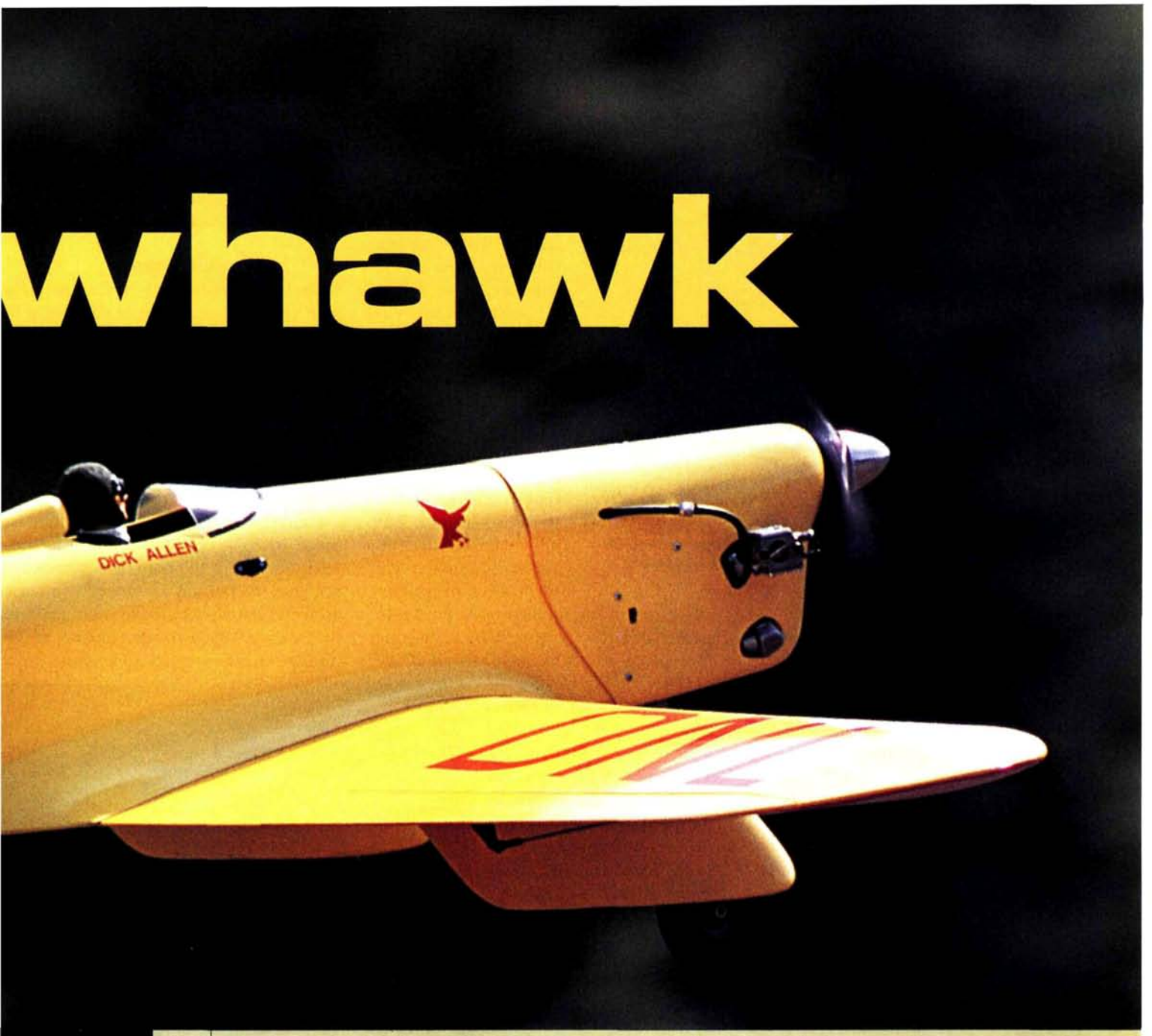
whawk



FLIGHT PERFORMANCE

Balance the model as indicated on the plans. The model should require little or no lead weight for balance. Check the left/right balance by picking up the plane by its engine shaft and tailwheel mount. Add weights to the lighter wingtip, if necessary. For your first flight, start with the following control-surface throws:

