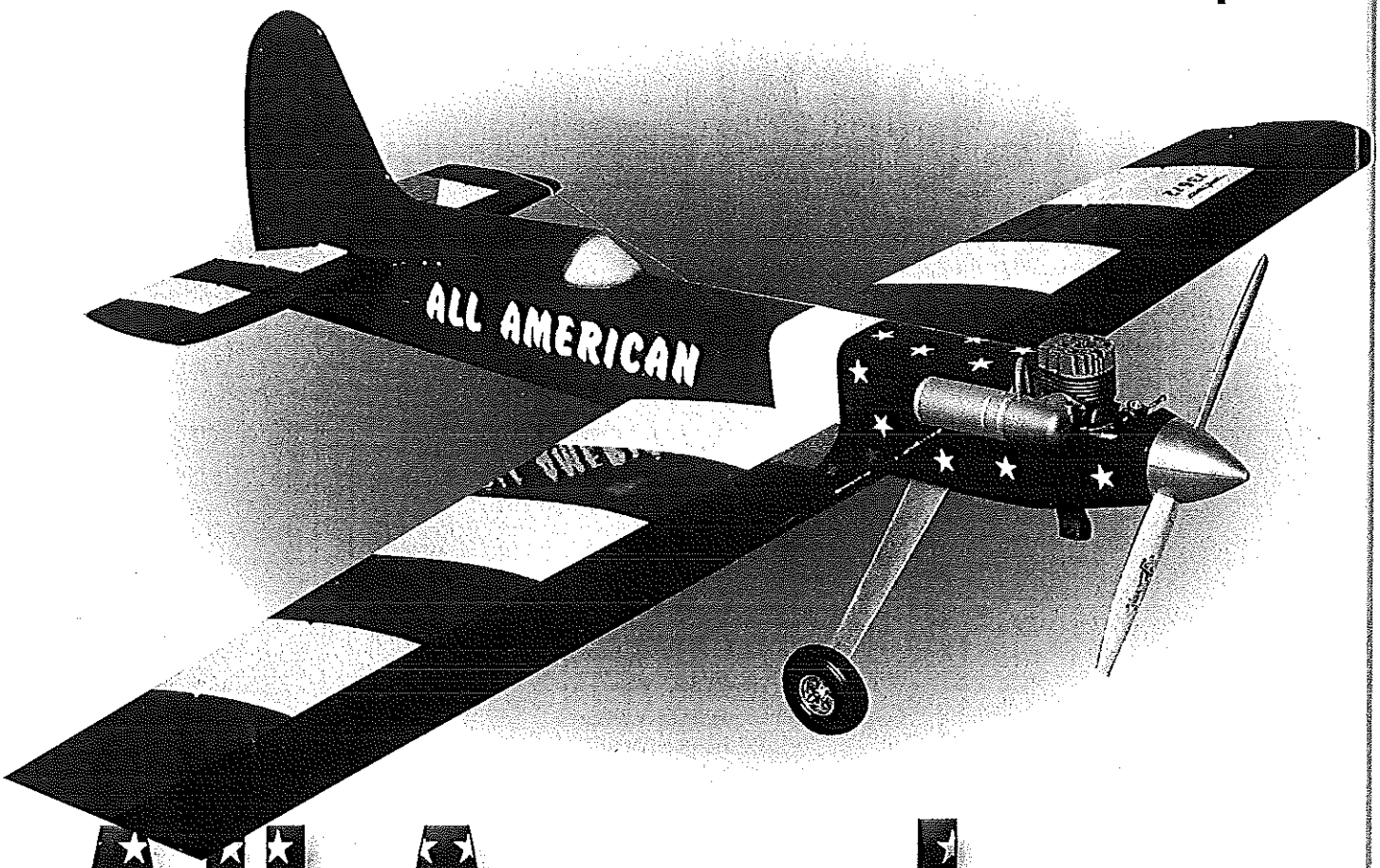
■ Dick Sarpolus



All American

A patriotic remake of Hal deBolt's famous CL Stunt design for RC

I LIKE TRYING new engines, and that's what got me into this new project. I bought a SuperTigre S-3000 awhile ago and had never used it. It was by far the largest glow engine I ever had, and I wanted to see what it was like to run this large glow fuel burner.

Most of my recent projects have been quarter-scale aircraft with large fuselages, large canopies, large fiberglass cowls, and large gasoline/ignition engines.

I wanted to go back to a simpler model-airplane concept, and for this design idea I went back to the 1950s, to Hal deBolt's All American series of Control Line (CL) Stunt models.

Most readers probably won't have any idea of how the deBolt All American Senior looked, but I sure remember it, and I tried to style this Radio Control (RC) model like Hal's original.

I enjoyed laying out this project as a pure "model airplane" design; I didn't want a Scale Aerobatics Extra, CAP, or Staudacher, a Mustang, Corsair, or anything else Scale. This airplane isn't intended for competition—not IMAC (International Miniature Aerobatic Club), not Pattern, and not fun-fly.

The All American is large enough for IMAA (International Miniature Aircraft Association) events, and its appearance takes me back to the 1950s modeling days.

It's fully aerobatic with the symmetrical airfoil, short moments, large control surfaces, and good power-to-weight ratio, along with plenty of wing area.

It's sort of like my friend Leon Shulman's approach when he did his RC Secret Weapon in 1993, based on his original Secret Weapon design for CL in 1947. Bringing back a vintage model identity with modern performance capability—it works for me.

This All American has an 82-inch wingspan with an area of approximately 1,100 square inches. It's roughly 56 inches long and weighs 12¼ pounds with the SuperTigre S-3000, for a 24 ounces/square foot wing loading, making it pretty lively.

Foam-core wings and tail surfaces make for quick and easy building.

