

HAWKER DEMON

During the inter-war years, many startling leaps forward in airplane design were made, one of the most significant examples being Sydney Camm's Hawker Hart day-bomber. The Hart was developed along with stiff competition from rival concerns and the prototype took to the air in June 1928; she immediately proved to be the most successful of her type. The engine was the new 525 hp R.R. Kestrel, finely cowled and, although the whole aircraft was almost artistic in its beauty, it was an extremely robust machine, having all metal structure with fabric covering.

The Hart literally burst into squadron service at 190 mph in 1931, and the poor old Home Defense fighter pilots had quite a shock as the Hart outpaced their mounts by up to 20 mph. The Hawker Fury single seat fighter with a 210 mph top speed was eighteen months away, so an old W.W.I. concept was revived,

that of the two seat fighter. With a cut down gunners cockpit, long exhaust pipes, and a doubling of frontal firepower, the Demon fighter was born. Losing nothing in elegance to the Hart, and gaining in rakish looks, the Demon proved well up to its task of defense, so the fighter boys could breathe easily again!

The fine lines of the Demon were enhanced by the gloriously colorful squadron markings of the period. Nine R.A.F. squadrons operated the type, (Nos. 23, 25, 29, 41, 64, 601, 604, 607 and 608). A full bibliography for color schemes is given at the end, but I like my 604 squadron scheme best!

As is normal on my small scale ships, I've left off all the things which I don't think contribute to the overall character of the ship, and have simplified things here and there to minimize complexity which might arise through lack of customized components. That is, you make the whole ship yourself!

Those who've read this far, but still ain't gonna make the Demon may still like to study the comments on the metallized cowling, and customized crew members. Those who do build her

will be rewarded with a sparkling silver biplane which will draw admiring scrutiny from all at the field, whether she's flying or just sitting at rest.

CONSTRUCTION

General: The fuselage is the usual box girder, faired to streamline section with stringers and a sheeted nose section. The wings employ my favorite section, Clark Y, and use top ailerons driven by a servo hidden in a dummy non-scale 'fuel tank'. The tail group uses the 1/32" sheet 'core' method for rigidity with lightness. The landing gear is hinged at the front leg, the rear legs being supported by the lower wing bands.

Fuselage: All balsa here is of medium grade, since there are a lot of stringers, which give high strength. Make two fuselage sides, including formers F1A, F2A and F3A and the lower wing seat. Do not alter the tailplane incidence from that shown on the plans. When dry, sand the inside faces flat, and glue the 1/32" ply doublers in place with white glue followed by the external 1/8" balsa lower wing saddle doubler and internal 1/8" balsa nose doubler. Bend the front L.G. and center section struts to shape, and bind to F2. Join the fuselage sides with F1 and F2, passing the wing struts through the holes in the fuselage sides where indicated. When dry, add all remaining cross-braces, formers and stringers. Then add the rear center section strut and engine mount, followed by all sheeting, block, etc. Cut and line the gun troughs, then cut out the engine hatch, referring to the photos. The hatch is retained by a couple of P-K screws into nylon brackets which are screwed to F1 and the nose ring. Don't finish the landing gear or center section struts until after covering. Cut out the cockpit openings and fit the cockpit floors, gun





Gordon Whitehead's latest gem, a .20 powered 46" span Stand-Off Scale model of the fighter that had to be developed from the bomber which no contemporary fighter could catch!

HAWKER DEMON

Designed By : Gordon E. Whitehead

TYPE AIRCRAFT

Sport Stand-Off Scale

WINGSPAN

46 Inches

WING CHORD

7½" upper — 6¼" lower

TOTAL WING AREA

540 Square Inches

WING LOCATION

Biplane

AIRFOIL

Clark Y

WING PLANFORM

Swept Constant Chord

DIHEDRAL, EACH TIP

1" upper — 5/16" lower

O.A. FUSELAGE LENGTH

36½ Inches

RADIO COMPARTMENT AREA

(L) 7½" X (W) 3" X (H) 3"

STABILIZER SPAN

16½ Inches

STABILIZER CHORD (incl. elev.)

5½" (Avg.)

STABILIZER AREA

77 Square Inches

STAB AIRFOIL SECTION

Symmetrical

STABILIZER LOCATION

Top of Fuselage

VERTICAL FIN HEIGHT

6¾ Inches

VERTICAL FIN WIDTH (incl. rud.)