	Low rate (in.)	High rate (in.)
Elevator	Up/down ½	¾
Rudder	Right/left 2	3
Ailerons	Up/down ⅞	1⅛

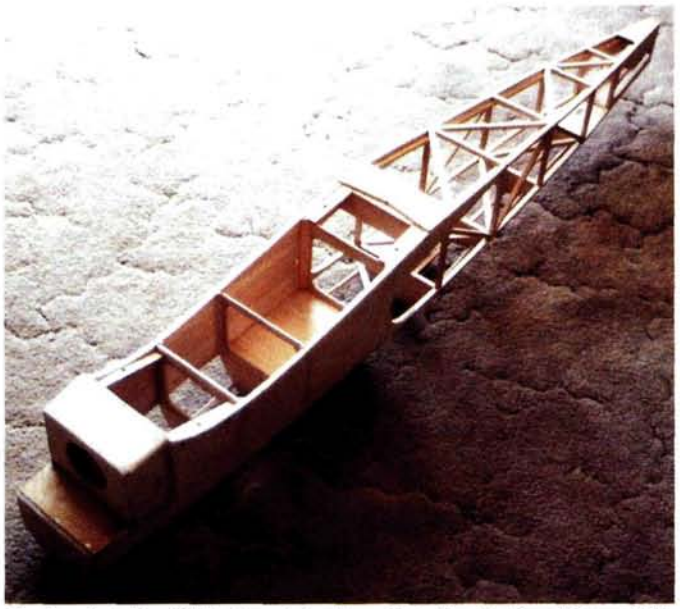
I use 30- to 40-percent exponential on all of the above.

My Sparrowhawk required only slight adjustment of the aileron and elevator trim on its first flight. I use full up-elevator to "dig in" the tailwheel for the first few feet of the takeoff run. If you have the correct amount of right engine thrust, the model will track straight into the wind with little or no rudder correction. Slight up-elevator will ease it off in about 75 to 100 feet.

Inside and outside loops are graceful, and performing vertical 8s is no problem. The rudder is very effective; the model performs good stall turns with no aileron correction. Rolls and inverted flight are docile. In straight and level flight, there is no roll coupling and only slight down pitch coupling with rudder.

Slow-flight characteristics are very good. The thick, stable airfoil slows the landing approach at the point where many other aerobatic airplanes would drop out of the sky. Set up as recommended, the model will neither snap out of nor tip-stall out of a tight loop. Stalls are straight ahead, with neither wing dropping out. In light wind, I sometimes use spoilerons (up-ailerons) to increase drag for landings. I prefer full-stall, 3-point landings—even in wind.

PHOTOS BY DICK ALLEN



The fuselage is a light, strong structure. Note the staggered firewall; it provides room for the engine and muffler in its narrow cowl.

FUSELAGE NOTES

The fuselage is constructed to be light and strong. Note that the staggered firewall (F1) is made of four separate pieces of ¼-inch aircraft-grade ply. For additional strength, four pieces of ⅜-inch-square (or ½-inch-triangular) basswood are screwed and glued to the firewall and side pieces. Coat the entire outer surface of the firewall with epoxy to fuelproof it. Drill a hole in the bottom of the tank compartment to allow any leaking fuel to drain out. The five top ¼-inch-square longerons from the firewall to the cockpit are made of spruce; from there back to the tail, the longerons are made of balsa. The four 5/16-inch-square corner doublers at the inside corners of the fuselage (from F5 and F6 to the tail) are glued into place after the sides have been assembled. Do not omit these; they add great strength and stiffness by increasing the glued area of the structure.

The front and rear turtle decks are covered with 3/32-inch balsa. They will be easier to bend and glue into place if you first soak them in water for 20 minutes and then tape them into place to dry overnight. Cut out a slot for the fin, and then glue the rear turtle deck into place after the stab and fin have been glued into place. Glue the front turtle-deck sheeting into place after you have installed the engine.