The usual balsa and plywood for the minimum cross-section fuselage are incorporated, with a carved canopy area and balsa shaped nose around the engine, along with a sheet-aluminum tail-dragger landing-gear setup.

Standard-size servos used on each aileron and each elevator plus the rudder and throttle servos equal six, so I use a 1,200 mAh battery pack.

This is almost as quick and easy as you can get and still feel like you've actually built an airplane. There's no inverted engine and no fiberglass cowl; the engine sits upright and accessible in the nose—the way we used to make 'em.

To build this airplane, you need to cut or buy the foam wing cores, cut the balsa and plywood parts, and get the standard hardware used on this size of model.

Photos by the author Graphic Design by Carla Kunz

Inspiration from Hal deBolt

Hal deBolt was a leader in this hobby in the 1950s. He designed his own aircraft, flew them in competition, and manufactured kits of his designs.

If you flew Control Line (CL) Speed, you knew Hal's airplanes would be fast because he was flying and setting records with them. If you flew CL Aerobatics, you knew his models would fly well because he was competing and winning with them.

Later, if you flew RC, you knew Hal's airplanes would fly well because he was flying them, competing with them, and winning with them.

In the early 1950s, Hal had Speedwagons for CL Speed and Stuntwagons for CL Aerobatics. With the popularity of CL flying, he introduced a new series of CL designs: his All Americans.

He had the All American Trainer, All American Junior, All American, and All American Senior. Fifty years later, his All American Senior is a popular choice for use in vintage Old-Time Stunt competition.

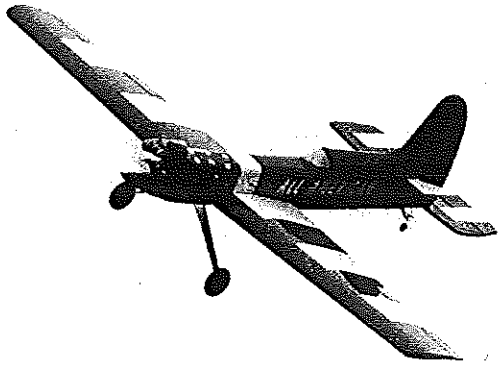
With its red-white-and-blue paint trim scheme, Hal's All American Senior was impressive in appearance and performance.

Although the All American Senior's large wing, extremely short tail moment arm, and small fin/rudder couldn't be copied for today's RC flying needs, I tried to capture the overall styling of Hal's design in an RC sport and aerobatically capable aircraft for flying fun.

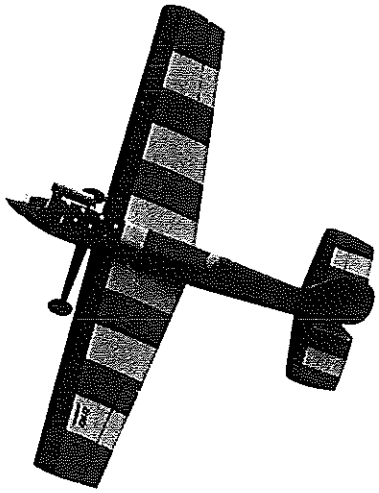
I like the result, and although it's a modern design, I get a kick from its 50-year-old styling.

Thanks, Hal!

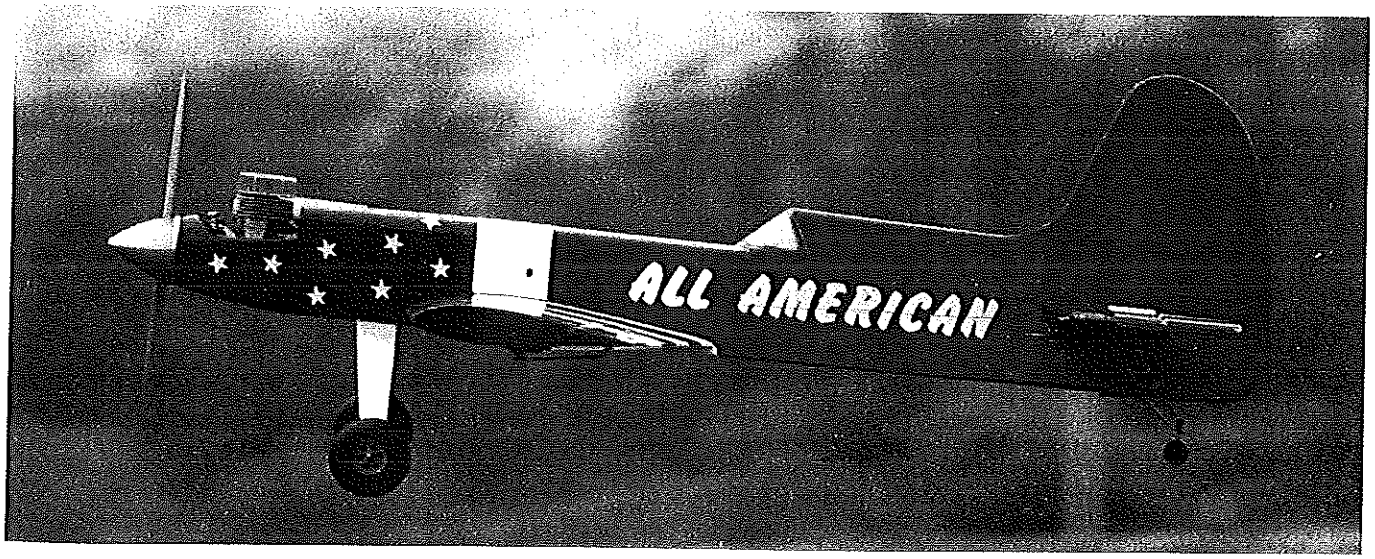
—Dick Sarpolus



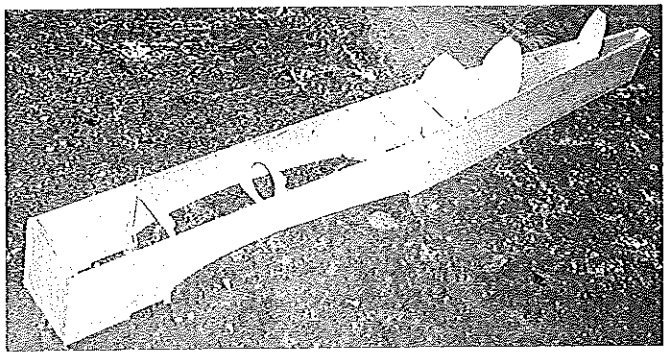
This design has a most distinctive look in the air. It is somewhat suggestive of a 1930s racing airplane. It really performs!



