A sophisticated and impressive FAC Scale model

Extra EA-500

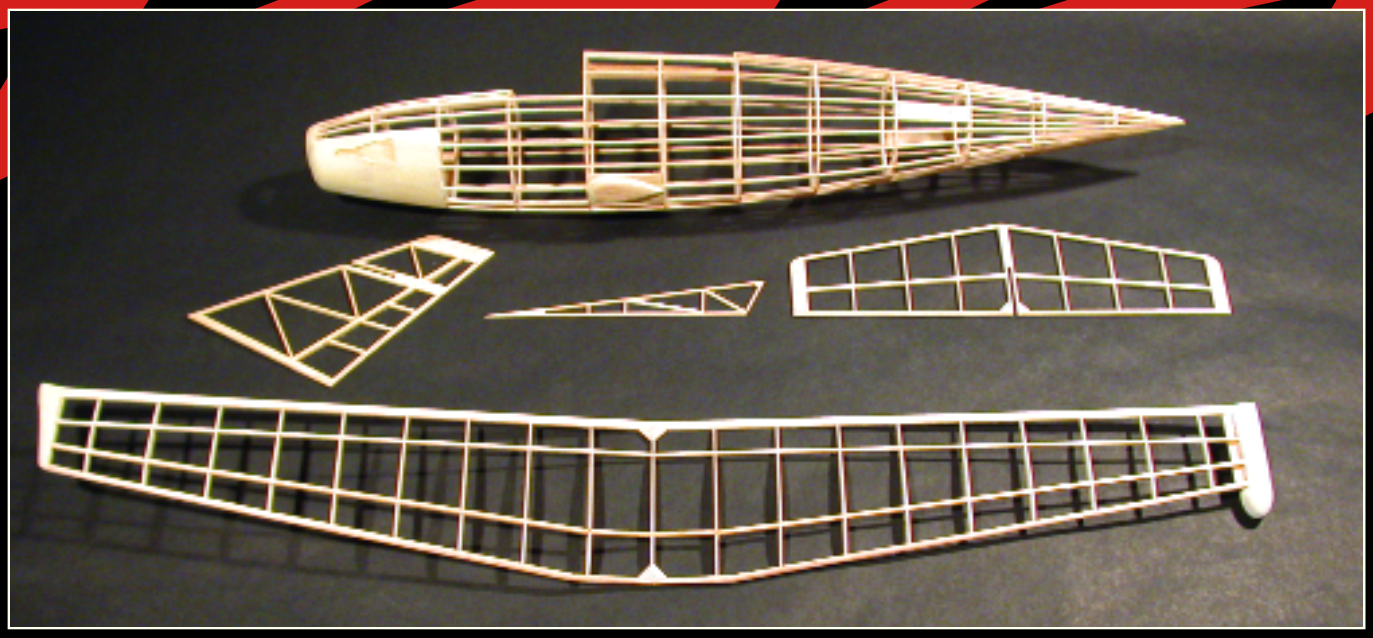
by Mark Fineman

The Extra takes off in a fast, left-hand turn and quickly climbs out. This is followed by a gentle right-turning glide.

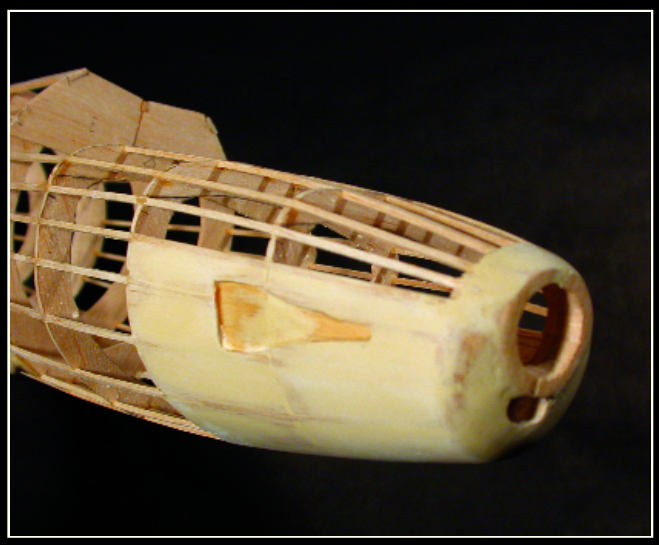
THE EXTRA EA-500 is an aircraft that begs to be modeled. This high-wing cabin monoplane is so sleek and so beautiful that it makes the usual strut-braced types look clumsy by comparison.