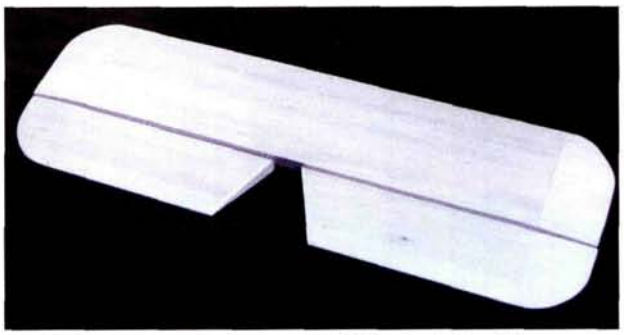
I used a Sullivan tailwheel bracket (item no. S862) rated for a 16- to 35-pound model. The large and beautiful Spitfire-like wing fillets are made after the wing has been framed up and attached to the fuselage. I used a 1/32-inch ply base sandwiched between the fuselage and the wing. I used plastic wrap to protect the upper surface of the wing, and then I formed the fillets with blocks of foam, fiberglass cloth and resin.

When the fuselage has been completed, hold the fuel tank, receiver and battery pack (wrapped in foam) in place with double-sided hook-and-loop fastener material.

TAIL FEATHERS

Since the Sparrowhawk has a relatively long tail-moment arm, it is imperative to keep the tail surfaces light. The stab airfoil is symmetrical and is covered with light 3/32-inch balsa sheet. The laminated tips shown are light, strong and elegant; but it will fly just as well with conventional, carved-balsa tips. Please don't build the tail out of a heavy slab of ⅜-inch balsa.

Build the fin as shown on the plans, and make the rudder out of the lightest piece of ½-inch balsa you can find. Reinforce its top and bottom as shown. Do not glue the tail-surface hinges into place until the stab and fin have been glued to the fuselage. When you glue the tail to the fuselage, use the wing as a reference.



The built-up stab and elevators are fully sheeted and have a symmetrical airfoil.

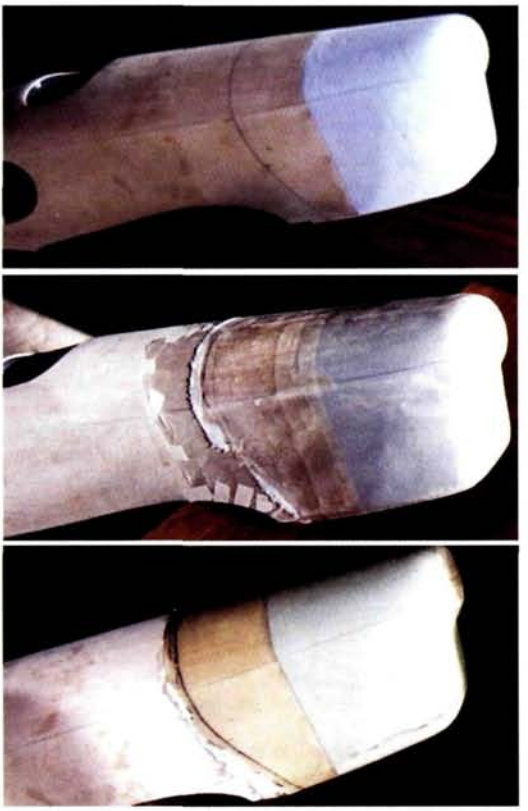
SPECIFICATIONS

MODEL: Miles Sparrowhawk
SCALE: 26 percent
WINGSPAN: 88 in.
WING AREA: 1,440 sq. in.
WEIGHT: 20 lb.
WING LOADING: 32 oz./sq. ft.
LENGTH: 74 in.
ENGINE USED: Zenoah G-62
RADIO REQ'D: 4-channel (rudder, elevator, throttle, aileron)
PROP USED: Zinger 22x8

