# WINTERHAWK

**Special design considerations produced a tough, simple machine with an outstanding thermal riding ability.**

■ **Bill Evans**


**Author-designer Bill Evans displays the pleasing lines of the Winterhawk. Has foam wing and sheeted tail surfaces for easy building.**

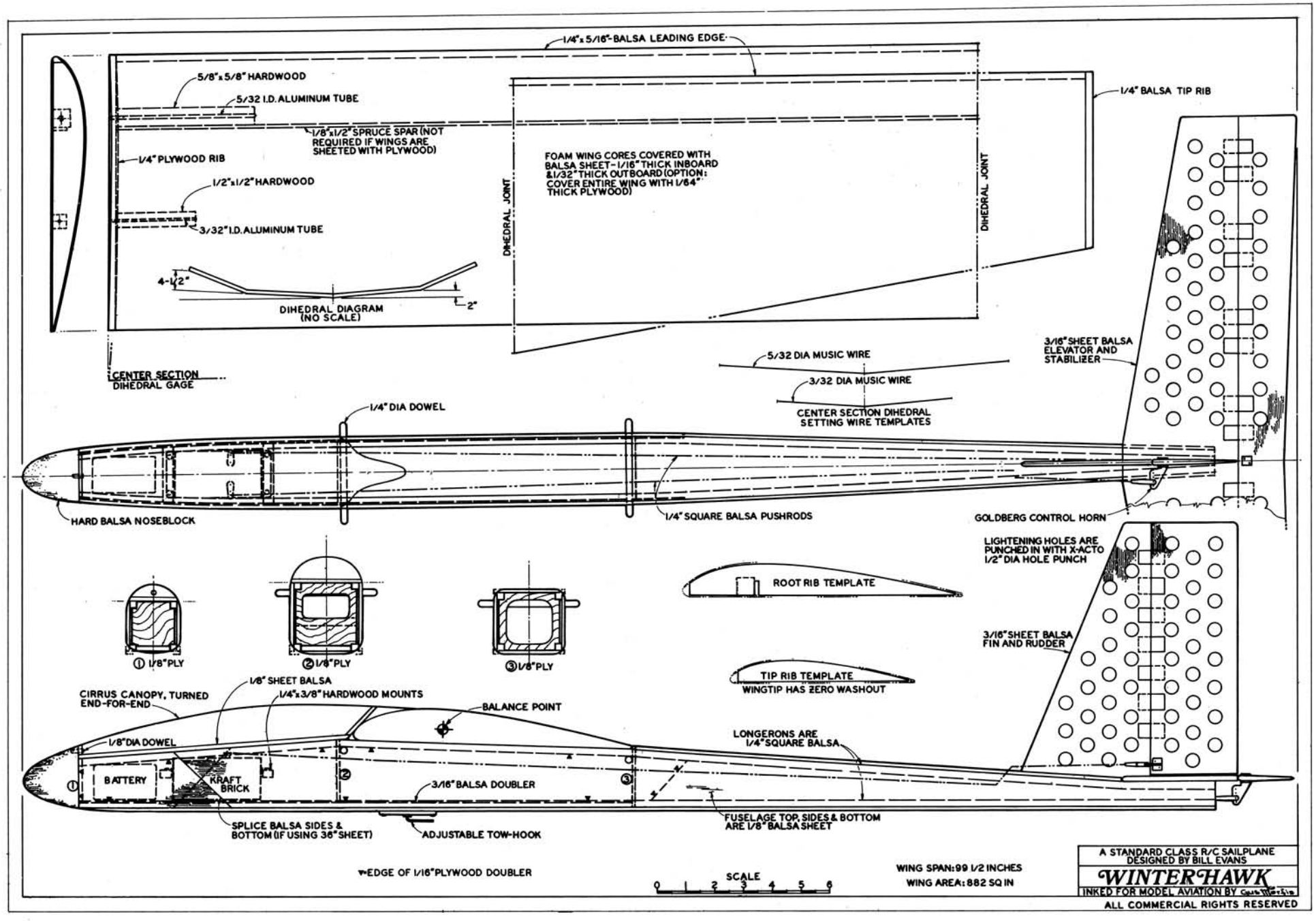
WINTERHAWK combines the strength of a tank with the flight characteristics of a "bird of prey," a combination that delivers superior thermal time and airframe longevity.

If it has been your goal to say to your fellow fliers, "gee it won't come down," the Winterhawk is the answer. The chief complaint from other fliers is, "you've been up for more than an hour, how about landing so I can use the frequency."