6" (Avg.)

REC. ENGINE SIZE

.19-.30 Cu. In.

REC. FUEL TANK SIZE

4 Ounces

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Ail. & Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Balsa, Ply & Spruce
Empennage	Balsa
Weight Ready-To-Fly	64 Ounces
Wing Loading	17 Oz./Sq. Ft.

ring, servo rails, etc.

Tail Group: Join 1/32" balsa sheet edge to edge, and cut out the complete outlines of the vertical and horizontal surfaces. Build up the structure on one side and, when dry, turn over and repeat the process. Sand the surfaces to a symmetrical section when all dry. Then separate the moving surfaces and sort out the hinges and wire joiner.

Wings: The wings are easily assembled on their flat bottoms. The dihedral joint is straightforward but requires careful cutting of the center section spars. Build the ailerons intergrally with the top wings, then cut out and add the sundry sheeting, fairings, etc. The hinge method is simple and frictionless, and simulates the full size slotted arrangement quite well. My old mini Futaba servo was too deep to fit within the wing depth, so I made the dummy tank shown, with hinged flaps. A servo hugging cut-out in the center section bottom, with the servo taped in would be equally unobtrusive. I had to make a servo extension lead, with plug and socket ends and, although this dangles between wing and fuselage, it

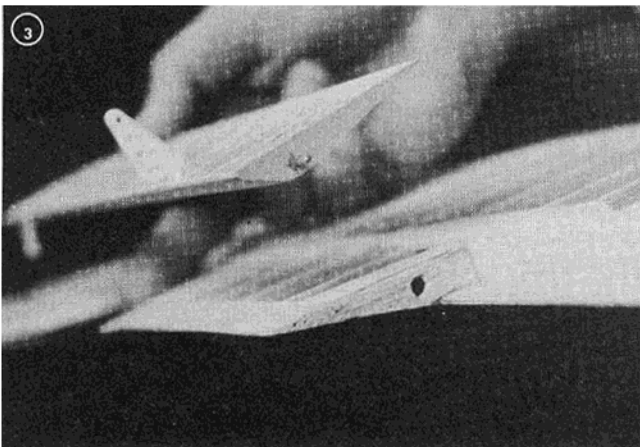
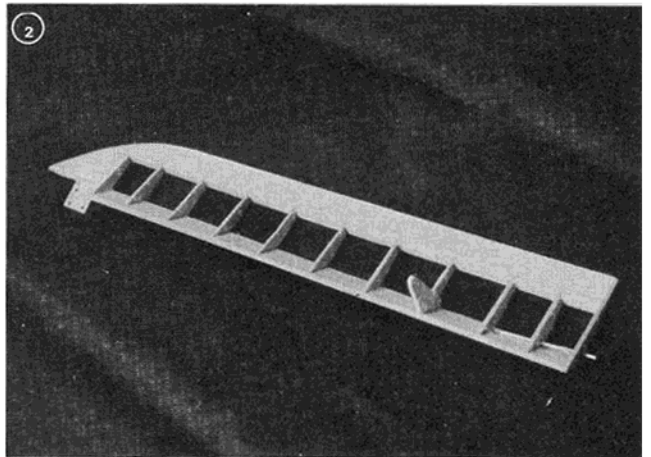
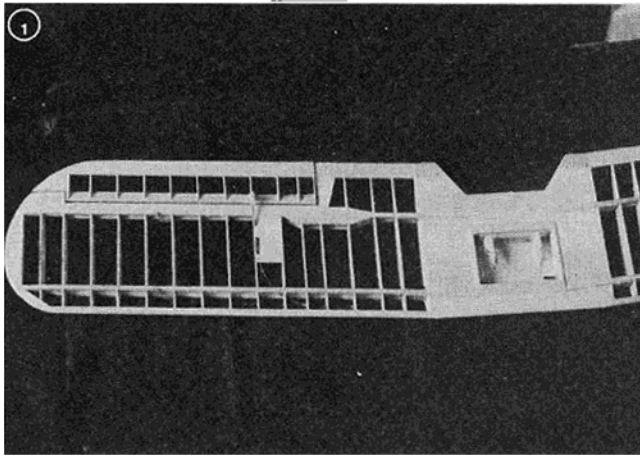
looks like a fuel line when painted silver — even though there wasn't one on the real ship!