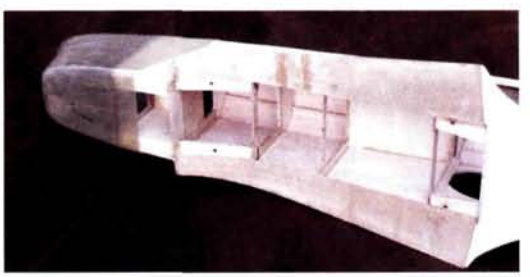
COMMENTS: *designed by Dick Allen, this 26-percent–scale Miles Sparrowhawk uses conventional built-up balsa and plywood construction throughout. Foam is used to form the fiberglass engine cowl and the wing fillets, and they are formed directly on the model's structure. The Sparrowhawk is very aerobatic and is legal for both IMAC and IMAA giant-scale events.*

FORMING THE ENGINE COWL

The engine cowl is formed directly on the finished fuselage before it's painted. Cut two side-view templates of the cowl out of lite-ply, and use them to cut a block of blue foam to shape with a hot wire. Tack-glue the foam to the nose, cut it to shape with a sharp knife and then sand it with sanding blocks. Cover the foam and the front 6 inches of the fuselage with a layer of plastic food wrap pulled tight and taped securely into place. Use a heat gun to smooth out any wrinkles so it conforms snugly to the nose. Build up several layers of fiberglass cloth and resin over the foam and plastic wrap (use just enough resin to saturate the cloth). After the resin has cured, sand it smooth, remove the tape and plastic wrap and pull the cowl from the fuselage. Cut the aft edge of the cowl to its correct shape, as shown on the plans, and sand it smooth. It's easier to position the cowl-mounting screws before the cowl has been painted. Likewise, cut the openings for the muffler, carburetor and spark plug before you prime and paint.



Top: I made the engine cowl by tack-gluing foam blocks to the fuselage and carving them to shape. I built up fiberglass cloth and resin over the foam after I had covered it with plastic food wrap. Center: when the resin has cured, sand it smooth, separate it from the fuselage, and (above) remove the foam.



The base of the wing fillets is made of thin plywood and glued between the wing and the wing saddle.

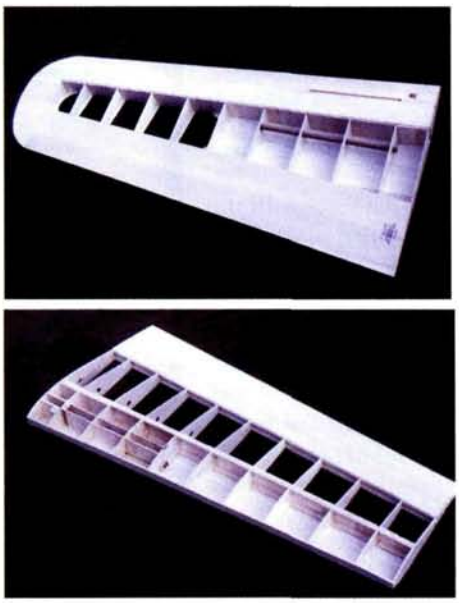
The tops of the fillets are formed of foam and covered with fiberglass cloth and resin.

For a lighter, smoother running G-62 engine that's easier to start, I had my engine modified by C.H. Ignitions Inc. The electronic-ignition system replaces the stock coils and coil-mounting lugs that would otherwise protrude through the cowl. This results in a cleaner front end. The modified engine produces more than enough power for the 19-pound Sparrowhawk. Install your engine with 2 degrees of right thrust. The four engine-mounting holes shown on the plans should give you the correct amount of right thrust and tilt.

WING CONSTRUCTION

The wing airfoil is semisymmetrical and is flat from the main spar to the trailing edge on both the top and bottom. Before assembly, draw a straight centerline on all the ribs and on the back side of the sub leading edge. On a flat building surface, pin the lower trailing-edge sheeting to the plans, and draw straight lines on it where the spars will go. Now place the rear 1/2x1/4-inch and 1/4-inch-square wing spars and the 1/8x1/4 aileron spar into position. Use a 48-inch piece of 3/32-inch sheet balsa near the midpoint of the ribs to support them during construction. Accurately position all the ribs on the lower trailing-edge sheet and spars; use weights to hold them down, and then glue them into place with CA. Glue on the sub leading edge after you've carefully lined it up with the centerline of each rib. Glue in all of the top wing spars and the diagonal braces in the ailerons. Glue in the 1/4-inch ply plate for the aileron horns and the hard-balsa fill for the wing bolts.

