

# ZENITH

705

## Here's a clever design that's a good bet to smoke out the competition in HLG. ■ Stan Buddenbohm

IF YOU'RE READY to go on a roll in Hand-Launched Glider—if you think you can take winning contest after contest—this model is a sure bet. Zenith has proven itself over and over in serious competition. Renowned FIA flier Bob Isaacson called it the best he's seen—and anyone as accomplished as Bob in Hand-Launched Glider (HLG) should know.

I built Zenith in February 1989, and immediately afterward the model won its first competition at the Max Men Annual. Win followed win: first place at the 1989 Nationals, first and second places at the 1990 USFFC, first and fourth places at the 1991 USFFC, plus multiple wins at annual meets and local events sponsored by southern California clubs.

Several factors combine to give Zenith a competitive advantage. Its transition from launch to glide is a cut above the norm. It's forgiving: If your launch is a little off, a good transition at the top is still probable. It will center in lift and stay there. It won't dump out of thermals—even powerful, turbulent ones. You can throw it high on launch. Just as important, it has a pop-up wing and Silly Putty Dethermalizer.

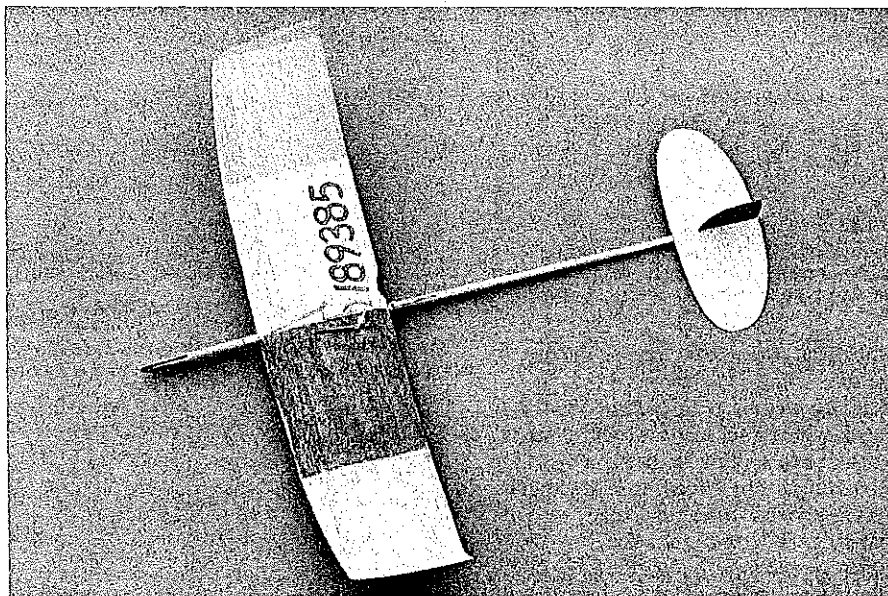
**Construction.** Reference to *left* or *right* is from the pilot's vantage point throughout. (If you're left-handed, reverse everything having to do with turning.) Unless otherwise specified, use one of the thin, instant glues.

Anyone who's had success building and flying Gliders should be ready for this model. Zenith is not recommended for beginning HLG builders.

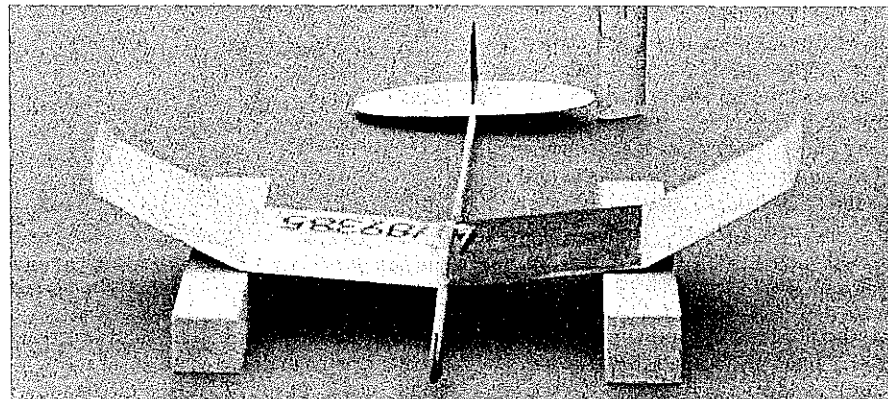
**Wing.** Use five-to-six-pound-density B- or C-grain balsa for the wing, except for the swallow tips. Such balsa is difficult to obtain, but it's worth the search. Compromising on the wood will also compromise some of this Glider's competitive advantage.