Finishing: I chose to nylon cover the open areas except for the tail group, which I tissueed. I doped tissue on all balsa areas, then applied three coats of sanding sealer, and sanded this smooth. I sprayed the whole ship with thin white as a base coat, then silver. For the roundels, use a pair of ink compasses loaded with color dope — use a brush to load the pen. Tape a piece of card to the wing at the center of the roundel for the compass point to bear on, then draw inner and outer circles of each color, filling in with a No. 5 brush.

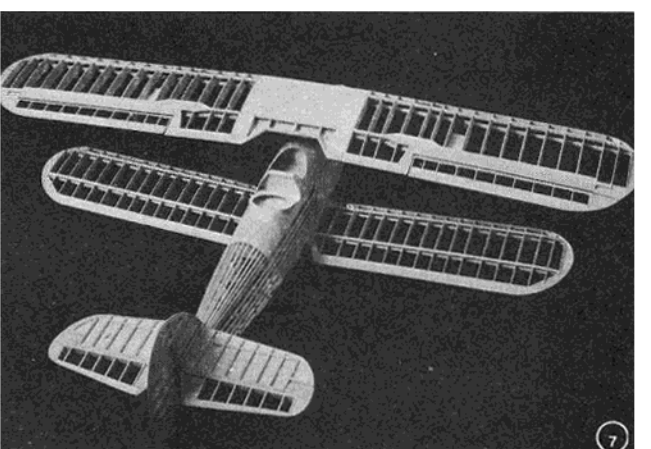
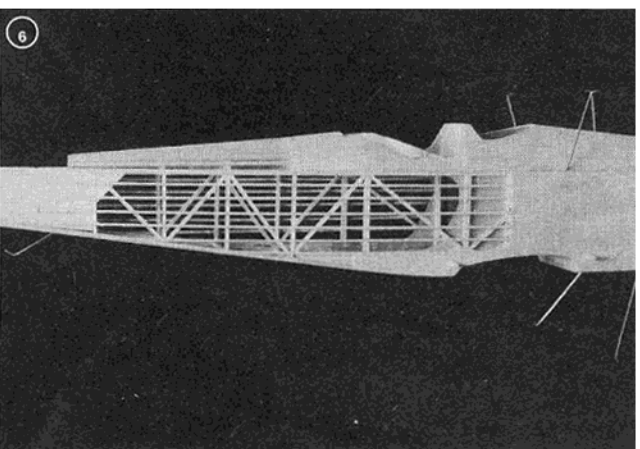
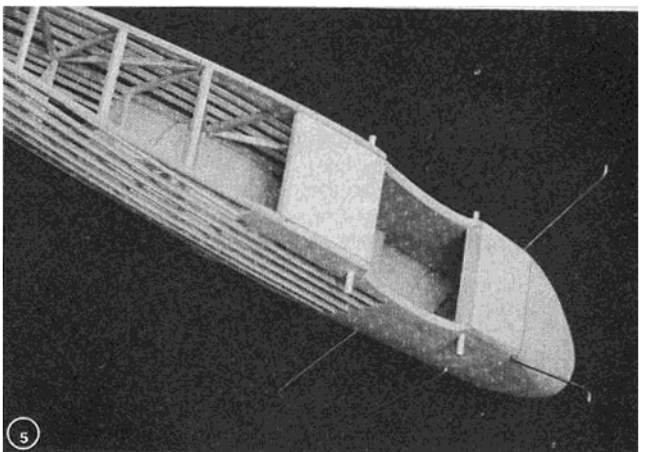
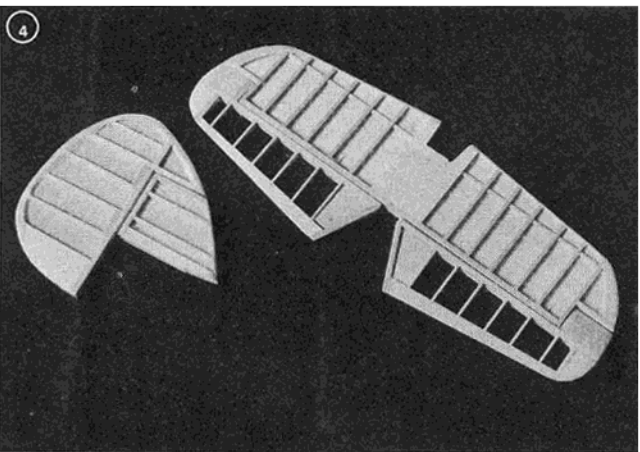
The squadron insignia is easily masked off, and one uses the masking tape technique for under-wing serials. The fuselage and fin numbers have to be done by hand, so draw on first using a soft lead pencil, then fill in with black dope on a No. 0 brush. When the dope is

