

B-2 Spirit Stealth Bomber

by Ken Johnson

America's most sophisticated bomber makes ideal electric-powered FF sport Scale subject

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THIS AIRCRAFT CAUGHT my fancy after I saw the full-scale B-2 fly at the Northrop factory in Palmdale, California. I was so impressed that I knew I had to build a model of it.

I have been playing with different power sources of late, and I decided to power my new Stealth with electric. I happened to have a Hobbico Ready-to-Fly Spitfire kit laying around. I took the motor, battery pack, and switch from this product and decided to try to power the B-2 with it.

A wingspan of 42 inches seemed right, so I set about drawing the model using the Squadron/Signal booklet about the B-2 for reference. I photocopied the three-view up to 42 inches in wingspan and drew the model's plans over it. I always consider wood sizes since I know the importance of building Free Flight models light.

The full-scale B-2 has no vertical fins or dihedral; my model does. I felt justified in making these two changes in scale fidelity. Someone commented that the full-scale aircraft needs computers onboard to make it fly, and I feel that the dihedral and fins are necessary to make the model airworthy as a Free Flight subject.

CONSTRUCTION

Wing: After pinning down the $\frac{3}{16}$ -inch square leading edges (LEs) on the wing and the $\frac{1}{8}$ x $\frac{1}{2}$ -inch trailing edges (TEs), cut the $\frac{3}{32}$ -inch square midribs and cement them in position. Cut the $\frac{1}{32}$ -inch sheet spars to size and glue them to the top of the midribs. (See plans.)

Cut the top ribs from $\frac{3}{32}$ sheet balsa. (Cut around a .020-inch aluminum template for the rib arcs.) Cement each rib at the wing LE and onto the top of the number-one spar. Using small weights to hold the ribs against the spars, attach the ribs to the top of each succeeding spar and finally to the front of the TE outline (after trimming ribs to the correct size). Cut and glue in the wingtips using trimmed-down TE stock.

When you have completed this part of the wing construction, lift the wing from the plans, turn it upside down, and build the bottom part of the wing while holding it in your hands. Cut the bottom spars to size, and cement each one in position to the underside of the midribs.

Cement the bottom wing ribs in at the LE

and the number-one spar. Attach the ribs to each spar. Trim and cement the ribs to the TE. Using a #22 X-Acto knife, cut away the midribs in the center open areas where they are not attached to the front or rear of the wing ribs and spars.

Cabin: Measure and cut the top bulkheads to size and cement them, in the positions shown on the plans, to the wing ribs on either side of the center rib on the top. Put in lengthwise stringers across the top of each bulkhead, front to rear, and cement.

Cut the bulkheads for the bottom of the fuselage and cement them in position. Add $\frac{1}{16}$ -inch square stringers across the bulkheads on the bottom of the model, front to rear. Complete the front of the cabin area as shown on the plans.

Final Assembly: Carefully sand the wing along the LE and TE and across each rib.



The author's lifelong modeling friend Richard Baria gives us a feel for the size of Ken's B-2 before flight testing.



Ken launches the B-2 on its maiden flight. This model presents a dramatic profile and planform in the air.

Sheet the center of the nose area top and bottom with 1/2 soft balsa. Fill the open front end of the nose with 3/4 scrap balsa.

Install the motor and battery box/switch as shown on the plans. No side thrust or downthrust is needed. Fill in the area around the switch with soft 1/6 sheet balsa. Cut and lengthen the wires from the motor aft to the batteries. Notice where the center of gravity (CG) is located on the plans, and make sure your model's CG is the same.

Add the gussets on the wing, as shown, where the elevons will attach at the rear of the wing. Add the wingtip gussets as shown.

Build the vertical fins over the plans in the usual way. Sand and cover them with black tissue. Cut the elevons from 1/4 sheet plywood, sand them, and then lightly spray them with black paint. Cement the small mounting triangles underneath the elevons at the center. Glue the bottoms of these triangles to the top side of the wing TE to the position shown.

Cover the entire model with black Japanese tissue (shiny-side up) except the cabin area at the front, which you cover with green tissue. Lightly spray with water from a misting spray bottle. It is important to warp in 4- to 5° of washout (TE up) at the wingtips. It is good to use a heat gun if you have one. If you don't, try a hair dryer.

Adhere the tissue to the frame with full-strength nitrate dope applied with a #4 soft brush. After water-shrinking the tissue on the model, use a 50/50 mixture of nitrate and thinner to coat the model.

If you do not have enough washout in the wingtips, you will need to install extra elevons at the TE of the wings to make the model fly.

Build the engine nacelles off of the plans, cover them, and cement them to the top of the covered wings on each side. Don't forget to add the loop of wire (part of a large paper clip) under the fuselage, as shown, which will be the handle for launching the model. I filled the inside of the loop with 1/6 balsa sheet and cemented it to the wire.

Draw on the white panel outlines with a white Marvy Gel Excel ballpoint pen, using a 10-inch length of 1/6 sheet balsa as a straightedge.