Use 12-to-16-pound-density C-grain balsa for the swallow tips. Note the direction of the grain shown on the plan. The tips are completed separately. They weigh only a few tenths of a gram more than if made from lighter wood.

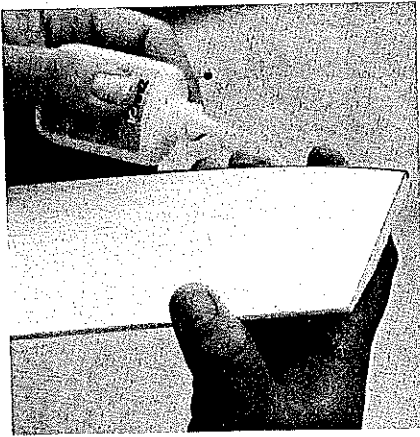
Shape the wing to outline, and add the plywood leading edge.



Above: Zenith is designed for function, not looks. The swallow tips help to smooth the tip vortices, making for better transition from launch to glide and greater stability in turbulent lift. Below: Achieving the correct stabilizer tilt is important. Eyeballing isn't good enough.



The author with his HLG and the raft of trophies it already has won. They read like a history of big-time FF competition since 1989: first place, '89 USFFC; first place, '89 Nationals; High Time Award, '89 Tulsa Glue Dobbers; '89 Southern California Free Flight Champion; first and second places, '90 USFFC; '90 NFFS HLG of the Year; first and fourth places, '91 USFFC.



The plywood leading edge is glued on without pinning. It's quick, easy, and the instant glue lets you continue to the next step.

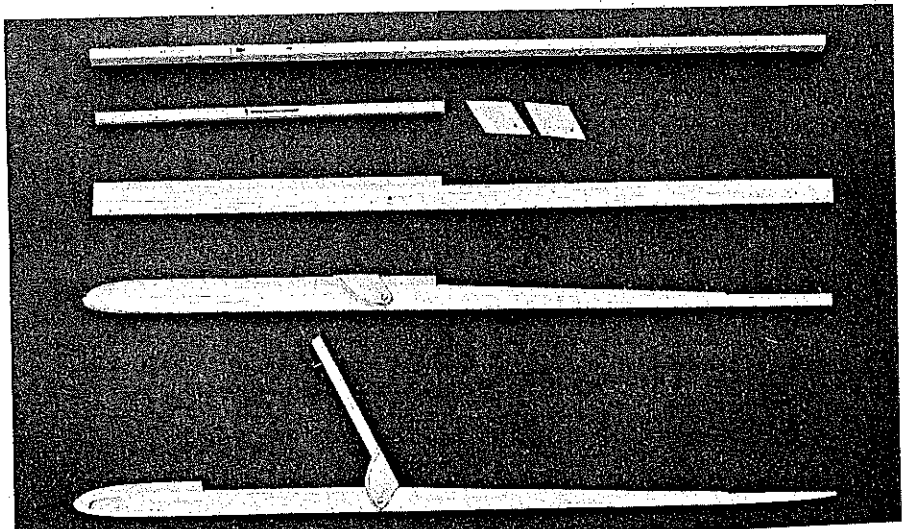
The  $\frac{1}{4}$  plywood used for the leading edge offers three advantages. First, it needn't be wet to go around curves. Second, since it adheres well with instant glue, you can apply it without pinning it to the building board. Third, it's very tough.

Avoid plywood with flaking or splintering along the edges; this indicates inferior lamination. Slice off long  $\frac{1}{8}$ -in. strips, making three or four passes with a razor knife for each strip. With the wing upside down, hold one of the strips so that it overlaps the bottom of the wing about  $\frac{1}{4}$  in. Begin gluing near one end, working your way to the other end a few inches at a time. Apply two thicknesses to the wing, and one each to the swallow tips and stabilizer.