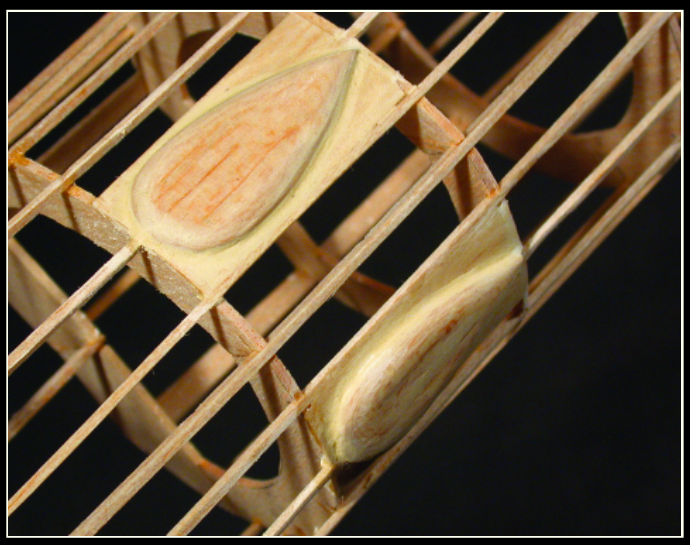
Walter Extra, the inventive designer of many successful aerobatic airplanes, created the eye-catching, high-tech EA-500 for the well-heeled end of the general-aviation market. A Rolls-Royce turboprop engine, with the performance one would expect from such a thoroughbred, powers the luxurious pressurized aircraft.

The rubber-powered model of the EA-500 has the same general proportions as a P-30 competition model: a 30-inch wingspan and a 9 1/2-inch, commercial plastic propeller, although a hand-carved propeller is also being contemplated.



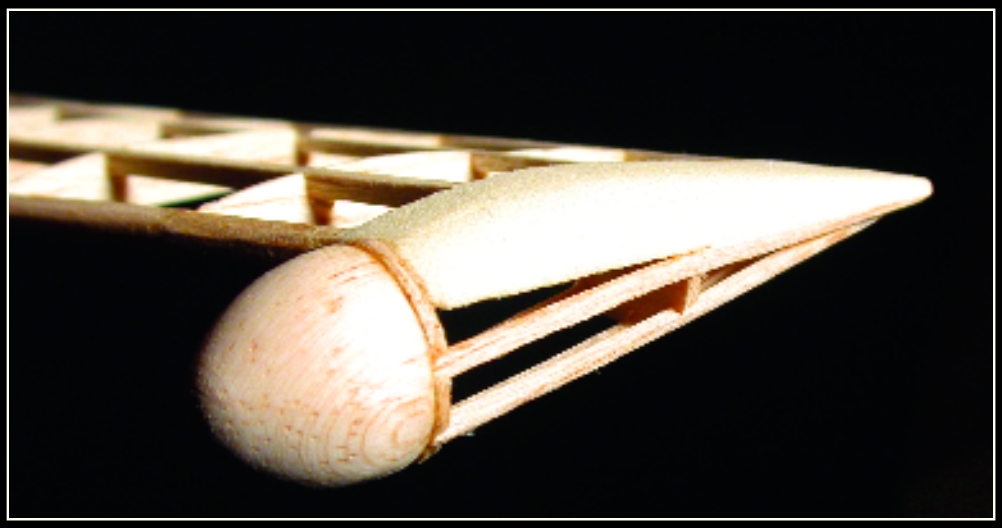
Unlike traditional solvent-based glues, cyanoacrylate will not shrink and thereby alter the dihedral angle. Small triangular gussets can be added at the LE and TE joints for extra strength.