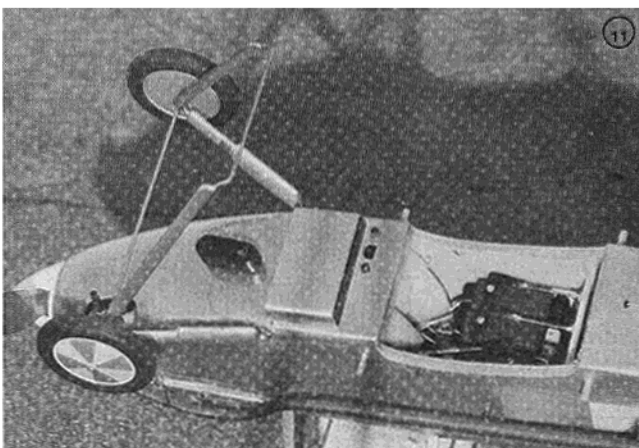
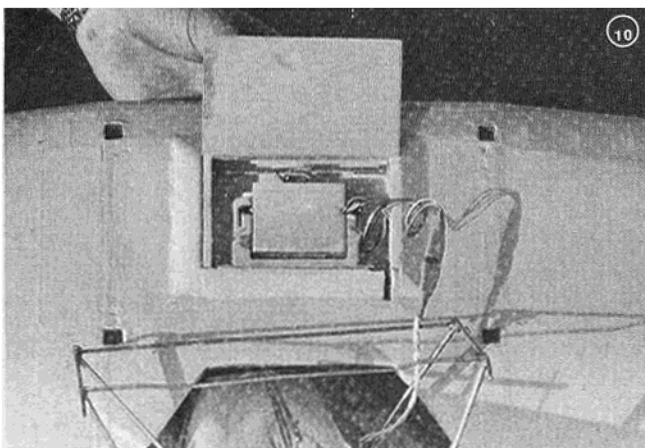
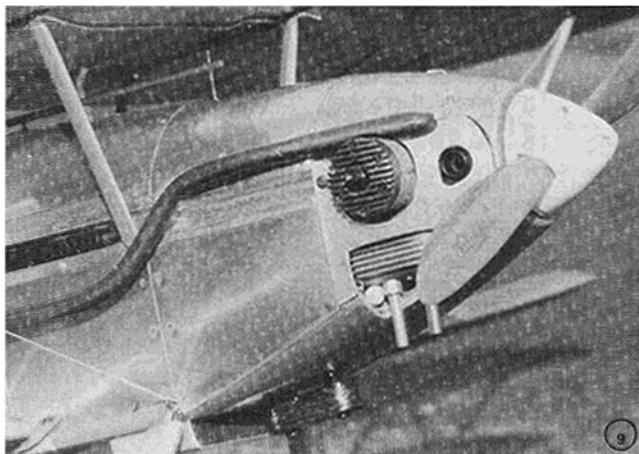
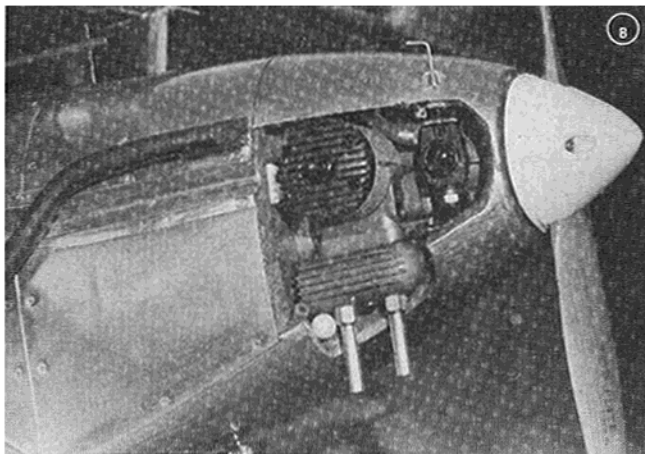
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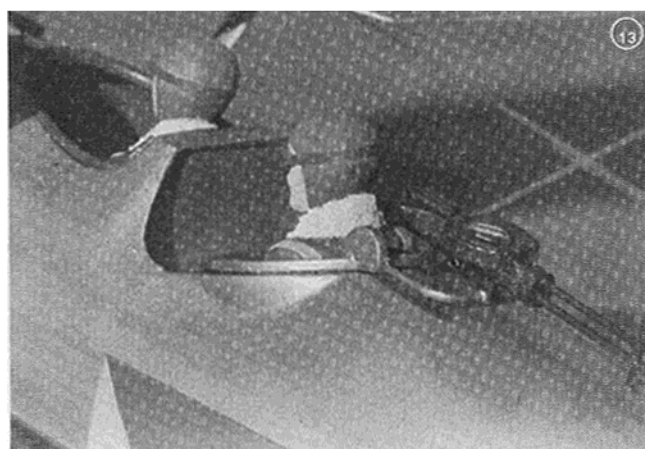
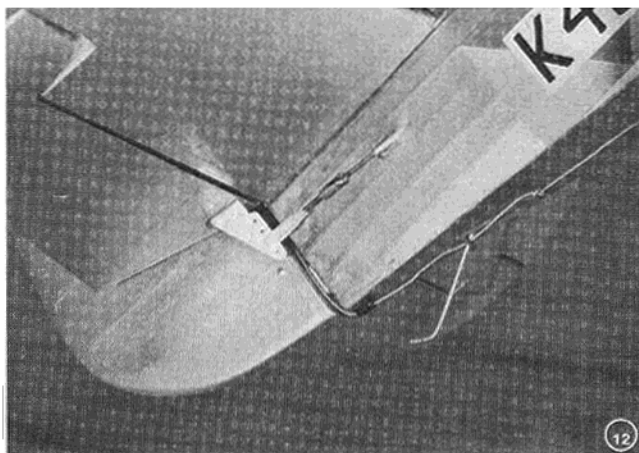