Tilt the two center ribs to accommodate the dihedral. Before you glue on the top trailing-edge sheeting, make small cuts in the bottom sheeting to define where the ailerons will later be cut out of the wing assembly. Turn the wing over, weight it down, and glue in the bottom wing spars, the landing-gear mount and the bottom leading edge and center-section sheeting. Let the assembly dry overnight. When the glue has set, turn the wing over again, weight it down, and finish all the details such as wingtip, servo mount, shear webs, landing gear and front vertical wing-bolt blocks, etc. Glue in the 1/4-inch-ply landing-gear fairing attachment-screw retainers. Do not glue the top center section and top leading-edge sheeting yet.



Top: each wing panel is built separately and then joined to form the completed wing. Above: here, the leading-edge sheeting and the leading edge have yet to be installed.

Build the other wing half in a similar manner, but do not cut out the ailerons until each wing-half assembly has been completed. Note that the grooved hardwood landing-gear blocks extend all the way to the center ribs, where they form the backbone of the dihedral support. They are tied together with a 3/4x1/2-inch hardwood block that extends between the R2 ribs. A 1/4-inch ply dihedral brace is then fitted between the R2 ribs and between the top of this block and

the bottom of the two ¼-inch-square adjacent top spars.

Cut the other dihedral brace out of ¼-inch ply, and fit it between the rear ¼x½-inch wing spars that run between the left and right R2 ribs. Rib R1 must be cut out to accommodate the dihedral braces. When the wing panels have been built and the dihedral braces are in place, glue on the top center section and leading-edge sheeting. Sand the front of the panels true, and glue on the leading edge. Shape them accurately, and then sand them smooth. Join the panels upside-down on a flat table with the center ribs blocked up 1 inch and the top of the tip ribs resting on the table. Block up the trailing edge at the center section so the ribs are parallel to the work surface. Make sure that everything fits perfectly, and then use slow-drying epoxy to join the wing halves.

Inside the fuselage, there's plenty of room for radio gear and the fuel tank.

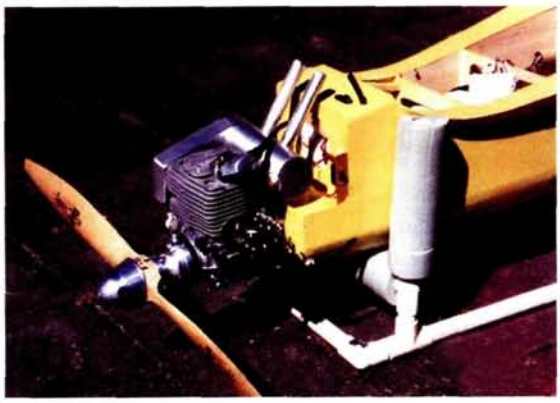
Do not build the wing with a flat top. If you do, the plane will have adverse roll coupling. The 1-inch block used under the center ribs provides the proper amount of dihedral for no adverse roll coupling; trust me on this one!

LANDING GEAR

My friend Bob Shattleroe made my landing gear out of highly tempered ¼-inch-diameter music wire, and it's much stronger than the music wire that's sold in hobby shops. The gear fairings (spats) give this airplane a lot of character. I made them out of fiberglass using two female half molds. The left and right spats are identical, and I shimmed the outboard edge slightly with foam wing-saddle material to account for the wing-dihedral angle. Position the spats carefully before you drill the dowel guide holes through the top of the spats and into the wing. Glue the dowels into place, and then drill the holes for the three 10-32 nylon attachment bolts. Tap the holes in the wing, and secure the spats in place.

PAINT AND FINISH

I covered the fuselage, fin and stab with Sig Koverall and painted the model with HobbyPoxy 2-part paint. The wing, rudder and elevator should be covered in Ultracote or MonoKote to save weight. The Sparrowhawk graphics as shown are available from Roy Weidman.



I used a Zenoah G-62 and a Slimline muffler to power my Sparrowhawk. To install and remove the narrow engine cowl, you must remove the carb from the engine.

THANKS TO ...