Project Winterhawk was undertaken to deliver a thermal craft with several desirable qualities; they are:

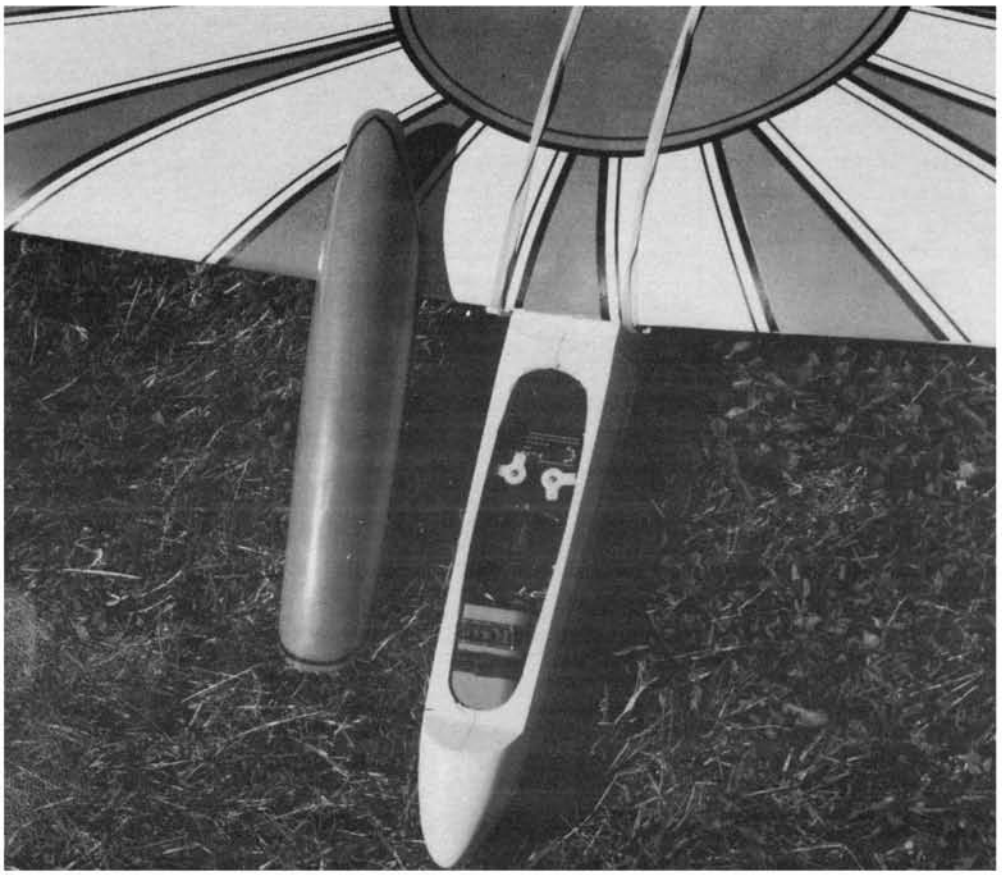
1) Maximum flight time regardless of lift conditions—accomplished by a maximum-lift wing and weight; weight for

**Get the line tension up before you launch. Use a wing spar if the wing is sheeted with balsa. With either balsa or plywood sheeting use glass cloth and epoxy to reinforce dihedral joints.**






FULL-SIZE PLANS AVAILABLE . . . . SEE PAGE 104



**Removing canopy (Cirrus, turned around) makes for easy access to radio gear. Battery, as usual, goes in front for balance—and to keep delicate items out of the way in those hopefully few cases when inertia does its work. Fiberglass fuselages and foam wings are available.**

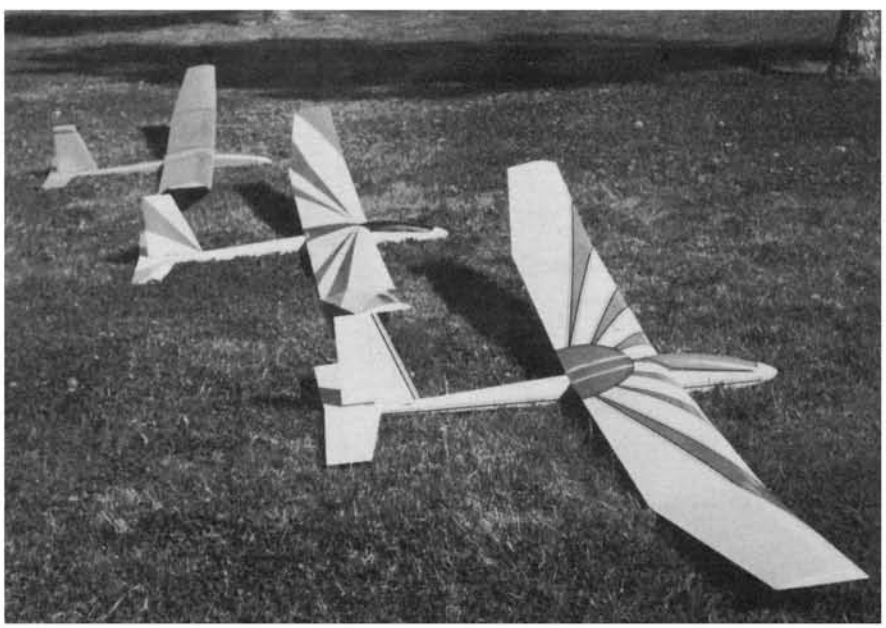
speed to produce optimum lift.

