TEXT & PHOTOS BY **RICHARD DERY**

SPECIFICATIONS

Wingspan: 63.5 in.

Length: 50.125 in.

Wing area: 1,024 sq. in.

Flying weight: 87 oz.

Wing loading: 12.23 oz./sq. ft.

Motor: E-flite Power 32 BL outrunner

Speed control: 60A brushless ESC

Radio: 6-channel A, R, T, E, and bomb release

Prop: 12x6 electric

Battery: 3S to 4S 3200mAh

To make it easier to build your own Hawker Hind, a laser-cut short kit is available from manzanolaser.com.

1/7-scale Hawker Hind

A great-flying 63-inch-span RAF biplane

A derivative of the Hawker Hart, the Hind incorporated the newly developed Rolls-Royce Kestrel V engine along with a few other refinements. The most notable of these was the cut-down rear cockpit, which afforded the gunner more mobility. With a combination of extremely clean lines and the new Rolls-Royce engines, these rugged biplanes could fly 30mph faster than their contemporary front-line British fighters.

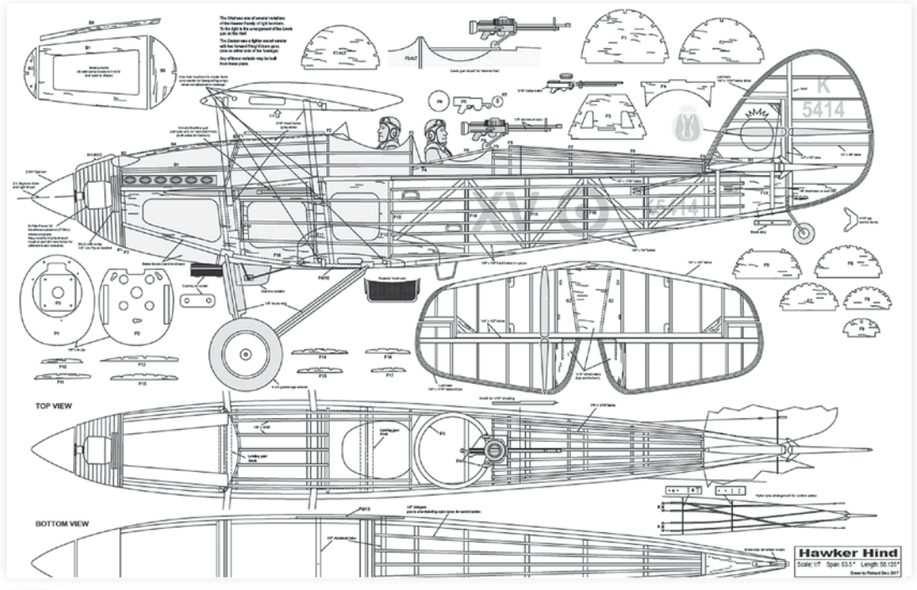
I chose to model this aircraft for its amazing history as well as its beauty. At 1/7 scale, the wingspan came out to 63 inches—a nice size to accommodate plenty of scale detail but small enough to fit in the back of my car with the wings removed and back seats folded down. While it is a modest size by today's standards, this would be the largest biplane I'd have ever built. Knowing that it wouldn't get much air time if it proved to be a hassle to transport and set up, I decided to keep the plug-in wing bays together with flying wires attached when separated from the fuselage. The end result is a biplane that is IMAA (International Miniature Aircraft Association) legal and only requires four 4-40 screws to secure the wings, and it can be assembled at the field in about five minutes.

CONSTRUCTION

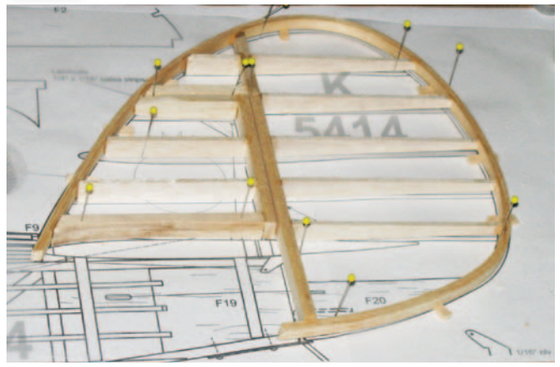
Traditional built-up balsa-and-ply construction techniques are used throughout. The power is provided by an E-flite Power 32 brushless motor on three cells. The plans were made from 3-view drawings, and I referenced many online photos of the full-scale example still being flown as part of the Shuttleworth Collection in England. Before we start construction, let the

