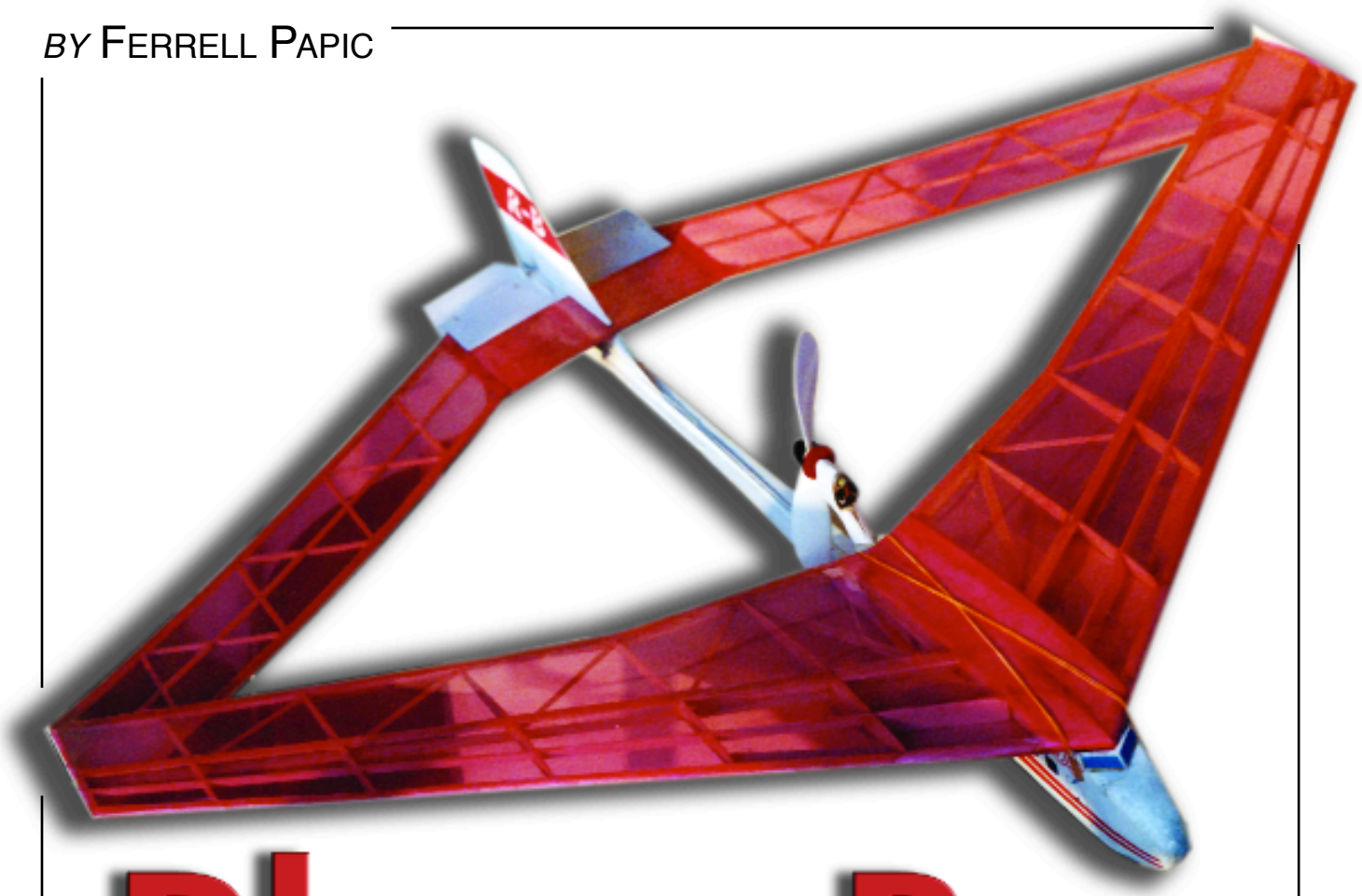
BY FERRELL PAPIC



Rhom-Bus

THE EDWARDS Rhomboidal biplane was built in Great Britain in 1911. In the 1920s Norman Hall-Warren designed a rhomboidal wing for his home-built airplane. He found that the joined wing was resistant to stalling in flight.