2) Airframe longevity; since the wing takes the most punishment, a high-impact, almost indestructible, fully-sheeted foam wing provided the answer. With the 3/16 sheet tail surfaces and a glass fuse, the Winterhawk has literally flown through trees, cutting a path, clearing and flying out the other side (testimony Dave Lloyd, Dave's Custom Models, Glendale, CA).

3) Span not to exceed 100 inches—actually 98 inches.

4) Hands-off performance, yet responsive, tested by setting up in a climbing turn, then switching off the transmitter.

Though the majority of Winterhawks built so far have weighed in at just about four and a half pounds, I prefer to fly it just between five and a half and six pounds. The 885 sq. in. area gives 6.15 sq. ft. of wing, which works out from 12 to 15 oz. per sq. ft. If your reaction is that the wing loading is too heavy for a glider, your skepticism would increase if you could pick up the ship and feel the weight. But all bets are off after it shoots up the line and the first 10 minutes are ticked off on the watch. After the first 60 minutes disbelief changes to amazement. To my knowledge, most flights of Winterhawks have been terminated at the pilot's discretion. Many Winterhawk pilots have developed stiff necks, getting a feeling that they have completely mastered silent flight, after turning in flight after flight of more than one hour.



**Initial success inspired whole fleet of Winterhawks. Though the sailplane comes out naturally at about 4-1/2 lbs., Evans prefers to ballast his to 5-1/2-6 lbs. for 12-15 oz. per sq. ft. loading.**

**Design Considerations:** Though the nose and tail moments play an important part, they are not super critical. A few minor weight and C.G. calculations yielded satisfactory ratios. Having flown free flight when it was all there was to fly (more years ago than I care to count), I have a few favorite percentages when it comes to airfoil thickness. So, after considerable plotting and fussing, an airfoil emerged that looked very good. For the wing loading, I took a 180-degree turn from convention, as in free flight, that the ship should be light. I loaded it down, stopping at just over 5½ pounds.

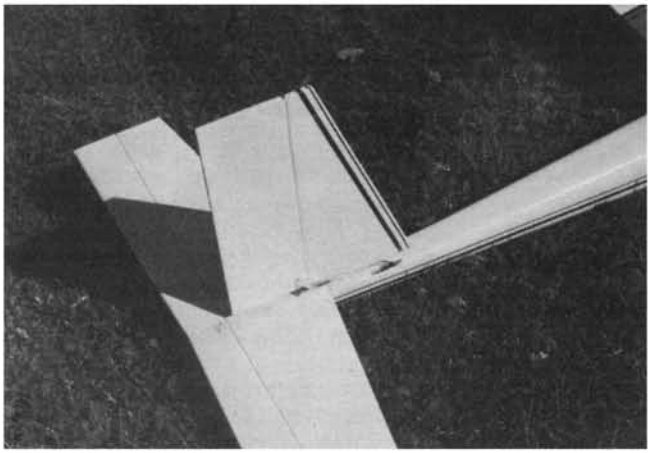
The check-out flight turned in a time of 55 minutes. I landed the Winterhawk because of darkness. Subsequent flights were one hour plus, in each case terminated by my command.