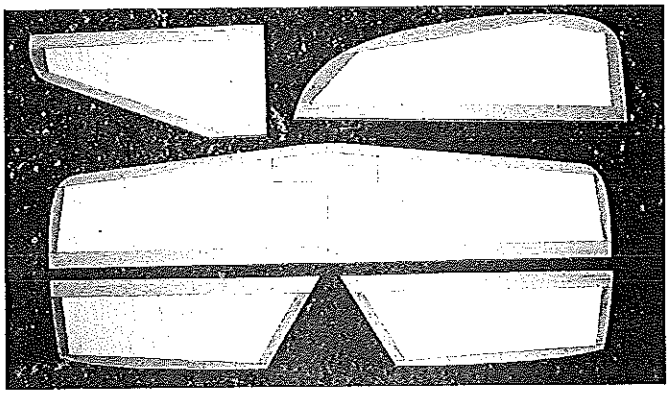
The SuperTigre S-3000 is a large glow engine fitted with a reasonably quiet muffler. Upright mounting is practical.



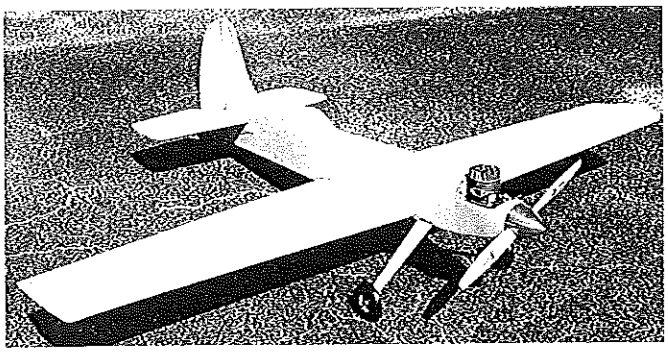
This model is nice and stable on approach! The All American is a great choice for everyday fun-flying duties.



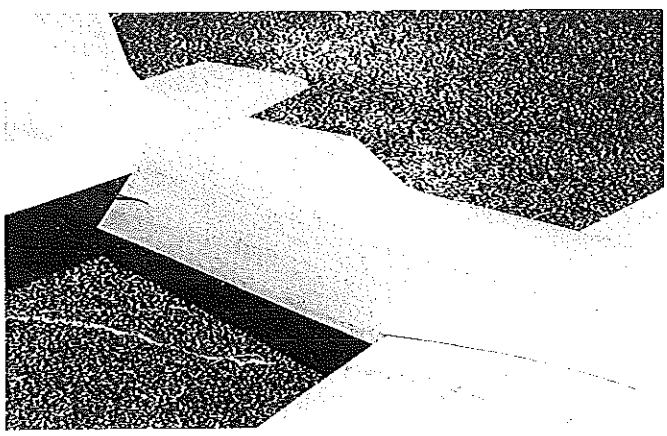
Basic fuselage structure consists of balsa sides, plywood doublers, plywood formers, and balsa formers. It's easy to build!



Tail surfaces are made from 3/8-inch-thick foam with balsa edging, and are then sheeted—easy yet rigid construction.



The finished airframe is very clean-looking. There are no open bays here, so covering with heat-shrink film is a cinch!



The cockpit area features a simulated windshield. You could substitute a clear unit for more realism, but this way is simpler!

The aluminum landing gear I used, sized just for this design, is available from TNT Landing Gear Products, 10530 Airport Hwy., Swanton OH 43558; Tel.: (419) 868-5408; Web site: www.tntlandinggear.com.

The large SuperTigre turned out to be as easy to handle as any smaller glow engine, but I'm much more careful around it, and I use a reinforced leather glove when flipping the propeller.

The Tigre turns an 18 x 10 propeller with real authority and idles reliably, slow enough for easy landings.

The first test flights showed that we had a good airplane—agile and aerobatic yet quite easy to handle. Our club flying field is a little tight for large aircraft, but the All American doesn't need much runway for takeoffs and drops in pretty easily for landings.

If you want a large, pure "model airplane" project for fun-flying, consider this All American.

CONSTRUCTION

Wing: Start with preparation of the foam wing cores.

Foam-core cutting is a basic model-airplane scratch-building technique that requires a reasonable investment in shop equipment and is a procedure that has been covered many times in the model magazines.

The know-how for cutting foam components is probably available in most model-aircraft clubs. If not, custom foam-core cutters will do the job for you.

Robin's View Productions, Box 68, Stockertown PA 18083; Tel.: (610) 746-0106, or Dynamic Balsa & Hobby Supply, Box 107, Leonore IL 61332; Tel.: (815) 856-2272; Web site: www.dbalsa.com, will cut any type of cores you want.

I encourage any modeler to get his or her own equipment and use foam cores where appropriate in scratch-building projects. Patterns for the foam-cutting templates are shown on the plans; I make my templates from 1/8 plywood.