Flying: After you have completed and covered the B-2, check the CG. Add clay to achieve a clean, flat glide. The target weight is 95 grams ready to fly. If your airplane turns out a bit heavy, add another battery cell to achieve more power.

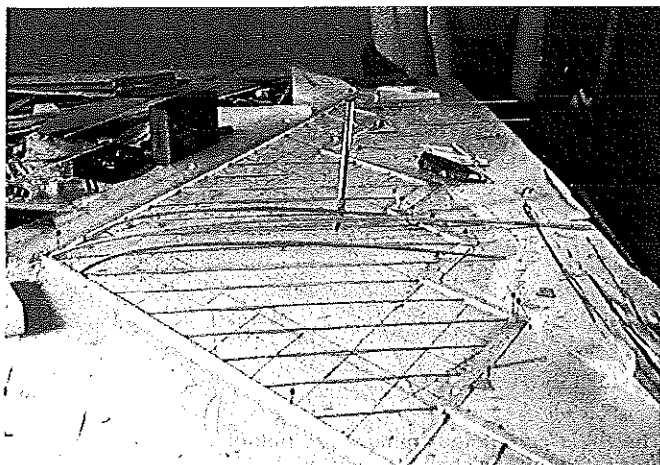
Charge the batteries using an eight-pack of D-cell flashlight batteries. VL Products of Canoga Park, California, markets a handy charger; call Hank Fasola at (818) 244-1702. Start with a 30-second charge and check to see if the model is climbing. A slight right turn is nice. I use a small amount of black modeling clay on the right wingtip to achieve this.

Add charging time to achieve a longer, higher flight. Have good flying with your Stealth B-2 model. **MA**

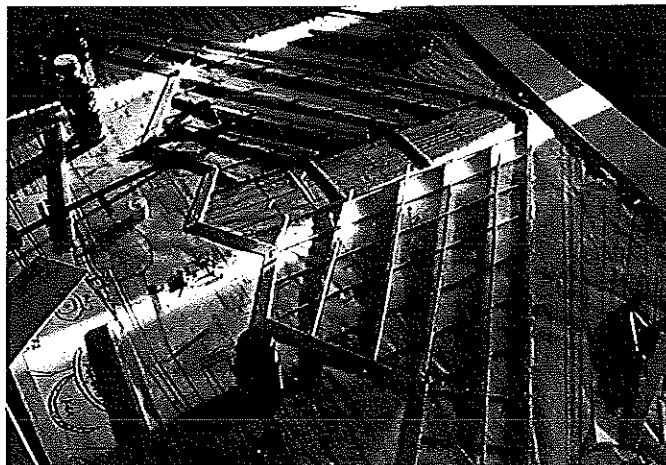
*Ken Johnson
14551 Bledsoe St.
Sylmar CA 91342*



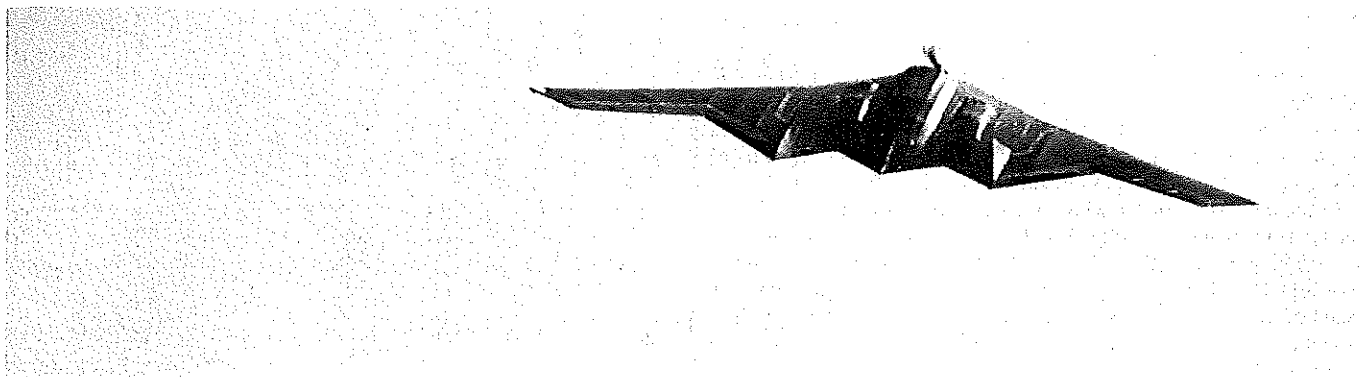
This is a large model, with a 42-inch span. It's not for beginners but is a challenging second or third FF Scale project.