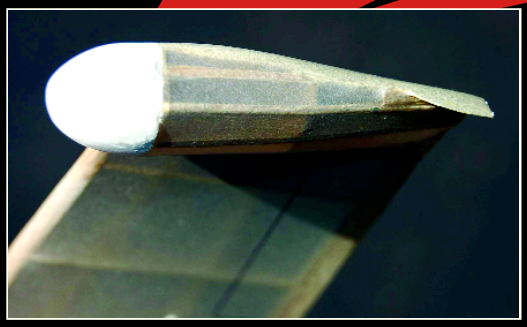




The nose and landing-gear locations are filled between the stringers with 1/16 sheet balsa, from Former A to Former C, below the main side stringer. The sheeted nose will add weight where it is most needed and provide a smooth surface for adding structural details.

Right: The radar pod on the left wingtip must be kept as light as possible. A small, circular former is glued into the notched end of the LE, and then a thin-foam or light-balsa wingtip is attached, followed by some stringers below it.



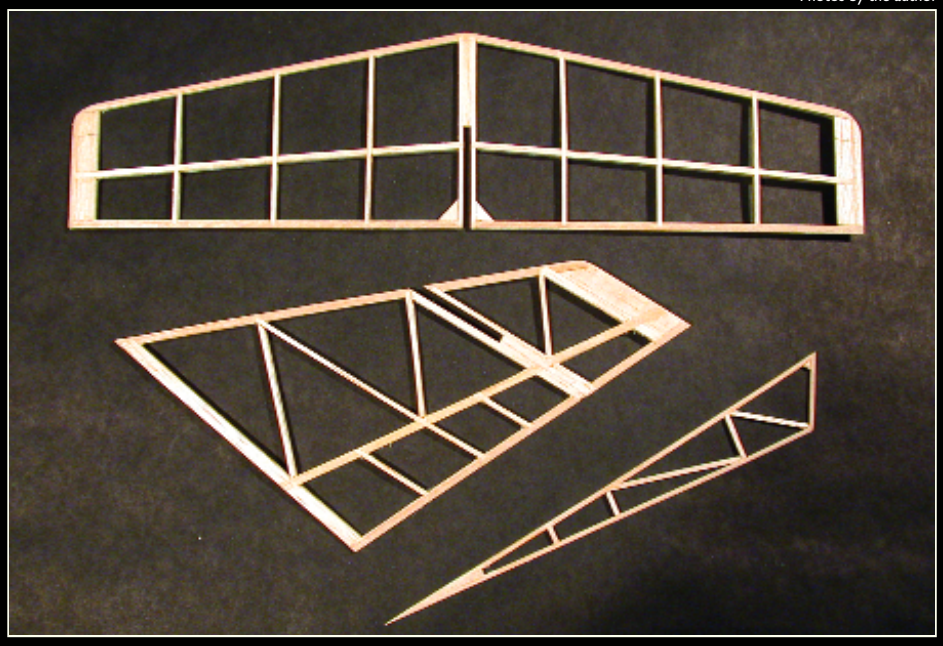


The radar dome is a turned piece of balsa (it could also be carved), hollowed out and glued to the former. A counterweight is required in the opposite wingtip.

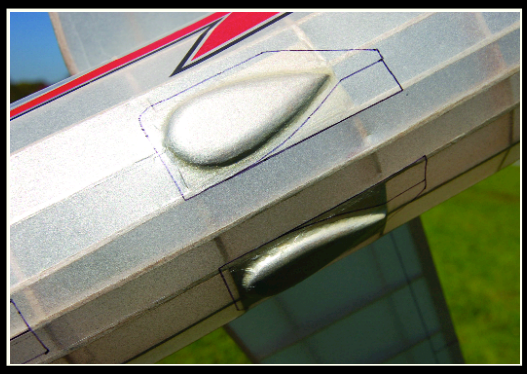
The Extra Aircraft Web site shows several color schemes. The author's model is finished in the first prototype scheme: aluminum base color with a distinctive red-and-black side stripe.

Photos by the author

The airfoil is a Rhode-Saint-Genese 30, which curves upward slightly on the bottom surface as it approaches the LE.