My good friend Bill Underkofler built both of my 88-inch-span Sparrowhawks. Bill also contributed greatly to the aerodynamic and structural design of the model.

I am indebted to Ralph Jackson, Ken Maroni and Rick Allabaugh for helping me use DesignCAD to produce the plans.

The vinyl graphics are by Roy Weidman—(607) 625-4277.

The landing gear are from Bob Shattleroe—(734) 261-9064. ✈

C. H. Ignitions Inc.
(307) 857-6897; ch-ignitions.com.

Horizon Hobby Inc. *(800) 338-4639; horizonhobby.com.*

MonoKote; *distributed by Great Planes Model Distributors Co. (800) 682-8948; greatplanes.com.*

Sig Mfg. Co. *(800) 247-5008; (641) 623-5154; sigmfg.com.*

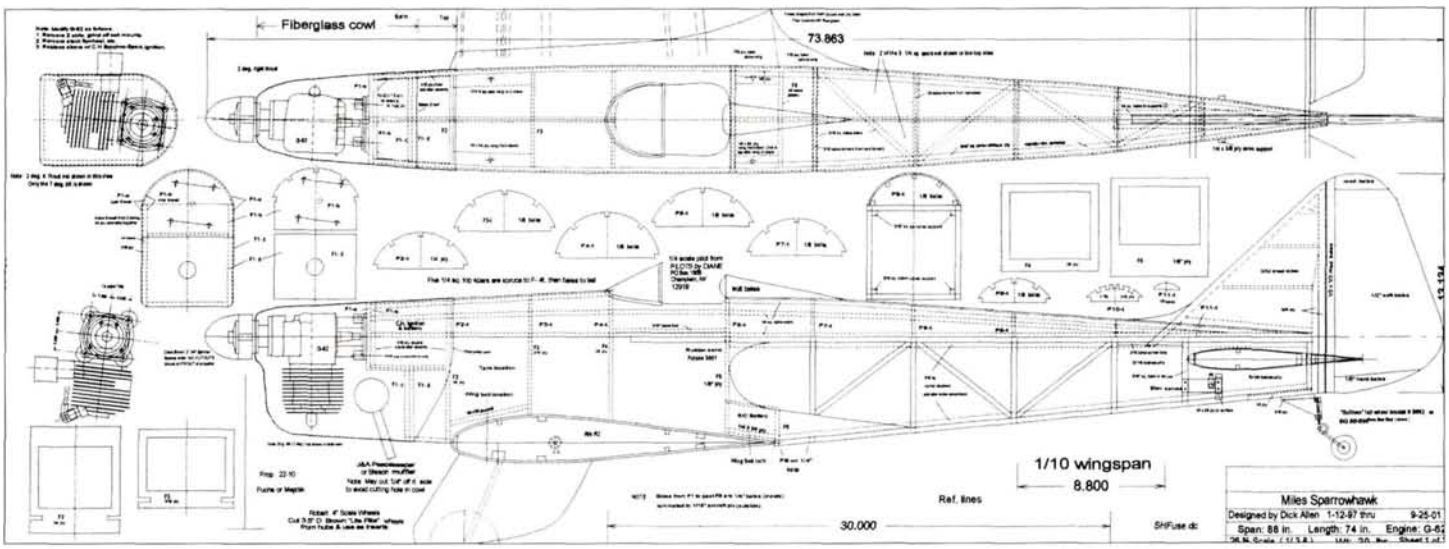
Sullivan Products *(410) 732-3500; sullivanproducts.com.*

Ultracote; *distributed by Horizon Hobby Inc.*

Zenoah; *distributed by Horizon Hobby Inc.*

Miles Sparrowhawk FSP0503A

Designed by Dick Allen, this 26-percent-scale Miles Sparrowhawk uses conventional built-up balsa and plywood construction throughout. Foam is used to form the fiberglass engine cowl and the wing fillets, and they are formed directly on the model's structure. The Sparrowhawk is very aerobatic and is legal for both IMAC and IMAA giant-scale events.
WS: 49.5 in.; power: .25 to .40 glow or electric; 5 to 6 channels; 3 sheets; LD 3. $24.95



To order the full-size plan, turn to "RCStore.com" on page 158.