Hawker Hind
Plans number: X0618A
Category: Scale
Designed by Richard Dery, the Hawker Hind is an attractive pre-WW II RAF biplane that uses traditional balsa-and-plywood construction. Designed to be a scale airplane, its flying wires are functional to support the wings under scale speeds and flight loads. The Hind was designed to be lightweight, so if you plan to do more aggressive maneuvers, replace the balsa wing spars with equal-size spruce spars.

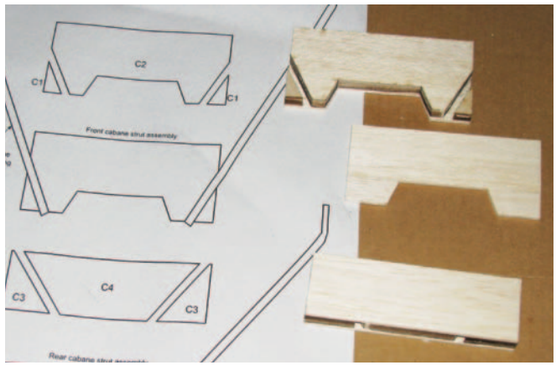
Span: 63.5 in.; Length: 50 1/8 in.; Power: E-flite Power 32 outrunner; Radio: 4 channels; Level of difficulty: 2; 3 sheets
Price: $24.95



To order the full-size plan, visit AirAgeStore.com.



Block up the laminated outlines with 1/8-inch scrap balsa, and frame up the tail feathers.



The cabane blocks are a balsa-wood sandwich that form a channel for the cabane struts to slide into.

rumble of the Rolls-Royce engine linger in your ears. Catch a whiff of exhaust as it hangs in the air. Sit back, close your eyes, and feel the history... We are now ready to begin.

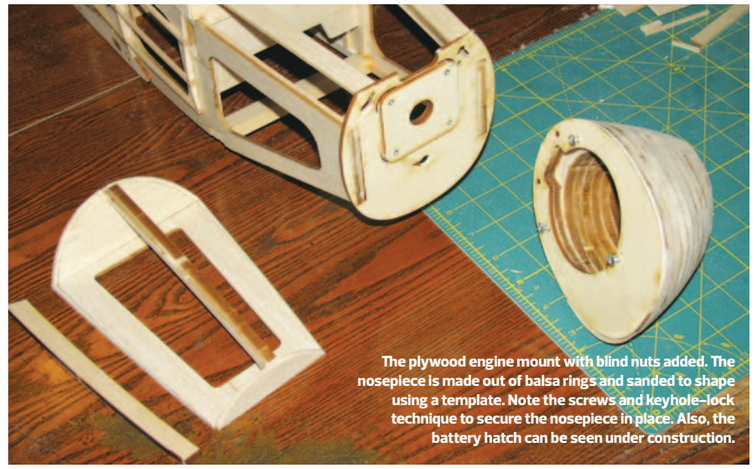
The tail feathers are a good place to start. Trace the inner outlines onto a piece of 1/4-inch foam-core to make a template. Tape the edges with transparent tape to prevent the glue from sticking, and pin it over wax paper. Soak 1/4 x 1/16-inch balsa strips in warm water, then run a bead of white glue down the length and laminate three strips together, gently curving around the template. Let dry overnight. This produces a strong, lightweight outline for your tail surfaces. Remove the template and pin the outlines over the plans, blocking them up with scrap 1/8-inch balsa. Frame it with 1/2 x 1/4-inch spars and 1/2 x 1/8-inch cross-pieces. Sand the finished framework to an airfoil shape, and set aside.

The fuselage, although straightforward, incorporates a method to help align the cabane struts and a keyhole setup to attach the nosepiece.