(1) Bottom view of top wing showing servo location.
(2) Aileron – note hinge on one end with pin on other end.
(3) Close-up of aileron hinge pin and bearing plate.
(4) Tail group before covering. Note center 1/32" balsa core.
(5) Bottom view of fuselage.
(6) Built-up fuselage with all those stringers. Looks like the real thing when covered.
(7) Completed airframe prior to covering.





(8) Engine compartment with cowling removed - note metallized cowling.
 (9) Cowled engine - exhaust pipe is from balsa wood as shown on plans.
 (10) Aileron servo mounted inside dummy non-scale fuel tank. Extension servo lead passes through slot at bottom right of opening.
 (11) Servo installation - note landing gear pivots forward and switch located behind radiator.
 (12) Elevator cable exit.
 (13) Cockpit close-up --- unless in action, gunner faces forward.
 (14) Completed "Demon" on the flight line ready for a mission.





dry, a soft rubber removes the pencil marks.

I always paint cockpits matt green, as black is too stark for this purpose.

For the metal panels I used litho plate, obtainable as scrap from a printers. Soft aluminum sheet would be better, as one has to anneal the alloy litho plate. Rub soap on the plate, play a blow torch onto the plate until the soap goes black, then plunge the plate into cold water. The only really sharp compound curves are on the top and bottom cowl surfaces. I made the top panel in three pieces, from nose-ring to F1, F1 to F2, and F2 to F3. (The real ship had a one piece top panel from nose-ring to F2.) Cut each panel to about 1/4" oversize. Tape the panel to the fuselage at its aft end, then 'bone' the metal round the curves with a spoon handle, and finally cut to exact size. You will have to re-anneal the alloy periodically, and also have a good supply of spoons, since if you press on too hard, the spoon handle will 'pick-up' on the alloy, scoring the latter, and spoiling the spoon for the purpose! This is only the second time I've used this method, so I'm not such an expert, but it only took me two evenings part-time work. Weight increase is minimal at 3/4 ounce, but the sight of those polished cowlings will make everyone drool! The metal is stuck in place using contact adhesive, applied around the outer 3/8" border only of each panel. When stuck, scratches can be removed using No. 600 grit wet and dry paper followed by metal polish. Fuel proof the joints. I proofed the doped areas with eggshell polyurethane house paint.

Radio Installation: I employed NyRod type linkages throughout, but have shown a typical bellcrank installation on the plan for those who prefer it. Apart from the squeeze to get the servo in the wing, there were no installation problems. Indeed, the long nose and sweepback help to reduce positioning problems. I always use base mounting clips for my servos, because this gives me flexibility of installation and also means I don't need lots of airborne outfits!