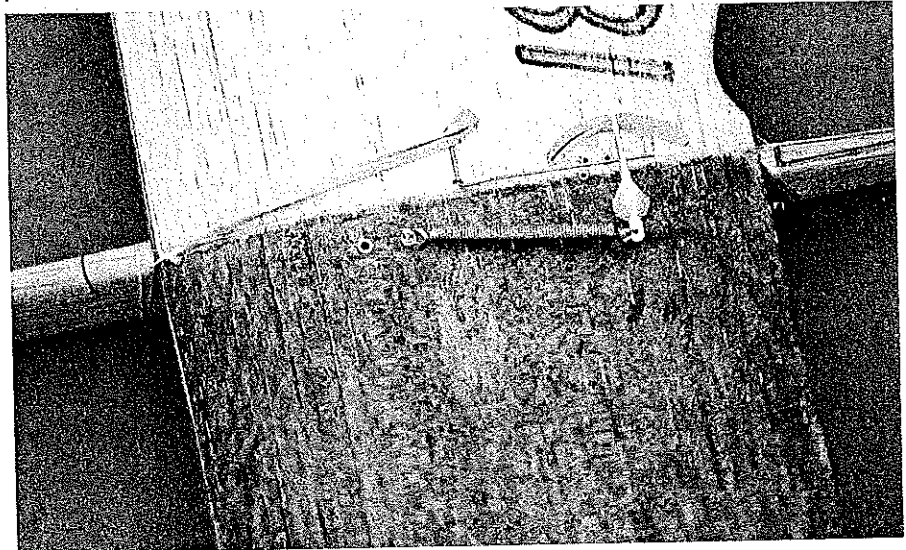
Sand the plywood smooth and flush with the bottom of the wing; sand in the leading edge top taper. This is done in two steps. The center panels taper to  $\frac{1}{32}$  in., the tip panels to  $\frac{1}{16}$  in.

Mark the high point of the airfoil with a fine-tip pen. With a broad-tip marker, draw parallel lines at approximately half-inch intervals from the leading edge to the trailing edge. Sanding away the marks, you'll have a clear sense of how the job is progressing as you shape the airfoil.

Finish shaping the airfoil by creating the upsweep on the bottom. This will add several feet to the launch height without harming thermal ability. The upsweep



The pop-up fuselage passes through four stages of construction. Notice that the wing mount piece is initially  $1\frac{1}{2}$  in. longer than the finished length.



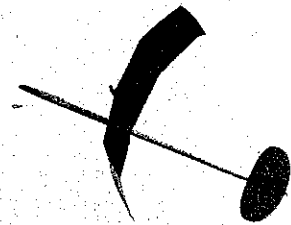
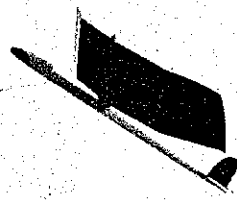
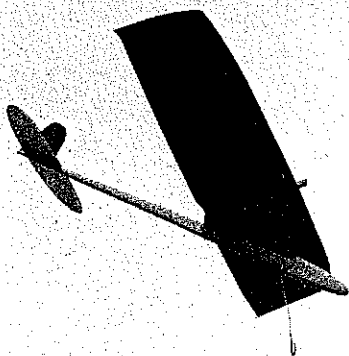
The author has been perfecting his Silly Putty Dethermalizer system since the mid-1970s. He claims it's reliable, easy to use, and a big advantage in Hand-Launched Glider competition.

tapers at the same rate as the thickness of the wing and should be about  $\frac{1}{16}$  at the center and  $\frac{1}{64}$  at the tip. Shape the swallow tips to match the airfoil at the wing tips.