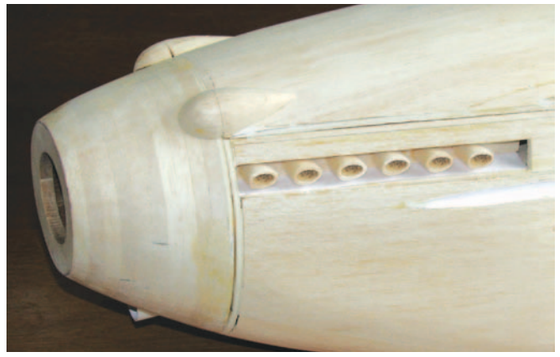
I won't go into much detail on the overall construction but rather highlight the areas of interest. Start by pinning the forward-fuselage slabs onto the drawing on the last page of the plans. Use the dashed lines as a guide to align the uprights that will be used to place the cabane blocks. These blocks are built up as a sandwich of balsa pieces, creating a channel for the cabane struts. Make sure to build a left- and right-hand side of this forward section. Transfer the right-hand side to the full plans, and add longerons and uprights. Place wax paper over the completed side, and build the second side over the first to assure they both line up. Remove them from the plans, and join the two sides together starting with the cabane blocks. Place it over the top view of the plans to ensure proper alignment. Add landing-gear blocks and then bring the tail section together. Fill in the rest of the cross-pieces on the bottom of the fuselage.

Note the location of the keyholes on the plywood firewall. Put screws into the back of the plywood nosepiece, and check-fit onto the firewall; they should fit through the holes and turn to lock. Once satisfied, add blind nuts to the back of the firewall to secure the engine mount. Glue the fuselage sides into the slots on the firewall, using care to bring the front together evenly on both sides. Note the orientation of the firewall: The bottom is round and the top is flat, with a notch to pass the engine leads (see photo at right).

Now add turtle-deck bulkheads and side formers, noting their location with the plans. Add stringers. Cover with 1/16-inch sheeting from the cockpits forward. Use balsa blocks to fill in the underside from the landing gear forward, then sand to shape. Finish constructing the nosepiece with balsa rings, and sand to shape; use the template as a guide. Build up the battery hatch with balsa, and secure it with pegs and magnets. Note that when the pegs fit into the nosepiece, they will lock it and keep it from turning.



The plywood engine mount with blind nuts added. The nosepiece is made out of balsa rings and sanded to shape using a template. Note the screws and keyhole-lock technique to secure the nosepiece in place. Also, the battery hatch can be seen under construction.

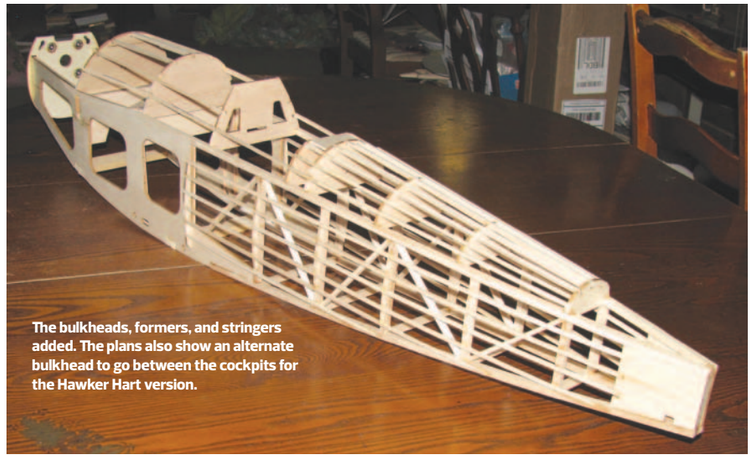


The finished nose assembly after sanding. The dummy exhaust will be glued in after painting and finishing.

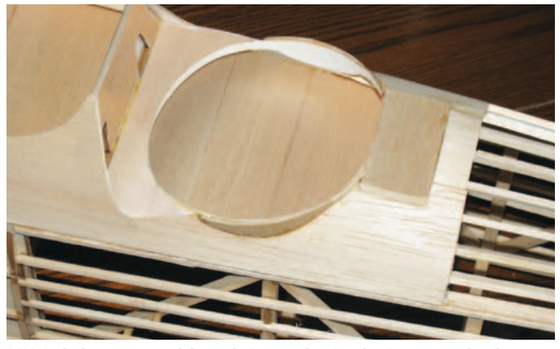
The E-flite brushless motor dry-mounted. The author needed to add an additional 1/4-inch plywood block to bring the propeller collet flush with the nose.