Cockpit Equipment: Recently in RCM, there was a spate of articles on using Williams Bros. figures in cockpits. However, I find that no matter what kind of paint job I do, they still have that stuffed shirt appearance. Try this! Sit on a chair in front of a mirror. Lean over to

your right and pretend you are a pilot trying to squint round a cowling. Your right shoulder will be lower than the left one, but your head will still be almost erect. Now stick your Williams pilot together, and cut his head off! Sand the neck joint on both head and body to enable the head to be tilted about 10° to the left, then glue the head back in place. Turn the head slightly to the right, if he is to be squinting over the right side. When dry, stick the doll on to a piece of 1/2" thick balsa which has been shaped to allow the right shoulder to droop about 1/8". Sand the wood to blend in with the plastic, seal the grain, then paint the pilot. Overalls should be white. Repeat the process for the gunner, but make him look left. Then when you look at the ship from 3/4 forwards you will always have someone looking at you, instead of both staring glassily into oblivion!

The Lewis gun shown definitely isn't up to the plastic kit standard, but I still get asked where I bought it!

Flying: The completed model weighs 64 ozs. This is with H.B. .20, 10/3 1/2 TF nylon prop, 2 oz. tank, and 1 lb. of old Futaba gear. A .19 is the minimum engine size for this ship, and up to .30 would be acceptable. I used a helicopter muffler for my ship since it fitted within the slim cowling line best. I thought plenty about the engine angle and decided on the side mounted arrangement since, in my view, it least interrupts the lines of the ship in this position. Three further advantages of the sidewinder mounting are: ease of accessibility, ease of starting, and the ejection of exhaust mess below the model with consequent easy cleaning. My ship needed no balance weight but even if yours does, get the C.G. right.

Take-offs: When taxiing, the fixed skid hinders turns on grass, so use full rudder, with powerful bursts of thrust to get her aligned into the wind. For take-off, use full power and be ready to correct a swing to the left with constant application of about 3/16" right rudder, centralizing as she breaks ground. At 4 lbs. with .20 power, the ship accelerates slower than my lighter Turbulent and Gipsy designs but, once in the air, is quite quick.

Landings: With the C.G. position shown, she will not 3-point, so keep a few revs on during the approach. She doesn't ground loop on grass but may on a hard smooth surface because the skid can't grip.

Maneuvers: Most of the usual sport maneuvers are possible. Open up loops, and perform rolls as slowly as possible to help deepen that feeling of nostalgia that will be eating through everyone at the strip when she gets airborne. The stall turn is very pretty, as is the Split 'S'. She spins fast and descends quickly, so do your first ones high up. She does not spin accidentally, and stalls are clean,

however, the nose doesn't rise much, and pre-stall warning is slight.

Although I really like trying to go through the book with all my models, I find that I enjoy trimming my little bipes for free flight, then steering with blips of aileron. This way I can relax my concentration on flying and take in all the spectacle as she rumbles past on half throttle. This is one flight regime where both pattern ships and 1/2A buzzers lose out totally in appeal. Incidentally, the ship would be okay without ailerons if you put 1" extra dihedral on both upper and lower wings.

Conclusion: My idea of a modeler's model is one that you can make with basic tools and ordinary glue. Demon, for all her apparent complexity, is just such a model (even the tin-bashing job uses ordinary kitchen tools!). This ship is no different in concept to what the folks used to fly free flight in the 1950's, except for a slight beefing up to withstand piloted landings. So go to it, and get scale modeling like dad used to do it!

Bibliography: Though widely used in the 1930's, the Demon is not as well known as some of its contemporaries. I, therefore, append the following bibliography which covers a large choice of color schemes, and also variants of the basic airframe. The titles are in order of recommendation.

- (1) *Camouflage and Markings (Gladiator, Gauntlet, Fury, Demon)*; Ducimus Books, c/o Air International, P.O. Box 353, Whitestone, N.Y. 11357 - best reference, cheap!
- (2) *Radio Modeller Magazine* October 1977.
- (3) *Aeromodeller Scale Drawing 2729* (shows Hart and Demon). Bob Holman Plans, P.O. Box 741-SM, San Bernardino, Calif. 92404.
- (4) *Profile No. 57* (Hart) and 140 (Audax and Hardy Variants). □

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