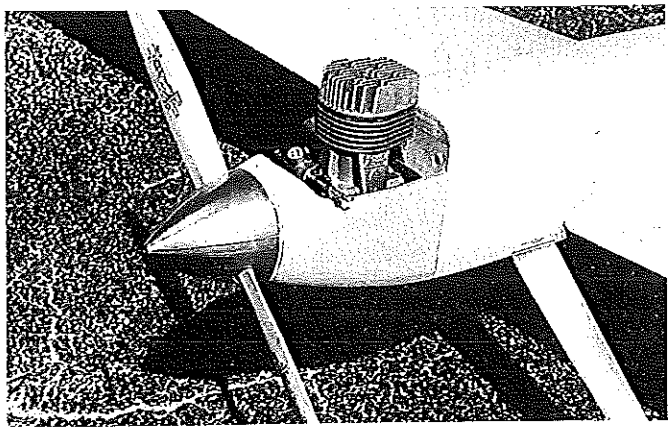
The only work to do on the wing cores before sheeting them is to sand the root ends at a slight angle for the wing dihedral, trim back the root ends at the leading edge to accept the plywood partial rib, which reinforces the wing-mounting tongue, and cut off the outboard tips at the angle shown on the plans.

If the cores are rough, some sanding with fine sandpaper will ensure a better bond with the sheeting. The wing cores are sheeted with 1/32 medium balsa, edge-glued as necessary to achieve the required width.

I prefer aliphatic resin woodworking glues for edge-gluing because that type of glue is easier to sand for a smooth joint. The difficult part of edge-gluing the balsa for sheeting is getting a good fit between the individual sheets; most balsa won't have good, straight edges.

I use a long, sanding straightedge made from a piece of aluminum right-angle stock with sandpaper glued on.

On a badly warped piece of balsa, you can cut a new straight



There is no need for a removable cowl. Balsa blocks around the nose can be faired smoothly into the spinner contour.

edge with a long, steel ruler and a sharp modeling knife, then follow with the edge-sanding.

The separate sheets are bonded with masking tape to make up the width needed. Then flip the wood over, open the taped joints one at a time over the edge of the workbench, and apply the glue to the edges of the wood.

With the sheeting flat on the bench, scrape the excess glue off each joint with a putty knife and weight the wood until the glue dries. Remove the masking tape and use the taped side as the outer surface of the sheeting.

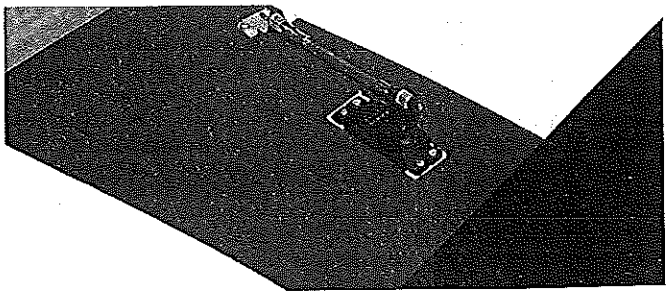
I sand the inside surface of the sheeting with rougher sandpaper to speed up the work and use fine sandpaper to finish the outer surface.

I recommend Dave Brown Products' Southern's Sorghum contact cement to apply the sheeting; I've used it for many years, and it works well. Alternatives are thinly spread epoxy, spray-can cement, double-stick tape, or whatever you prefer—but be sure it works.

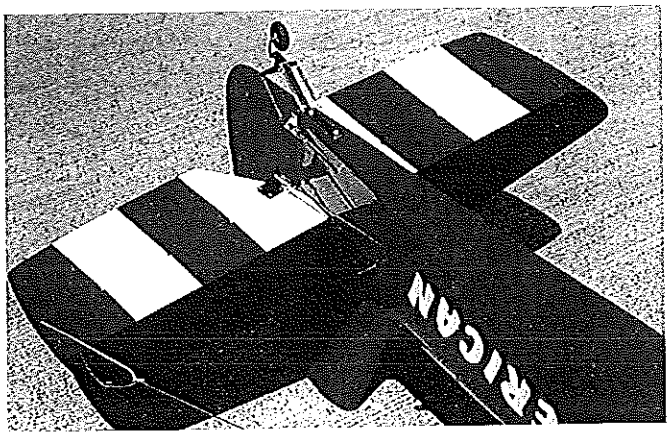
With the cores sheeted top and bottom, trim off the leading-edge overhang and block-sand it square. Add an oversized balsa leading-edge strip. I use five-minute epoxy for most of this work, to speed things along. Plane and sand the leading edge to shape.

Trim the trailing edge close to the foam core and round it off.

On the wingtip, sand the top and bottom sheeting flush with



Mounting separate aileron servos in each wing half is standard practice. The result: easy access and short, straight linkages.



Leaf-spring tail-wheel assembly is linked to rudder for steering. There are separate servos, linkages to each elevator.