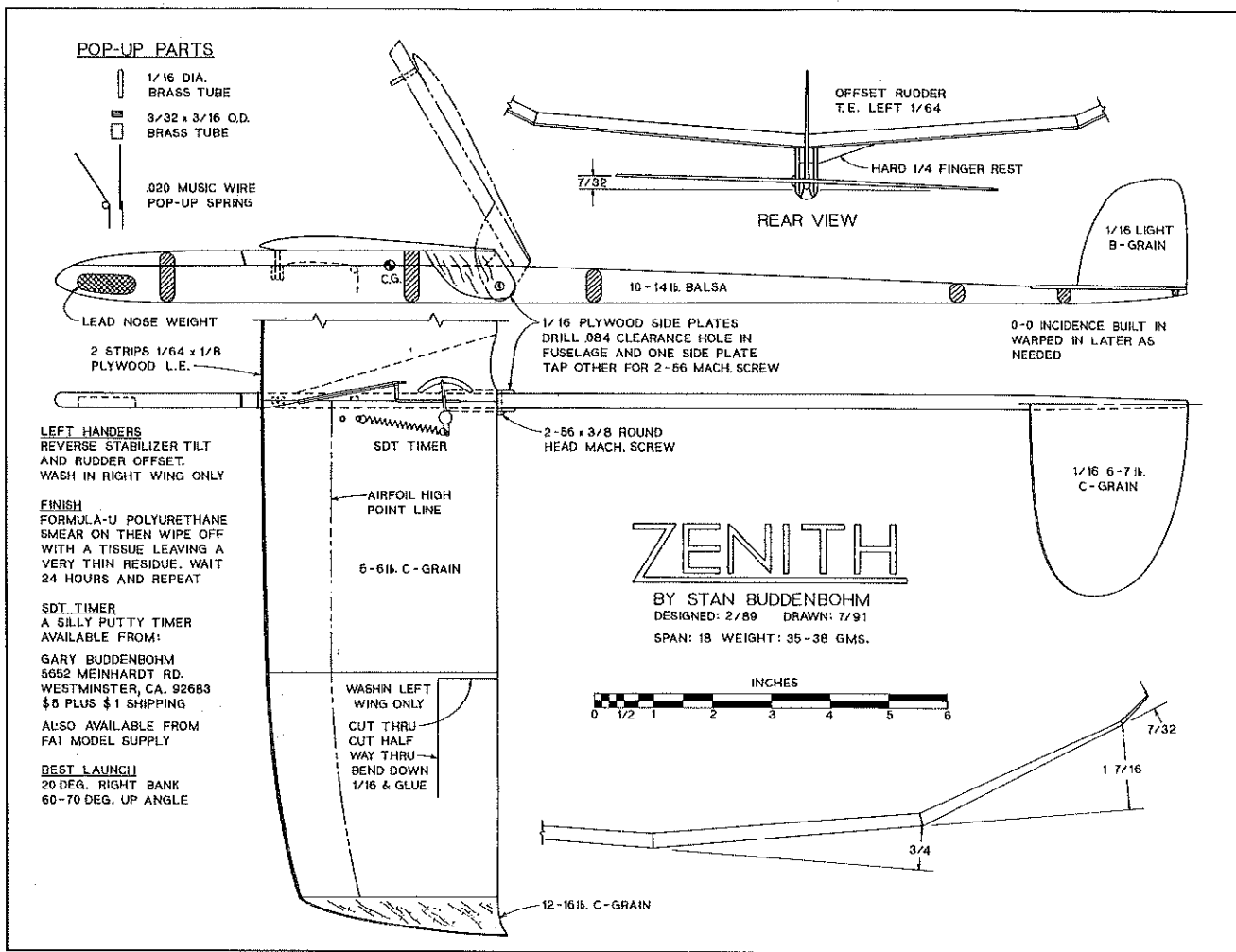
Mark and cut the dihedral breaks with a fine-toothed razor saw. Sand the dihedral angles, making sure they are accurate and equal on both sides of the wing. Glue the wing sections together.

**Stabilizer and rudder.** Wood selection is important. Six-to-seven-pound C- or C-B-grain stock is best. Make certain the wood is flat and free of warps. (Sometimes, thinning a good sheet of  $\frac{3}{32}$  balsa is easier than finding a good  $\frac{1}{16}$  sheet.)

It's easy to err in shaping the stabilizer. A too-thick structure will of course be too



Above: When the Zenith dethermalizes, it drops like a shot bird—no drifting or hanging in thermals.



heavy, while one that's too thin is fragile and prone to warp. The rudder should be a full  $\frac{1}{16}$  in. at the bottom for a good joint with the stabilizer, yet very thin at the top to save weight. Since the rudder withstands little stress, use your lightest wood.

**Fuselage with pop-up wing.** This method produces a glider as rigid as if it had been glued, one that is durable and totally reliable. Never in my experience has there been a failure, and the pop-up wing lets the airplane drop like a shot bird when the dethermalizer activates.

Use good-quality 10-to-14-pound-density balsa for the fuselage. Make the nine-inch-long wing mount piece and the main fuselage separately. Sand each until straight and square, and make sure they fit well together.

Drill a hole for the  $\frac{1}{16}$  brass tube, and rout the cavity for the rectangular brass tube with a rotary router. I use a Dremel Moto-Tool with a No. 193 cutter, but the job can be done with a drill and needle file.

