blue or you can't call it Electric Blues!) Spray the motor/landing gear mount with several coats of whatever paint you have on hand.

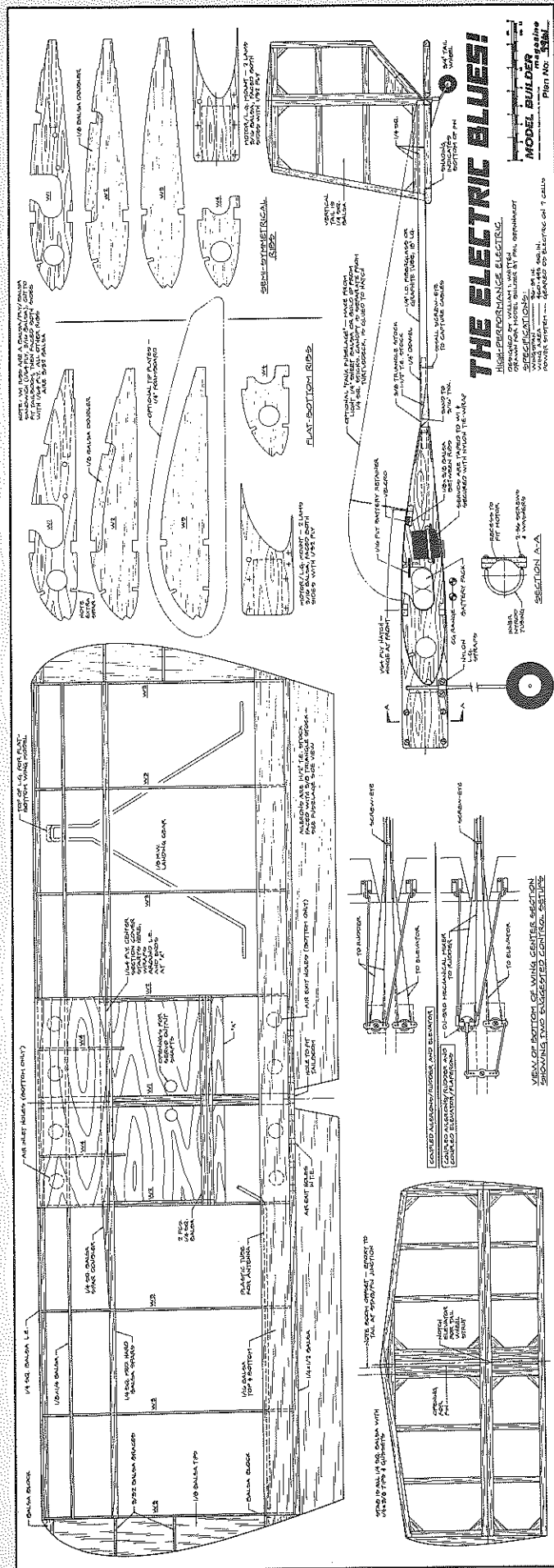
Hinge the tail surfaces and the ailerons and install the six control horns. Glue the fin into the slot in the stab and trim away a bit of the covering where the tailboom will be glued. Make the hatch cover from 1/64 ply and cover it with film (leave 1/2 inch of covering hanging off the front edge to serve as a hinge and leave a bare area for the "canopy"). Trim a strip of film off the wing where the motor mount will be mounted. Use a soldering pencil to melt the covering over the various holes in the wing.

Glue on the motor/L.G. mount with 5-minute epoxy—be sure it's straight and centered on the wing. Using the same epoxy, glue the tailboom to the fin/stab and also the length of 1/4-inch dowel inside the boom where it exits the wing. When dry, drill the pilot hole for the screw eye cables guide. Slide the boom into the wing, line it up square and wick in some thin CA to lock it in place.

Install the control horns, the tailwheel assembly and the landing gear. You'll have to unbend it some to get it through the hole, then carefully squash it back closed enough to put on the plastic retaining clips. Install the battery retainer tab with a flat-head screw. Mount the servos with double-sided foam tape, then run a tie-wrap around them and through the holes in the center rib. Tighten it and nip off the excess. Don't trust just the tape to hold the servos.

Turn the plane upside down and put on the cables guide screw eye. Mount the aileron horns and the wingtip skids if used. Make up the aileron links and install the servo output arms and pull-pull cables for the rudder and elevator. I use plastic-coated braided steel fishing leader, but Du-Bro makes a kit with all the hardware. The cables should be snug but not so taut that they bind. If you opt for the flaperon mixer, it and its turnaround can be installed at this time.

Install the receiver, speed control, on/off switch and arming switch if used. Run the antenna inside the guide tube—not inside the carbon fiber boom. I use "shorty" antennas made by Hayes—they work well and don't



trail outside the wing. Wire up the motor and mount it with 2-56 screws and straps cut from inner nyrod tubing. I put a layer of thin servo mounting tape under the motor to keep it from twisting under torque, plus it dampens the noise a bit.

Attach the faux fuselage to the tailboom—either glue it on or iron on strips of covering under the boom and back up the other side. Lay the hatch cover in place and iron down the loose strip of covering to the top of the wing to form a hinge. The aft end is held down with Velcro on scrap balsa or ply platforms. Glue the canopy to the hatch cover so it lines up with the fuselage. Mount the wheels and prop and you're done.

FLYING

The Blues isn't real fast and can slow down to a crawl on landing, so lots of control surface throw is helpful. Expo or dual rates would be nice if you have them but I rarely use mine. The CG isn't critical and most of the heavy stuff is on or forward of the CG anyway. The low wing loading helps too—with flaperons mine won't even spin. Even without them the flat-bottom plane doesn't want to spin; the semi-symmetrical version will spin nicely. Both versions will loop and roll like crazy although the coupled rudder makes rolls a little barrel-like at times. I like to fly my Blues low and close around myself, much like a control line plane without the wires. Ground handling and takeoffs are easy except when a crosswind gets under a wingtip. Plastic wingtip skids are recommended if you fly off of a hard surface. Be advised that a rapid taxi with the flaps down (up elevator) may result in the plane becoming airborne before you're expecting it!

If you're wondering how the Blues will do in fun-fly events against the gas powered planes, it depends. No way will either of the Blues keep up with the competition "stick specials" with all their mixers and such. However, the one time I flew the semi-symmetrical Blues in a local fun event, it held its own against the gassies. Our club team didn't win but it was more the pilots' doing than the planes!

I hope you'll enjoy whichever version of the Electric Blues you try. Just watch out—you may not want to go back to your old electrics! MB