All American

Type: RC sport

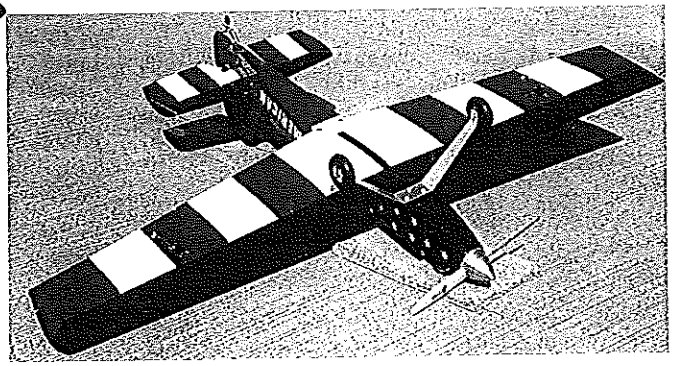
Wingspan: 82 inches

Engine: SuperTigre S-3000

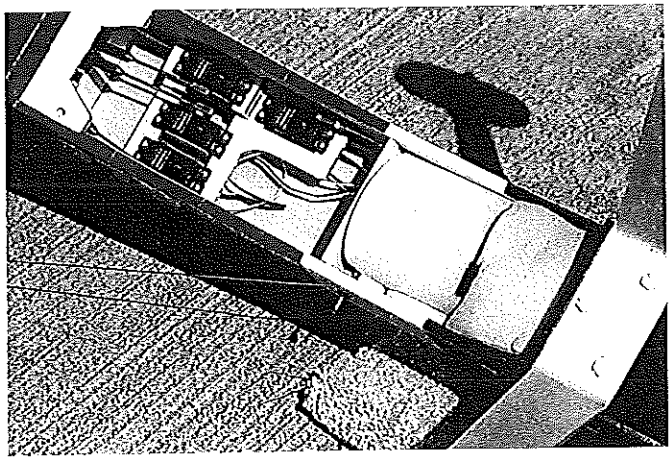
Flying weight: 12¼ pounds

Construction: Balsa and foam

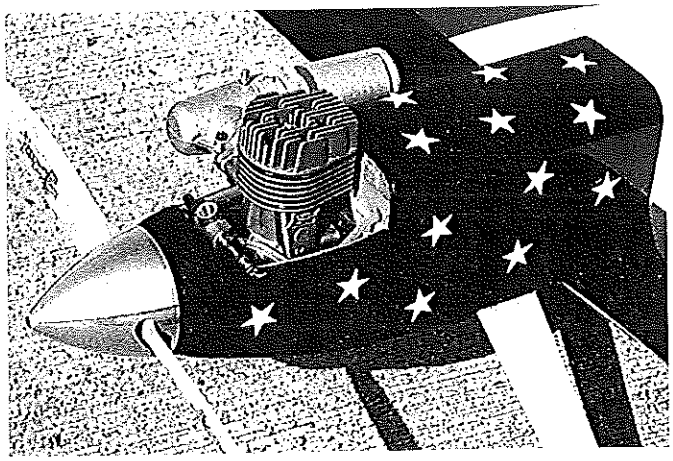
Covering/finish: Heat-shrink film



A different perspective: the underside of the All American.



Plenty of room for radio gear. Shown are two elevator servos, rudder servo, throttle servo, foam-wrapped receiver and battery.



The blue field with star trim really gives this model a patriotic flavor. It has a clean and serviceable front end.

the angle-cut core, and sheet that section with 3/32 balsa, then trim and sand the edges of the tip.

Cut the ailerons free from the sheeting wing panels, and trim them to allow for the balsa edging on the wing panels and the ailerons, which is epoxy-glued in place and planed and sanded to shape.

Hinge the ailerons along their centerlines using large, sturdy, free-moving hinges of the type you prefer.

Keep the gap between the ailerons and the wing as tight as possible while still permitting full aileron movement. Don't glue the hinges in place yet; that will be done later, after the covering has been applied.

Cut recesses into the bottom wing surface for the aileron servo mounting. Epoxy plywood mounting pieces in position in the wing to suit your servos; have the servos protrude from the wing surface just far enough for hookup of the aileron pushrods.

I used to bury the aileron servos completely inside the wing with removable hatches for access, but it's much easier to leave them exposed.

A hole, or "tunnel," is needed through the foam cores from the root to the aileron-servo location for the servo extension cable.

To melt the tunnel, I heat the end of a piece of metal rod with a propane torch and push the hot end through the foam; I hope your aim is good.

An alternative method is to cut a groove in the foam-core surface before the sheeting is applied.

Where the wing hold-down bolts will be located, insert dowel sections or hardwood blocks flush with the sheeted wing panels before the fiberglass cloth and epoxy is added.

Block up the tips of the wing panels to join the wing at the proper dihedral angle; I use roughly one inch under each tip.

Butt-glue the wing halves together, then wrap the center joint of the wing with heavy fiberglass cloth and epoxy. I used a 10-inch-wide strip of cloth around this wing.

I brush on a coat of epoxy, position the fiberglass cloth, and brush on additional epoxy to make sure the cloth is saturated.

For a good, smooth appearance without too much sanding or extra weight, I squeegee off excess epoxy, leaving enough so that the cloth is saturated for strength but is smooth and level.

The plywood wing-mounting tab is used at the leading edge to position and retain the wing; cut through the fiberglass cloth to add the plywood tab, or install it first then cut the cloth as you apply it—whichever you prefer.

With the mounting tab in the wing, the

contact area of the fuselage bulkhead retaining the wing mount can be trimmed or shimmed as necessary to get the correct wing-to-fuselage fit.

Fuselage: Select firm to hard 1/8 balsa for the sides, edge-gluing and splicing as necessary to get the size required.

Glue the 1/16 plywood doublers, 1/4 plywood landing-gear-block doublers, balsa wing-saddle doublers, and stabilizer saddle doublers to the two fuselage sides.

I make the 3/8-inch-thick firewall from a piece of 1/4 and a piece of 1/8 plywood glued together.

With one fuselage side flat on the workbench, add the firewall and the next three bulkheads, installing them perpendicular to the side. Glue the second side to those bulkheads and the firewall; the sides are parallel from the firewall to the wing trailing-edge position.

Add triangle stock and fiberglass cloth behind the firewall to reinforce its joint with the sides. I also put several small screws in the firewall through the fuselage sides.

Add the 1/4 plywood landing-gear mount and wing bolt plate to the fuselage.

Pull the tail end together and install the rear bulkheads. A piece of 1/8 plywood on the bottom end of the fuselage serves as the base for the leaf-spring tail-wheel assembly.