The tail surfaces are constructed from 1/16 sheet balsa. The fin and rudder must be strong to support the stabilizer.



The fuselage, wing, and tail surfaces were covered with white Japanese tissue followed by a light coat of aluminum dope—a mixture of clear dope and aluminum powder—sprayed, with an old-fashioned artist's atomizer.

Control-surface and landing-gear-door outlines were carefully drawn with a fine-tipped black Sharpie marker. The side windows are black tissue.

Extra EA-500

Type: FF Scale

Skill level: Intermediate

Wingspan: 30 inches

Wing area: 101.25 inches

Length: 27.75 inches

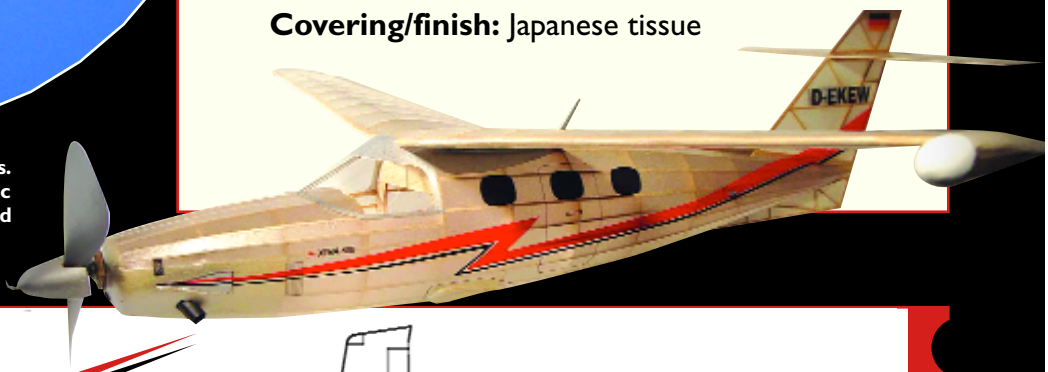
Weight: 1.8 ounces (without motor)