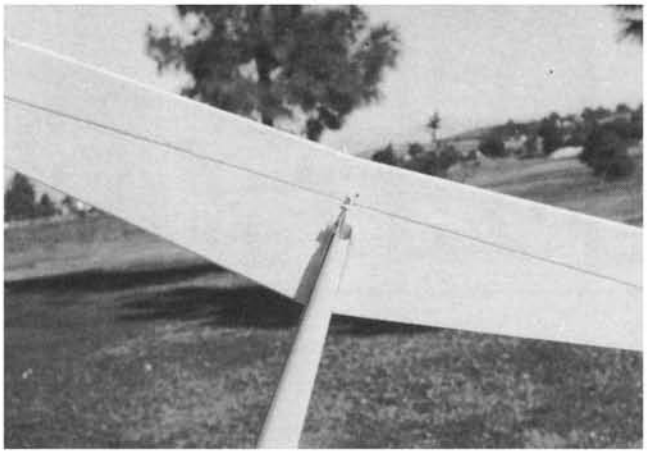
The first Winterhawk was built with 1/16 balsa-sheeted inboard panels and 1/32 outboard panels. All three wing joints were epoxied without the use of glass and without a spar. After several near full-up elevator launches, I managed to fold the right wing panel about four inches out from the root. The right wing panel parted company from the ship at just over 600 feet. With a bit of help from the large elevator and rudder I managed to somewhat soften ground contact just before impact. Repair to the wing, using epoxy, took about 30 minutes, except for a few splits in the wood fuselage. Subsequent balsa sheeted wings have included a main spar, as shown on the plans. However, I do recommend 1/64 plywood as the ultimate answer. The weight difference between balsa and ply is small —34 ounces for balsa, and 36 ounces for ply.

The fascination I hold for the Winterhawk is not unique; it's an experience shared and spoken of by all Winterhawk pilots.

Since I have principally devoted the majority of my efforts to the design of slope gliders and flying wings, it is with sincere pleasure that I offer you the Winterhawk, a truly exceptional soaring craft.

**Material List:** 12—1/16 × 4 × 36, 10—1/32 × 4 × 36 or equivalent 1/64 ply, 1—3/16 × 3 × 36, 2—3/16 × 4 × 36, 5—⅛ × 3 × 36, 1—2 × 3 × 3 block, 1—sheet ⅛ ply.





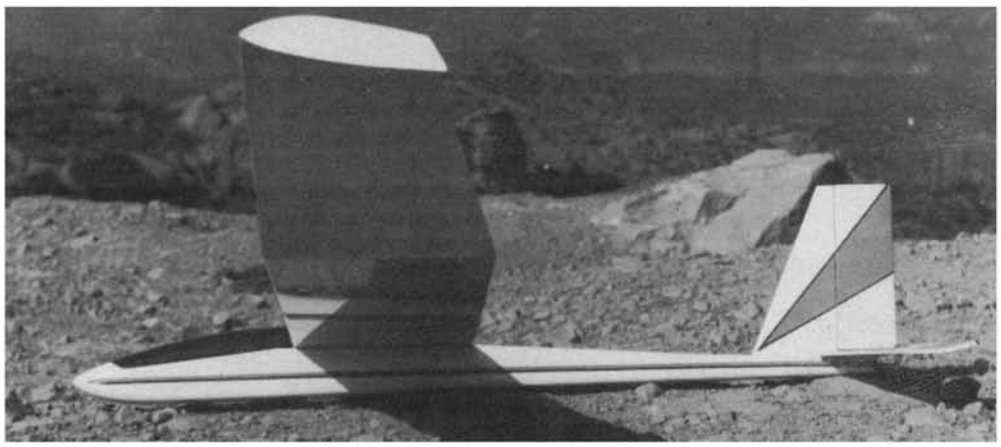
**3/16" sheet balsa tail surfaces make for easy construction—lightening holes, easy to put in with Xacto hole punch, are suggested.**

Winterhawk foam cores are available for $10.00 including shipping (CA residents add 6%) from Soaring Research, 19216 Calvert St., Reseda, CA 91335, who also can supply 1/64 plywood Winterhawk wing sheeting for $10.00, and a epoxy-fiberglass fuselage for $30.00.