The forward top section of the fuselage is made from 1/2 square balsa stringers—one on each side—and a 1/2-inch sheet of balsa on top; the top edges can be nicely rounded.

The rear top section of the fuselage is made from 1/8 balsa sides and a 1/4-inch top piece, rounded to shape.

The canopy windshield area is a balsa block glued in place and carved and sanded to shape.

Do not add the rear fuselage bottom sheeting until the tail surfaces have been added, so that you can cut holes in the bulkheads for the elevator and rudder pushrods.

Drill the firewall to suit the radial mount you'll use for the engine. For an engine as large as the SuperTigre S-3000 I used, I went with an aluminum mount by J'Tec.

With the engine in place, add the 1/2-inch cowl sides and bottom piece along with additional balsa around the nose to permit carving to shape.

Use a 1/16 plywood ring on the front of the cowl pieces, lining it up with the spinner you're using. I epoxy the inside of the engine and fuel-tank compartments to protect from fuel spills.

Tail Surfaces: These are built from 3/8-inch-thick hot-wire-cut sheets of

Styrofoam® with 3/8 balsa framing added before sheeting the surfaces with 1/16 balsa, just as with the wing foam cores.

Round the leading and trailing edges of the tail surfaces, bevel the elevator and rudder leading edges, and cut the slots or drill the holes along the centerlines of the surfaces for whatever hinge type you're using.

Notch the control surfaces as required to permit a close fit of the surfaces to the main structures, allowing proper movement. Don't glue the hinges in place at this time; you'll do that after covering.

I use 1/4 plywood pads for control-horn mounting, recessing and epoxying the plywood into the elevators and rudder. The heavy-duty nylon horns are mounted with self-tapping screws.

Final Assembly: I mount the wing to the fuselage, adjusting the fit of the wing-mounting tab through the fuselage bulkhead if necessary, and drill and tap the wing mount for the 1/4-20 nylon bolts that hold the wing in place.

With the wing mounted, I add the horizontal stabilizer and align it with the wing. Then I add the vertical fin perpendicular to the stabilizer.

The two elevator pushrods cross inside the fuselage so they can be

straight and exit beneath the stabilizer.

I use a small nylon horn on each side of the rudder for the springs that connect to the steerable tail wheel, and the rudder pushrod connects to one of those horns. With the pushrods installed, you can add the bottom rear fuselage sheeting.

I prefer fiberglass pushrods for the elevator and rudder linkage, along with all 4-40 hardware. A long Y-harness is needed for the two aileron servos in the wing, and a short Y-harness is needed for the two elevator servos.

I used a 1,200 mAh battery pack, packed along with the receiver well-wrapped in foam rubber, above the wing.

The fuel tank has a 16-ounce capacity, although with that large 1.8 SuperTigre glow engine, I may want to go to a larger size later; there is plenty of room for a larger tank.

The aluminum landing gear is mounted with three ¼-inch nylon bolts.

Covering: I covered my airplane with red, white, and blue MonoKote®, using the same trim scheme that Hal deBolt used on his All American Senior in 1951. It still looks good to me.

Ironing on the MonoKote® was faster and easier than painting butyrate dope over silk covering the way we did it back then. I masked off a windshield shape and airbrushed epoxy paint on the MonoKote® to simulate a cockpit area.

I got the cut vinyl stars and lettering from Vinylwrite Custom Lettering, 3361 Mt. Veeder Rd., Napa CA 94558; Web site: www.vinylwrite.net—a very friendly and helpful outfit.

I ended up with a large, glow-engine-powered, sporty, aerobatic aircraft that is easy to build with its foam-core surfaces, and it has a different design appearance that dates back to a 1951 CL model.

I'm happy with it, and it brings back some good memories for me while flying with up-to-date capability. MA