Motor: Two 26-inch rubber loops—one 1/8 inch and one 3/16 inch

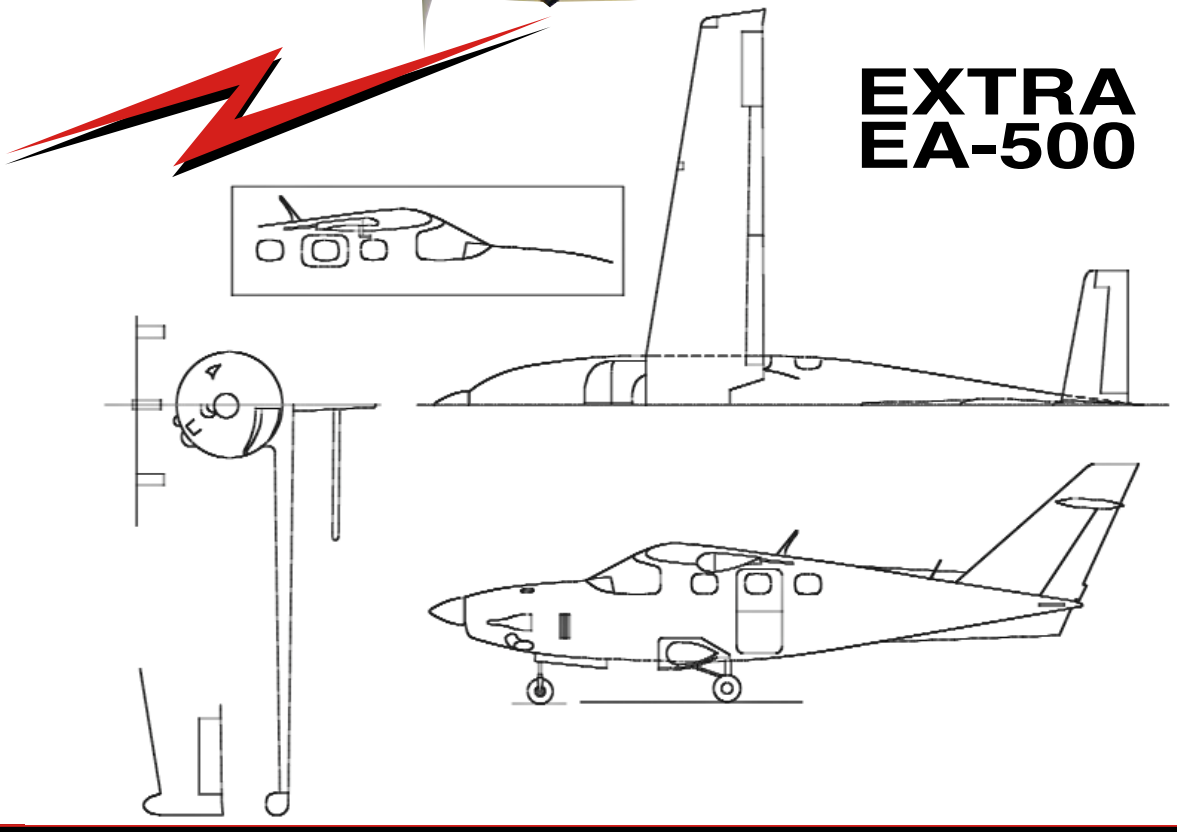
Propeller: 9 1/2 inches

Construction: Balsa sheet and stringers

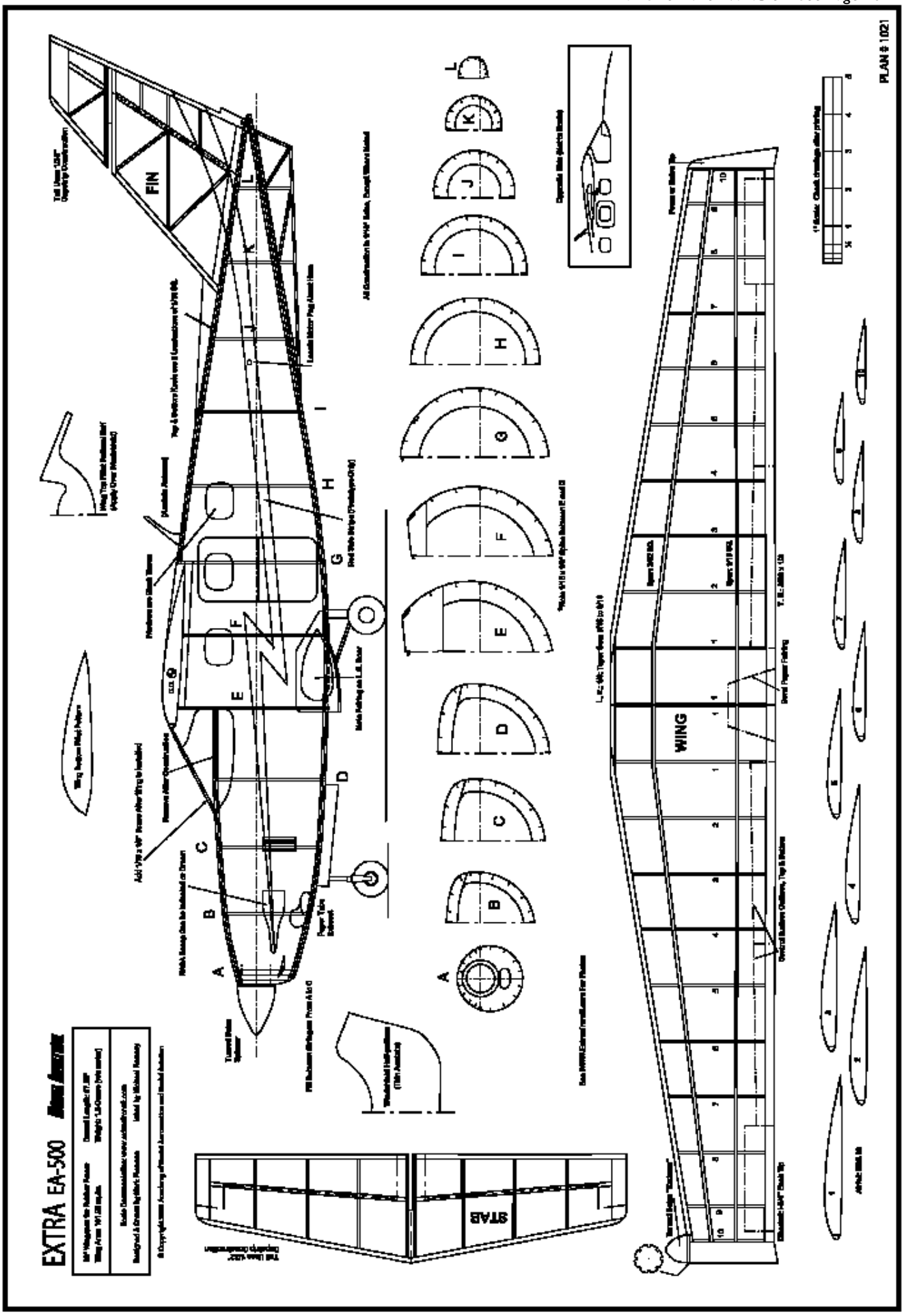
Covering/finish: Japanese tissue



The best time thus far has been 75 seconds. The 9 1/2-inch Peck-Polymers plastic propeller is satisfactory, but a hand-carved balsa propeller may be better.



Full-Size Plans Available—See Page 191



The EA-500's construction is quite conventional, with a few minor exceptions. The wing is built up from sheet-balsa ribs, and the fuselage uses the half-shell method of construction, which is probably familiar to most builders. A photograph of the framework is included for guidance.

The model is intended for Flying Aces Club (FAC) Scale and modern civil scale competitions. Because FAC rules permit retractable landing gear to be portrayed in the "up" position, that was how the model was made. The plans also show the landing gear extended.

CONSTRUCTION

Fuselage: Lay out the top and bottom keels. Each consists of two 1/16 square stringers, soaked for a few minutes in very hot—preferably boiling—water and then joined with 50-50 diluted white glue that is applied with a brush. The presoaking in hot water allows the stringers to bend to the fuselage's curved outlines.

Notice that the front top keel temporarily extends between formers D and E. That portion will be cut away after all the formers and stringers are in place. Allow the top and bottom keels to dry.

Cut all the former halves from 1/16 sheet balsa. Former halves in the cockpit and nose area are built in two pieces for added strength. These are built directly over the plans.

Starting at the rear of the fuselage, glue each former half into position. Use a small metal triangle or other right-angle tool to repeatedly check to ensure that the former halves are at right angles to the building board. Some modelers prefer more elaborate building fixtures, but a right-angle tool and some patience work well too.