My Rhom-Bus test flights did display a stall-resistant characteristic. Especially when flying into a light headwind, with nearly full up-elevator and low throttle, the model comes down like a parasail. Another of the wing design's positive characteristics is the nonexistence of wing warping because of the joined wingtips.

Owing to the design's strut-bracing feature, wings can take a much greater "G" load before wing failure occurs. I have built and flown several gas-powered FF joined-wing models with varying degrees of incidence angle between the front and rear wing. The models with less incidence flew fast and straight, and the models with more incidence exhibited the parasail characteristics.

Having done that I often thought an interesting experiment would be to install a servo-controlled incidence angle to achieve the desired flight characteristics when flying cross-country or landing.

Another experiment I would like to try someday is to install an electric speed control with a motor reverse. Since the CG is near the center of the model, a forward and reverse turn might be possible by manipulating the elevator and rudder.

Photos by the author

The Rhom-Bus's distinctive joined-wing planform contributes to its stall-resistant characteristics. It looks neat too!

CONSTRUCTION

Stabilizers, Rudder, Elevator: Patterns

A unique biplane with power options for the FF or RC modeler

of the stabilizer parts are provided on the drawing plans.

Assemble the 1/16 balsa horizontal stabilizer on the vertical stabilizer with a square and corner braces. Install the 1/32 balsa wing guides on the underside of the horizontal stabilizer.

Install the 1/32 plywood control horns on the rudder and elevator. Attach the rudder and elevator to the stabilizers with figure-8 thread hinges.

Fuselage: Patterns of the fuselage parts are provided on the drawing plans.

Assemble the 1/16 balsa bulkheads. Cut the 1/8 balsa fuselage base. Mount the 3/32 balsa base brace. Match-drill the holes in the fuselage sides for the 1/16-inch aluminum wing-mounting tubes.

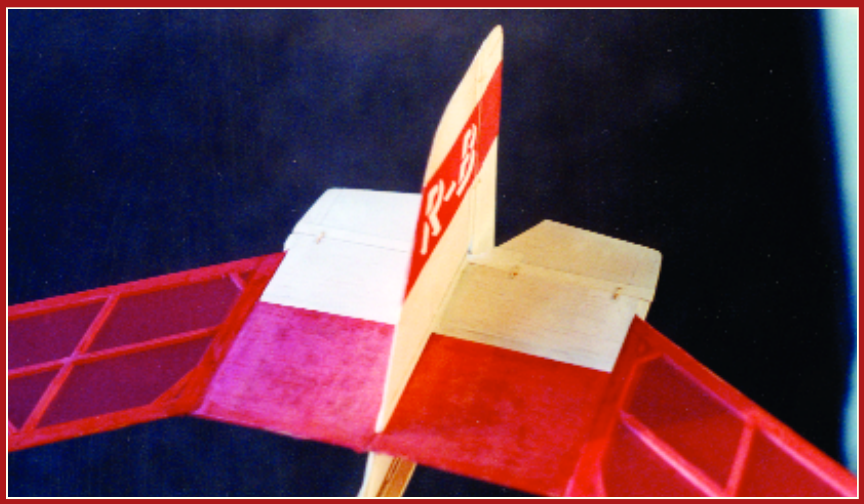
Since the Rhom-Bus's CG is near the middle of the airplane, a GWS 40 or 50 electric ducted fan can be installed in place of the propeller drive. The recommended ducted-fan motor batteries can range from 550 mAh to 1200 mAh 7.4-volt Li-Polys.

Install and drill doublers inside the fuselage at the tube mounting holes. Assemble the fuselage, 1/16 balsa windshield, stabilizer assembly, motor-mount base, and motor mount. Shape the motor-mount doublers with sandpaper glued to a wood dowel.

Rough out the foam nose block and glue it in place with yellow carpenter's glue. After the glue dries, final-shape the nose block with a sanding block. Install the 1/16-inch-diameter wing-mounting aluminum tubes after painting and installing decorations.

Power-option 1 consists of a Roadkill N20 6-volt geared motor with a 5.2 Gunther propeller.

The second choice for power is to install a GWS 40 ducted-fan unit. The wide CG range allows this option.