ON TO THE WINGS

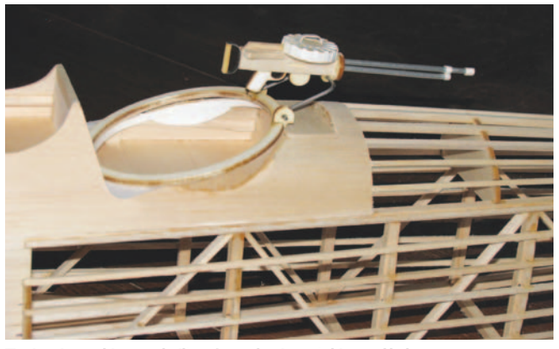
Frame the wings up over the plans. Laminate the wingtips after the same fashion as the tail feathers. Be sure to use plywood ribs at the root. Note that the wing-root ribs that attach to the fuselage and top-wing center section have larger holes to accommodate 1/4-inch aluminum tubes. On the top wing, be sure to put W3 and W4 in the correct order to set the proper angle of sweep to the wing. Block up the plywood interplane strut mounts with hard balsa, and drill a 1/16-inch hole through them. Cut 1/4-inch aluminum tubes to length for the top-wing center section, and slide the ribs on. Pin them to the plans, and finish framing. Cut 1/4-inch tubes for the bottom wing, and bend them at the center per the plans to set the dihedral. Slide them into the fuselage. Slide the 5mm carbon-fiber tubes into the wing roots, and trial-fit the wing panels into the center section. When satisfied, epoxy the carbon fiber to the wing spars and ribs. These can be blocked up with scrap balsa for extra strength.



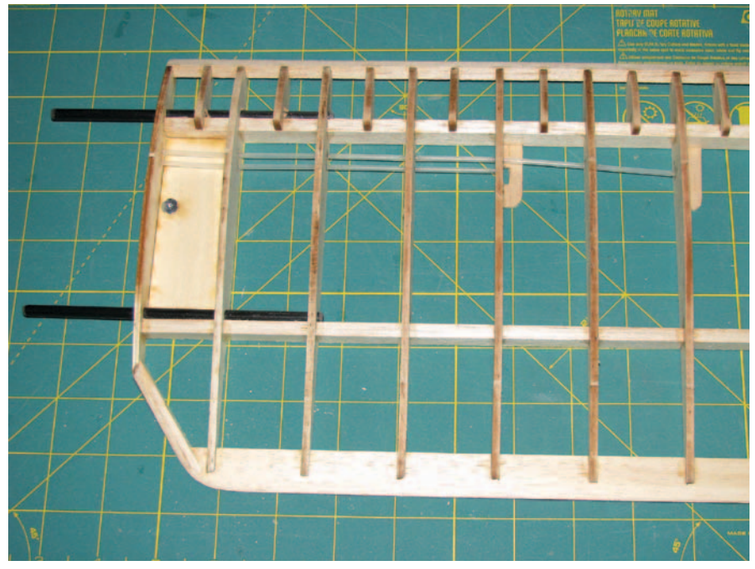
The bulkheads, formers, and stringers added. The plans also show an alternate bulkhead to go between the cockpits for the Hawker Hart version.



1/16-inch sheeting around the cockpit area, showing the ring-mount detail.



The Lewis machine gun built up from aluminum tubing and balsa.

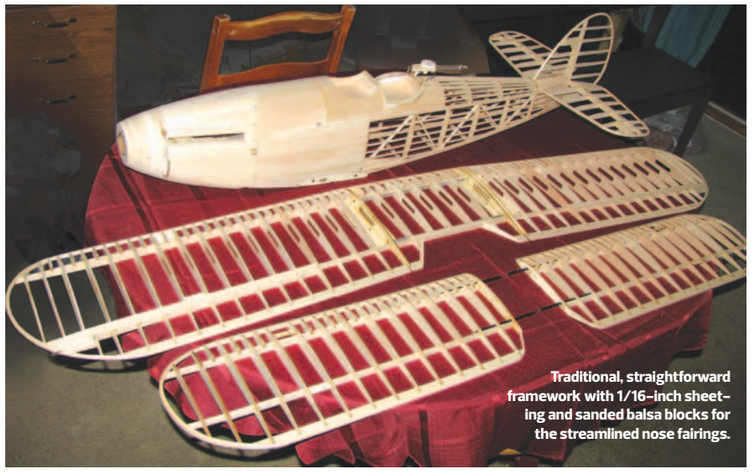


The nylon tubes for bomb release added along with carbon-fiber wing-mounting rods. The blind nut is for the 4-40 screw that will secure the plug-in bottom-wing panel to the fuselage.