When all the former halves have dried, glue in the main 1/16 square side stringer. Notches are shown on the formers where the main side stringer is located. Check repeatedly to make sure the formers are square.

Starting at the front of the fuselage, lay in the stringers from nose to tail, working out from the main side stringer. Small lines on the formers designate the location of the stringers. A 1/16-inch strip of sandpaper glued to a 1/16 x 1/4-inch length of hard balsa or basswood can be used as a notching tool. Sight down a stringer to make certain it isn't wavy, and attach it in place.

When all the stringers on the fuselage half are dry, carefully remove the structure from the building board. Add the corresponding former halves for the remaining side, working from back to front and checking alignment. Then, as before, add the stringers.

The nose and landing-gear locations are filled between the stringers with 1/16 sheet balsa, from Former A to Former C, below the main side stringer. The sheeted nose will add weight where it is most needed and will provide a smooth surface for adding structural details, which include the NASA-style inlets.

The inlets could be drawn onto the covered fuselage, but more convincing inset inlets can be created with a little additional effort. Use a card template of the inlet shape, tack-glue it in place, and carefully cut around the pattern with a sharp hobby knife.

Glue slightly larger pieces of 1/32 sheet behind the opening. Last, fill in the grain with fillerlike spackle or a mixture of dope and talcum powder, and sand smooth. Repeat for the other inlet.

Sheet fill between the lower areas between formers E and F is necessary to hold the bulged landing-gear doors, which are carved 3/32 sheet-balsa shapes. This is also a good time to fill in the bays where the motor peg is located.