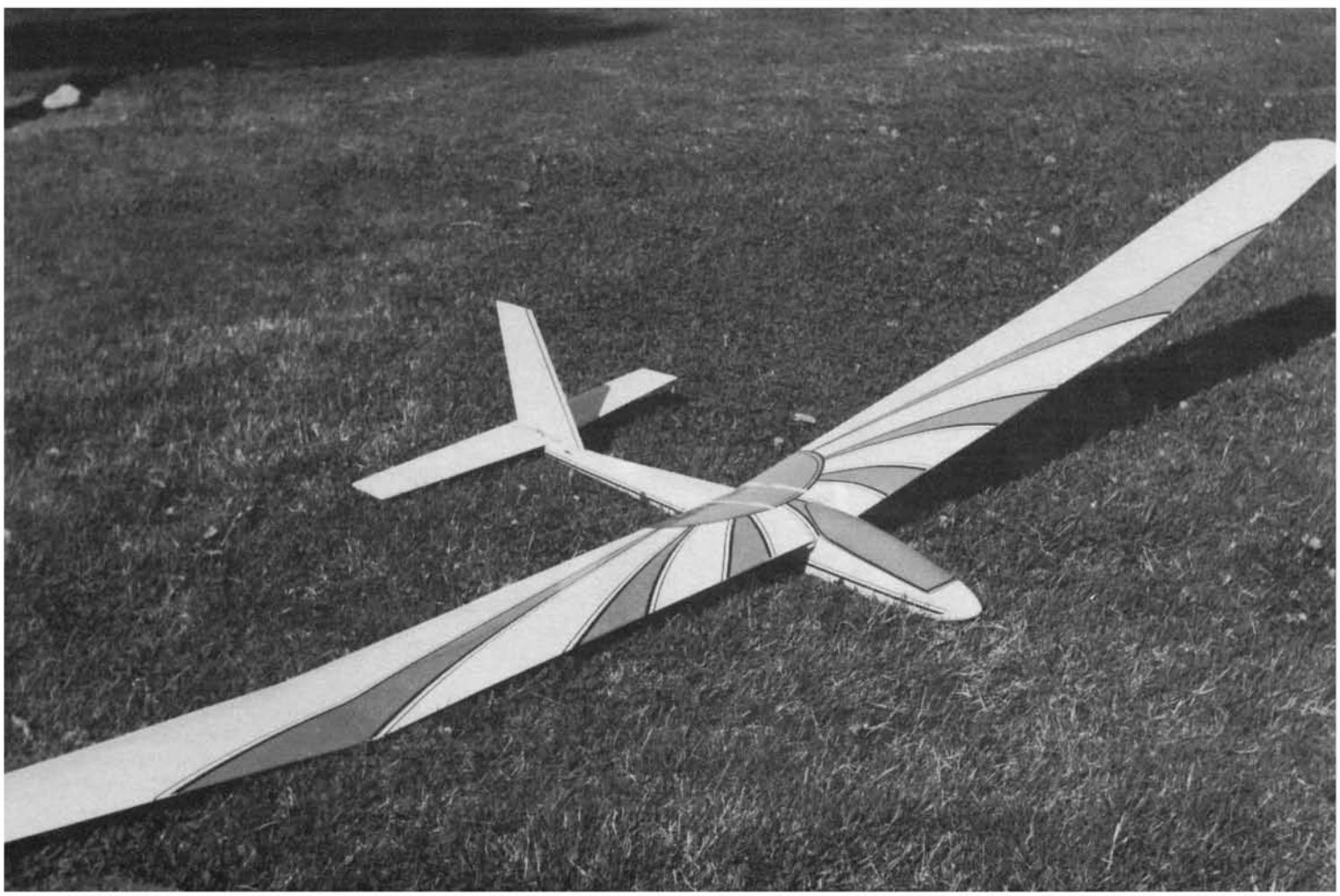
**Construction:** As you can see from the plans the KISS (keep it simple stupid) construction principle is used. The following construction sequence will be helpful as a building time-saver.

Cut, then white-glue the balsa leading edges to the wing cores, and set aside to dry. Cut out the fuselage parts (sides, bottom, top, doublers, formers, and nose block). White-glue the fuselage doublers to the fuse sides, making sure to make a

*Continued on page 88*



**Winterhawk employs the KISS ("keep it simple stupid") construction principle. Author's plane had Pontiac Firebird decal and DJ Multistripes for nifty trim.**



*continued from page 19*

right and a left side, and to raise the doubler at the bottom edge of the fuse side, to allow the fuse bottom to fit between the balsa sides and below the doubler. Let dry.

Cut out, trim, and sand the 3/16 tail surfaces, being sure to cut lightening holes in these surfaces as per plan. Xacto makes a ½" hole punch which can be used in a drill. It is ideal for this purpose.

Glue fuse parts together by first pinning the fuse bottom down on a flat surface, then glue and pin on the sides, corner squares, formers at rear top, and nose block. Let dry.

Trim and sand the leading edges of the wing panels so the sheeting will fit neatly on them. Cut wing sheeting to size and contact-cement sheeting to cores, using any good waterbase contact cement. Epoxy wing panels together, using 5-minute epoxy. Set the dihedral as per plans. You may elect to join wing halves using tubing and wire; if so, you should do it at this point. I generally make a one-piece wing.

The canopy is made from a large Cirrus canopy turned end for end. Use Zap and Zap filler to secure the canopy to the base.

After sanding the fuselage and other parts, use your favorite covering material, and install the radio and linkage. The trim on the original included a small Pontiac Firebird decal (from local Pontiac dealer parts), epoxy paint, and DJ Multistripes.