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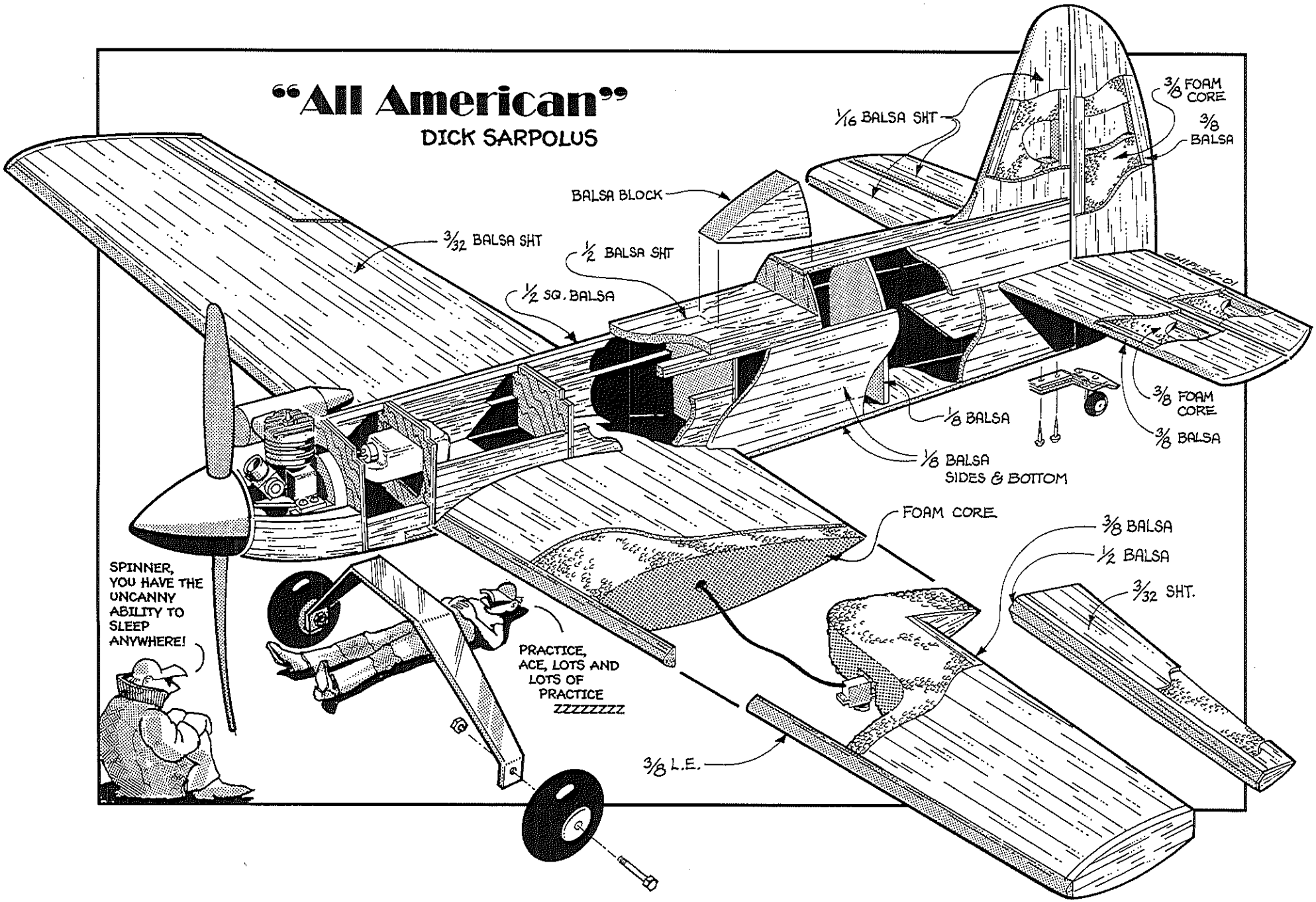
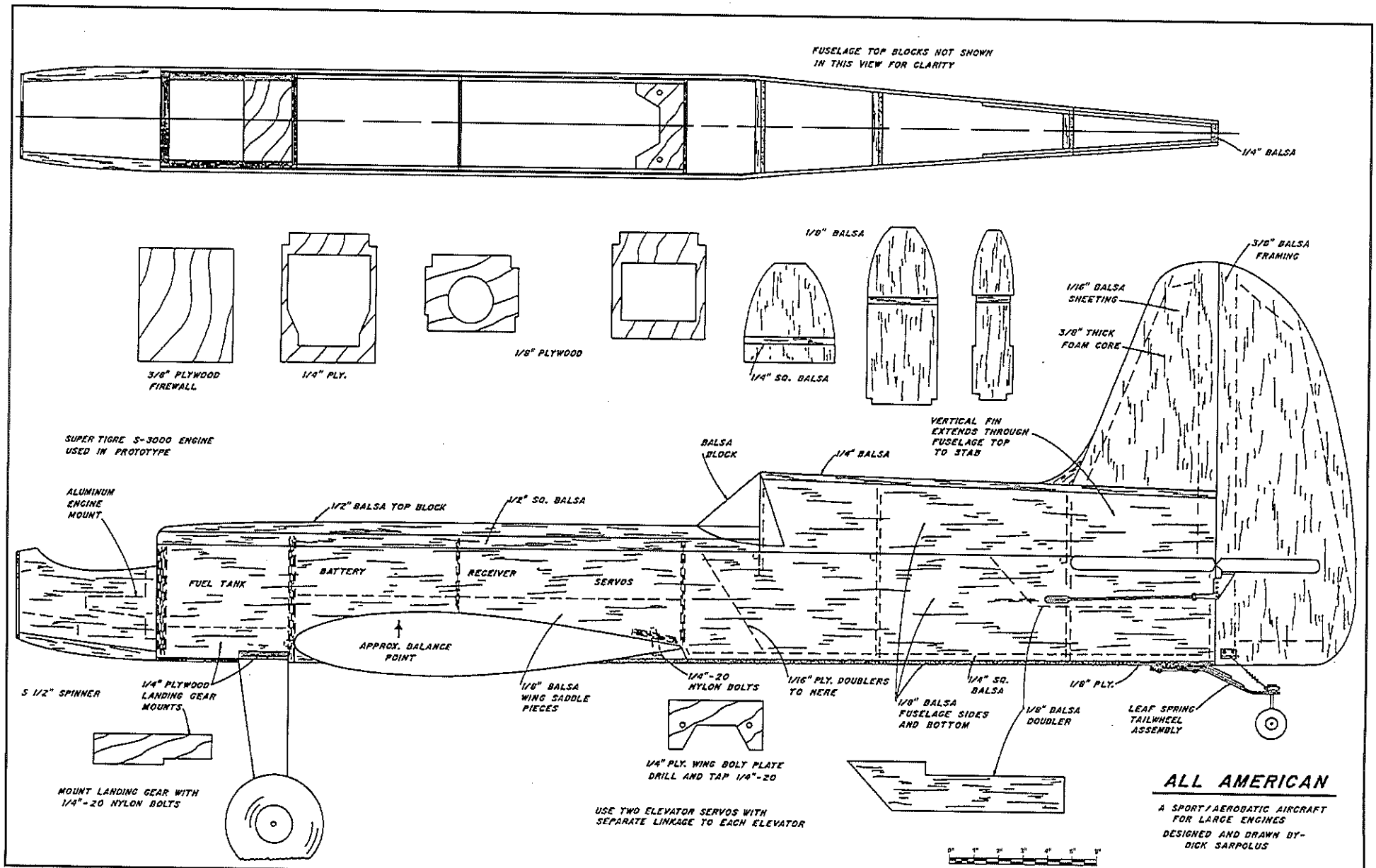
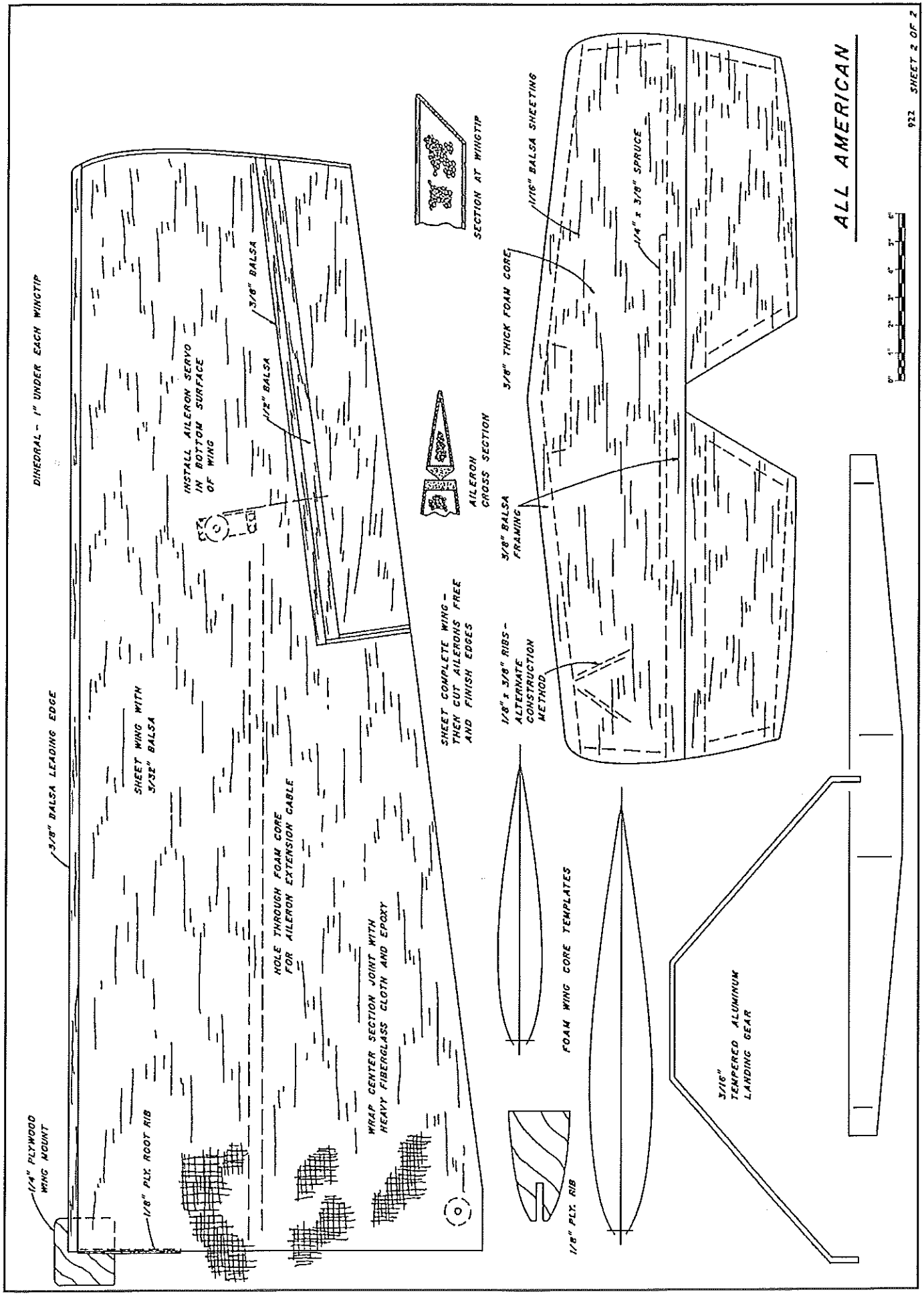