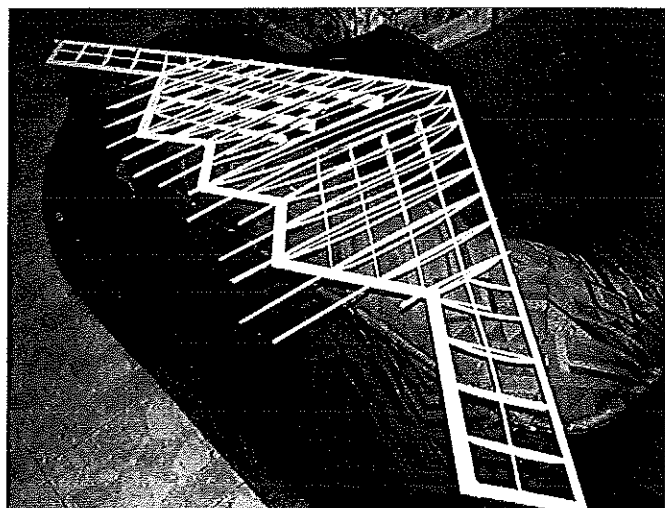
First step in construction is to pin down balsa outline pieces and glue in first of the ribs. A flat bench is a must!



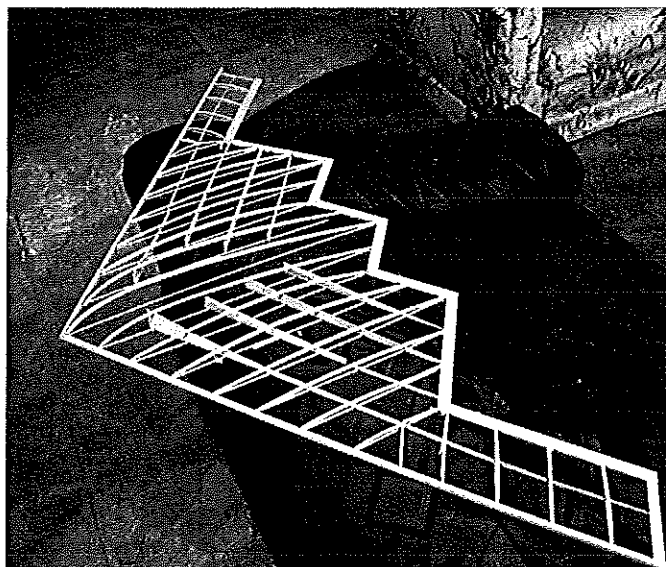
The 1/32-inch sheet-balsa spars are glued to the separator ribs. Not your normal wing construction, eh?



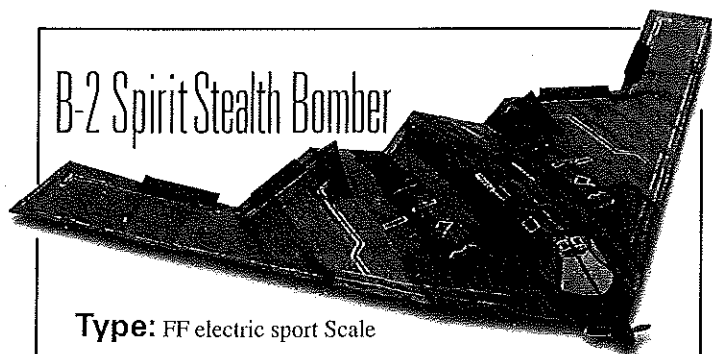
Just after launch and during the climbout, the B-2 offers yet another interesting perspective.



With top ribs in, bottom ribs are glued in at the front. The rear end of these ribs will be trimmed and glued later.



The basic structure is shown before the dihedral is added and the cabin area is built onto the framework.



Type: FF electric sport Scale

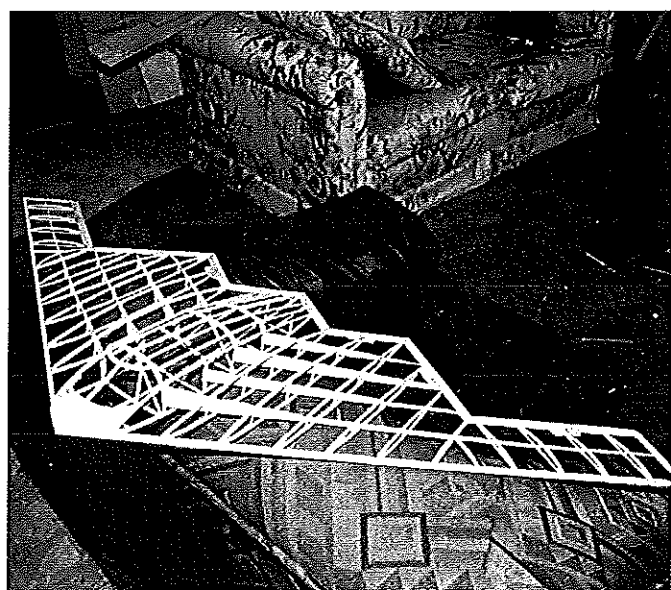
Wingspan: 42 inches

Power: Motor package from Hobbico RTF Spitfire

Flying weight: 95 grams

Construction: Balsa and plywood

Covering/finish: Japanese tissue and modeling dope



The B-2's completed framework, including the built-up cabin area, has a balllike character, doesn't it?