The elevator is small in area, but it is plenty for proper control response because of the CG placement.

Wing: The wing-rib pattern is shown with spars and LEs and TEs for reference.

The front wings are joined with 1.2 inches of dihedral on each wingtip. The rear wings are joined with 2.16 inches of dihedral on each wingtip. Those amounts are required when flying in an enclosed gymnasium space.

The rear wing joiner requires 1/32 balsa guides attached to the center top and bottom so it aligns properly in the vertical-stabilizer slot.

Cover the front wing center-section with heavy paper adhered with a light application of yellow carpenter's glue. I covered my wings with red Reynolds Plastic Wrap using water-thinned RC/56 canopy cement on the wing edges and centers. This material will heat shrink but can be damaged by excessive heat.

It is best to join the front and rear wings after the fuselage is complete. Slide the rear wing into the vertical-stabilizer slot and then install the front wing with wing-mounting rubber bands.

Cut some 90° 2.99-inch high-gauge blocks and align the wingtips so they are parallel to each other. Then it is safe to join the front wingtips to the rear wingtips. To give the wings a finishing touch, add the 1/32 balsa wingtip plates to the wingtips.

Finishing: I sprayed a light coat of white latex model paint on the fuselage and stabilizers.

I decorated the fuselage sides and vertical stabilizer with computer ink-jet art on bond paper, which I adhered with a light application of yellow carpenter's glue. Contact me by E-mail if you would like a copy of the digital Windows Metafile artwork.

Radio Installation: I use the reliable GWS 5-gram, four-channel GWR-4P FM receiver; 5-gram GWS Pico servos; and a GWS 2-amp speed control in my Rhom-Bus. For control cables I use .043-inch-diameter plastic tube and #6 .015-inch-diameter single-strand, stainless-steel fishing leader wire with Z-bend connections to servos and control horns.

I like to use two-pin Deans gold-plated connectors on my battery-pack and radio-gear connections. I charge my conventional 8.4-volt, 150 mAh NiMH batteries with a Hobby People Watt-Age pulse battery charger.

To prevent battery damage I must charge my 7.2-volt, 250 mAh Li-Poly batteries with a dedicated voltage-cutoff battery charger, such as a Poteski unit from my local hobby dealer or Hobby Club.

Adjust the battery and radio-gear location in the fuselage so that the correct CG indicated on the construction plans is achieved. Visually check the underside of the wing center at arm length for correct left and right symmetry. Then check all the servos for reversed controls.

Flying: Launch the model with your left hand so your right thumb is on the transmitter control stick from the beginning of the flight. Make transmitter-stick trim adjustments until the model flies straight and level with hands-off control.

Outdoor flying is best done in no wind or moderate wind conditions. Indoor flying is great anytime. ***MA***