Note that the plans call for balsa wing spars. Flying wires are functional to support the wings under flight loads. You can use spruce spars if you plan on doing high G-force aerobatics or are upgrading to a four-cell battery, but I would still recommend flying wires. This airplane was designed to fly scalelike, so the weight was kept to a minimum.

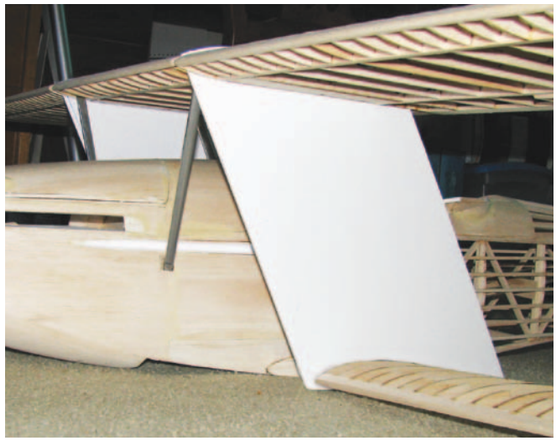
Align the top wing. Cut holes in the plan at the aluminum-tube locations, and trace them onto 1/4-inch foam-core. Create the wing saddles that will be used to transport the model with the wings unattached. These are also used as a jig to set the top-wing incidence. Cut 3/8-inch streamline aluminum cabane struts to length, and flatten and bend the top per plans.

Slide them into channels in the fuselage created by the cabane blocks, but do not glue. Trial-fit the top-wing center section onto the cabanes. Slide the carbon-fiber wing tubes of the bottom wing through the foam-core wing jig and into the fuselage. Do not push them all the way in; leave them about 1 1/2 inches away from the fuselage, with the jig against the bottom wing root. Push the top wing through the jig and into the center section. Push the top wing all the way in. Check that the top wing is straight with the bottom wing when viewed from above. This dry run will ensure a straight, properly aligned top wing during final assembly.



Traditional, straightforward framework with 1/16-inch sheeting and sanded balsa blocks for the streamlined nose fairings.

The landing gear is of the conventional soldered-music-wire type, with balsa fairings added. The dummy radiator and cooling fins are built up from scrap balsa and a bit of screen material.

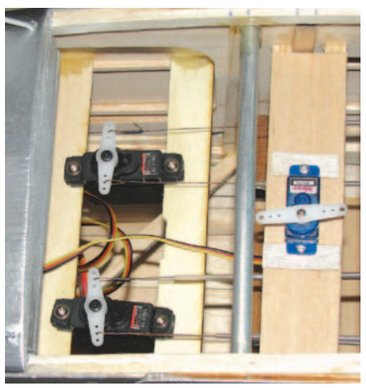


Foam-core wing-alignment jigs double as saddles to keep the plug-in wing bays stable for transport.

COVERING AND FINISHING

The markings on the plans are for the full-scale aircraft in the Shuttleworth Collection. This aircraft is aluminum, doped overall with bare-metal nose fairings. To re-create this look, I sealed and sanded the nose section, and primed and sanded again until I was satisfied with the finish. I covered the open frame with aluminum UltraCote.