"All American"
DICK SARPOLUS
1/16 BALSA SHT
3/8 FOAM CORE
3/8 BALSA
BALSA BLOCK
3/32 BALSA SHT
1/2 BALSA SHT
1/2 SQ. BALSA
1/8 BALSA
3/8 FOAM CORE
3/8 BALSA
1/8 BALSA SIDES & BOTTOM
FOAM CORE
3/8 BALSA
1/2 BALSA
3/32 SHT.
SPINNER, YOU HAVE THE UNCANNY ABILITY TO SLEEP ANYWHERE!
PRACTICE, ACE, LOTS AND LOTS OF PRACTICE ZZZZZZZZ
3/8 L.E.



1/4" PLYWOOD WING MOUNT

DIHEDRAL - 1" UNDER EACH WINGTIP


ALL AMERICAN
922 SHEET 2 OF 2
DIHEDRAL - 1" UNDER EACH WINGTIP
3/8" BALSA LEADING EDGE
1/4" PLYWOOD WING MOUNT
1/8" PLY. ROOT RIB
SHEET WING WITH 3/32" BALSA
HOLE THROUGH FOAM CORE FOR AILERON EXTENSION CABLE
WRAP CENTER SECTION JOINT WITH HEAVY FIBERGLASS CLOTH AND EPOXY
INSTALL AILERON SERVO IN BOTTOM SURFACE OF WING
3/8" BALSA
1/2" BALSA
SHEET COMPLETE WING - THEN CUT AILERONS FREE AND FINISH EDGES
AILERON CROSS SECTION
SECTION AT WINGTIP
1/16" BALSA SHEETING
3/8" THICK FOAM CORE
1/4" x 3/8" SPRUCE
3/8" BALSA FRAMING
1/8" x 3/8" RIBS - ALTERNATE CONSTRUCTION METHOD
FOAM WING CORE TEMPLATES
1/8" PLY. RIB
3/16" TEMPERED ALUMINUM LANDING GEAR