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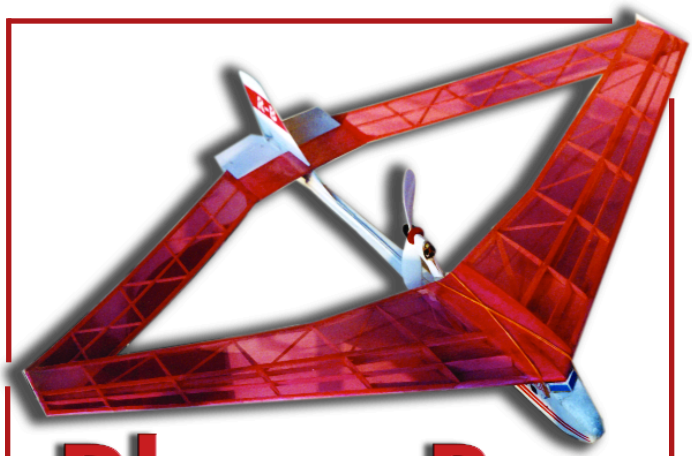
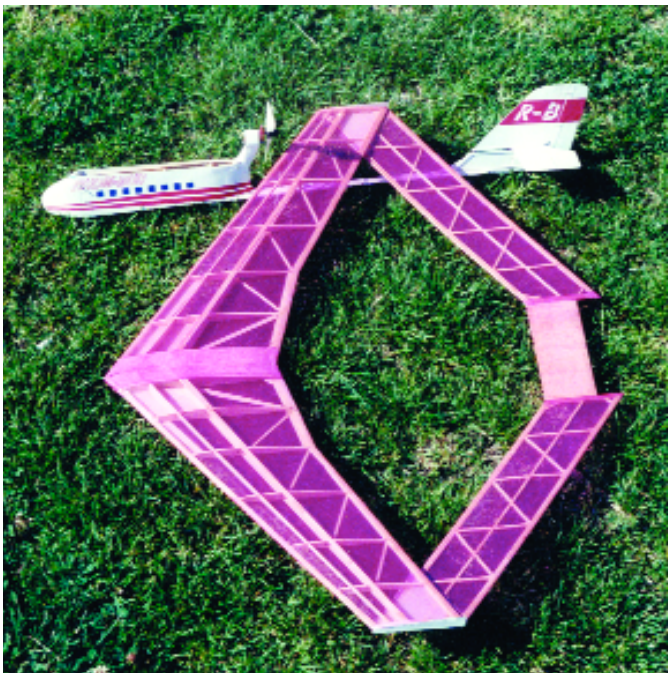
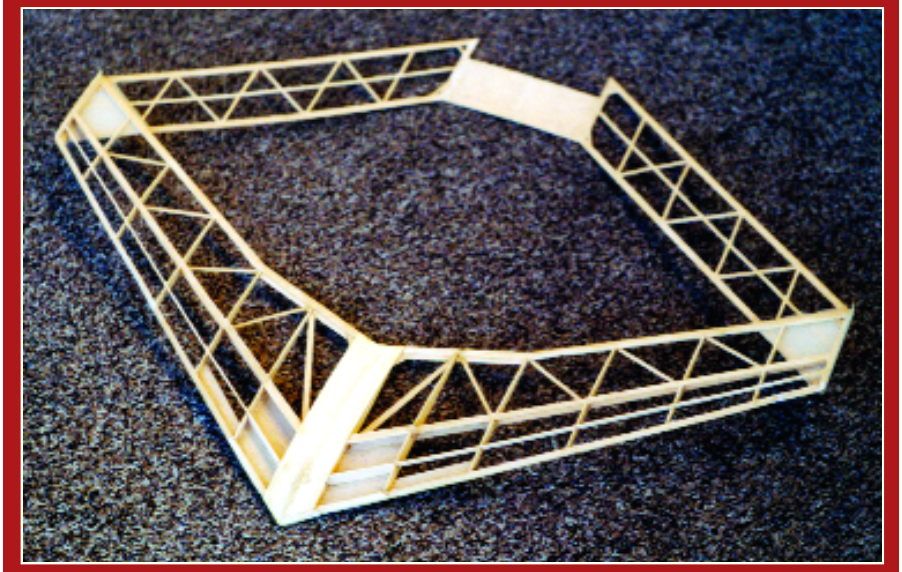


Rhom-Bus

Type: RC park flyer
Wingspan: 28 inches
Wing area: 127 square inches
Wing loading: .55 ounce/square foot
Length: 25 inches
Power option 1: Roadkill N20 6-volt geared motor with 5.2 Gunther propeller
Power option 2: GWS 40 ducted fan
Motor current: 850 mA for N20; 3 amps for fan
Motor voltage: 8
Motor power: 1-3 ounces of thrust
rpm: 4,200 for N20; 22,000 for fan
Watts/ounce: 6.8 for N20; 24 for fan
Battery: Seven-cell, 150 mAh NiMH or two-cell Li-Poly for fan
Radio system: Three channels minimum with GWS 5-gram receiver and 5-gram servos
Flying weight: 7 ounces
Flight duration: Five minutes
Construction: Sheet and strip balsa
Covering/finish: Plastic wrap, RC/56, ink-jet artwork



The wing and fuselage separate for transportation. This design uses ample FF technology!



The wing construction utilizes geodetic bracing for torsional rigidity. It builds into an extraordinarily light and strong unit.

Notice the shear webbing between the ribs in the center-section. This adds considerable strength with a small weight penalty.

The fuselage is built in the same manner as that of a competition FF model, with sheet sides and cross-grain sheeting on the top and bottom. The nose block is made from foam.

Full-Size Plans Available—See Page 175