I masked off this area and painted the nose with Testors silver spray paint. I wanted a contrast between the nose and the rest of the airplane to simulate doped fabric and bare metal, so after applying the markings, I brushed on Liquitex matte varnish over the UltraCote. Make sure, however, to use it sparingly: just a few drops spread out with a foam brush, applying it horizontally for the first coat and vertically for the second. Allow it to dry between coats. Brushstrokes will simulate fabric; practice on scrap material before applying it to the model. Use the same method on the wings. Be sure to install the Y-harness in the center section of the forward wing before covering. You may wish to leave the upper surface of the center section uncovered until after the cabanes have been epoxied in. Use the wing jigs to align the top wing as before, and epoxy the cabanes in place. Once the epoxy is set, remove the jigs and reattach the wings, pushing the bottom wing in all the way. Using the plans as a guide, bend 1/16-inch music wire for the interplane struts. Do not attach diagonals at this time. Trial-fit the interplane struts into the mounting holes in the wings, and adjust accordingly. Once satisfied, bend and fit the diagonals. Secure the diagonals to the interplane struts with thread and a drop of CA. Remove from the wings, and add the balsa fairings. Paint and glue into the wings with epoxy.



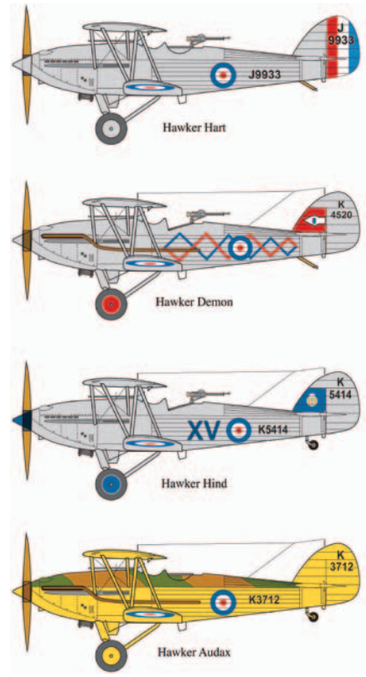
There is ample room for servos between the bottom-wing panels. Access is through a hatch secured with magnets. An extra servo can be added for the optional bomb release.

Add hooks to the wing roots and attach the flying wires. These can be as simple as mono filament tied in place or as elaborate as braided cables with turnbuckles, but they must be secure as they are functional in supporting the wings. The full-scale aircraft has a lift wire from the forward leg of the landing gear to the upper interplane strut. For ease of assembly at the field, this can be relocated to the bottom wing root. This way, all the flying wires remain attached when the wings are removed. Glue on the tail feathers, install the servos and the receiver, and add pull-pull cables or pushrods. We are now ready to go to the field for a test flight.

WIKI COMMONS

A Hawker History Lesson

The Hawker Hart and its derivatives were quite possibly the greatest warplanes to serve with the Royal Air Force (RAF) between the two world wars. When it first appeared in 1928, the Hart simply outperformed everything in its class. After the liquidation of the Sopwith company, Tom Sopwith together with Harry Hawker and a few others joined to form H. G. Hawker Engineering, the firm that produced this classic line of light bombers. Sydney Camm, the chief engineer at Hawker, designed some of the most aesthetically pleasing high-performance biplanes in aviation history. Although produced in peacetime, this series of light bombers would go on to serve throughout the British Empire, including India and the Middle East, into World War II. But alas, the 1930s were a bittersweet time in aviation history for us biplane lovers. These magnificent airplanes had reached the pinnacle of their type only to be considered obsolete a few years later. Imagine this test bed for the immortal Rolls-Royce Merlin engine without its top wing and you can begin to see its most famous offspring: the Hawker Hurricane.



Here are some of the Hawker variants based on the same airframe design.

The Hawker Hind making a low pass to drop its payload of balsa-wood bombs.

The maiden flight showed that the E-flite Power 32 brushless motor on three cells gave a nice scalelike performance. (For those of you who want something feistier, a four-cell LiPo would do the trick, although you might want to use spruce wing spars and beef things up a bit. I like to build light and fly slow.) Takeoff was uneventful: I had liftoff after about 60 feet at 3/4 throttle, and it climbed out smoothly. I needed to add a bit of right trim to both the rudder and aileron; a bit of right thrust should fix that.

No elevator trim was necessary. The plane cruised comfortably at less than 3/4 throttle. As expected with its light wing loading, the plane will balloon when turning into the wind, and a little extra throttle was needed when turning downwind. The landing was pretty; crosswind was not a problem. I made a tail-up wheel landing with no bounce, and there was no tendency to nose over. Overall, I was very pleased. It is a lightly loaded biplane with a lot of drag, so you need to maintain some power when landing. I also recommend coordinated rudder/aileron turns. Enjoy, and happy landings.