All the sheeted areas should be sanded smooth, filled where needed, and given two coats of sanding sealer. Sand with extra-fine-grit sandpaper between coats.

Flying Surfaces: The wing is straightforward, with the possible exception of the wingtip radar pod. For each wing half, lay down an LE and TE and then glue in the wing ribs.

The airfoil is a Rhode-Saint-Genese 30, which has a slightly upward curve on the bottom surface as it approaches the LE. You can omit this curve (by cutting the bottom of each rib flat). Raise each wing half 1 3/4 inches, and carefully sand in the

dihedral angle for the LE, TE, and wing spars.

When both wing panels join smoothly, align them and glue them together with drops of cyanoacrylate at the joints. Unlike traditional solvent-based adhesives, cyanoacrylate will not shrink, thereby altering the dihedral angle. You can add small triangular gussets at the LE and TE joints for extra strength.

The radar pod on the left wingtip must be kept as light as possible. A small circular former is glued into the notched end of the LE. Then a thin-foam or light-balsa wingtip is attached, followed by some stringers below it. The radar dome is a turned piece of balsa (it could also be carved), hollowed out and glued to the former. All this will eventually be covered with tissue.

The tail surfaces are constructed from 1/16 sheet balsa. Notice the diagonal braces built into the vertical tail structure. The fin and rudder must be strong to support the stabilizer.

When the tail construction is completed, add 1/32 sheet capstrips to the spars, crossmembers, and diagonals. These will be carefully sanded to a symmetrical cross-section. Capstrip construction is incredibly strong with little weight penalty.

Covering and Finishing: You can find several color schemes on the Extra Aircraft Web site. (See the source list for the address.) My model is finished in the first prototype scheme: aluminum base color with a distinctive red-and-black side stripe.

The registration number, D-EKEW, is in black lettering on the fin and in red lettering under the left wing. Check photos for the location of the Extra logo, German flag, and Rolls-Royce logos. The Web site also has a helpful video.

I covered the fuselage, wing, and tail surfaces with white Japanese tissue, which was shrunk with a light spray of rubbing alcohol and then clear doped. I followed that with a light coat of aluminum dope: a mixture of clear dope and aluminum powder sprayed with an old-fashioned artist's atomizer.

I carefully drew the control-surface and landing-gear-door outlines with a fine-tipped black Sharpie marker. The side windows are black tissue. I didn't use framed windows, because they might have weakened the fuselage structure. The tissue "windows" are surprisingly convincing.

I fashioned the fillets around the fuselage/wing juncture from bond paper; the windshield is thin acetate. You should select (or paint) the bond paper to match the overall base color. Attach the clear windshield and then the bond-paper trim pieces.

When assembling the basic structures, pay particular attention to the joint where the vertical tail meets the fuselage. A good, strong glue joint is necessary here, because the tail is subject to vibration during winding and flying.

Flying: The 9 1/2-inch Peck-Polymers plastic propeller is satisfactory, but a hand-carved balsa propeller may be better.

Power to the 1.8-ounce (empty weight) model is currently supplied by two loops of FAI Tan Super Sport rubber from FAI Model supply, each of which is 26 inches long. One loop is 3/16 inch wide, and the other is 1/8 inch wide.

The rear peg holding the rubber is a 1/16-inch-diameter carbon-fiber rod. Although it works well, I added small fuel-tubing "keepers" on the ends of the rod to prevent it from slipping.

The Extra required no additional ballast, fore or aft, so the strategy of filling the nose area worked. However, a tiny amount of clay was needed on the right wingtip to compensate for the additional weight of the radar pod on the opposite tip. I added a 3/32-inch downthrust shim behind the nose block.

The model takes off in a fast left-hand turn and quickly climbs out. This is followed by a gentle right-turning glide. The best time thus far has been 75 seconds, but additional testing should increase the duration.

The EA-500 is certainly a thing of beauty on the ground *and* in the air. MA

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Sources:

Extra Aircraft
(615) 564-1210
www.extraaircraft.com

FAI Model Supply
(570) 882-9873
www.faimodelsupply.com