Drill a cavity for the pop-up spring coils, making sure to offset it from the centerline. File a  $\frac{1}{16}$ -sq. groove centered along the bottom of the wing mount piece, from just above the spring coil cavity to within  $\frac{1}{16}$  in. of the hole. This groove accepts the spring arm when the wing mount is in the *down* position.

Place a film of glue along the groove, and insert the rectangular brass tube. This should fit just below the surface to prevent interference with the fit of the main fuselage and the wing mount. Fit the  $\frac{1}{16}$  brass tube as well, checking that it's just below the top surface of the wing mount to prevent interference with the wing. Glue both brass pieces in place.

Align the wing mount piece and the main fuselage so that the brass pin is centered in the brass rectangle. Don't bend the wing mount to align it with the main body. A little side-to-side misalignment is acceptable at this point. Since the pieces will be cut apart later, use only a single drop of glue to attach the rear of the wing mount to the main fuselage, and glue them for a length of not over two inches at the front.

Carefully sand the fuselage sides flat and smooth. Drill the pivot hole with a No. 44 bit. Reinforce the hole with glue, avoiding excess adhesive between the wing mount and the fuselage. Run the drill bit back through the hole to clean it. Rough out the fuselage profile, but don't cut into the wing mount piece yet. The stabilizer and wing mount should be parallel—that is, there should be no incidence.

Cut the  $\frac{1}{16}$  plywood side plates somewhat oversize. Note the grain direction shown on the plans. Drill a clearance hole in one side plate with

a No. 44 bit and a tap hole in the other side with a No. 53 bit. Use a 2-56 tap on the tap hole. Toughen both holes with glue, then drill and tap again. Shape the profile of the side plates, and sand both sides smooth. The outer edges may be beveled to a more aerodynamic shape.

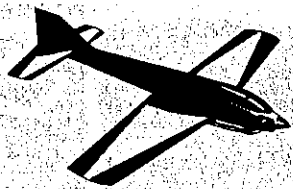
Screw the side plates to the fuselage with a 2-56 x  $\frac{3}{8}$ -in. machine screw, making them snug but not tight. At this point the wing mount extends about  $1\frac{1}{2}$  in. past the rear of the side plates. Holding the plates in the proper position, secure them to the top of the wing mount with a few drops of glue; take care that nothing gets glued to the fuselage.

Saw through the wing mount in front of the wing position as shown on the plan. Remove the pivot screw. Cut the rear of the wing mount from the fuselage with a razor blade, and remove the mount. Cut away the portion that extends past the rear of the plates.

Bevel the back of the wing mount as shown on the plan for a 60°-to-70° pop-up angle. Add more glue along the inside edges of the side plates and wing mount and along the fuselage where the wing mount was cut away at the front. Too much glue inside the side plates will interfere with the fit to the body.

Shape and round the fuselage. A one-inch strip of  $\frac{1}{64}$  plywood glued to

*Continued on page 170*



# The FIFTEENTH ANNUAL \* RC MODEL SPORT & HOBBY SHOW \*



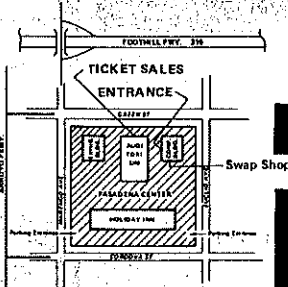
**Radio  
BIGGEST & BEST Control  
in the WEST!**

SHOW OPEN TO PUBLIC  
FRIDAY, JANUARY 10, 1992 - 2 p.m. - 7 p.m.  
SATURDAY, JANUARY 11, 1992 - 10 a.m. - 6 p.m.  
SUNDAY, JANUARY 12, 1992 - 10 a.m. - 5 p.m.

## Pasadena Center, Pasadena, California

300 EAST GREEN ST. (CORNER GREEN & MARENGO), PASADENA, CALIFORNIA

SEE INDOOR R/C BLIMP, BALLOON, CAR, BOAT, AND MODEL RAILROAD DEMONSTRATIONS, PLUS EXCITING OUTDOOR EXHIBITIONS OF RC HELICOPTER FLYING AND QUARTER-SCALE SPRINT, MODIFIED, AND GRAND NATIONAL STOCK CAR RACING!



SEE THE LATEST PRODUCTS AND VISIT WITH

• CAR TRACK • MAJOR MANUFACTURERS AND DISTRIBUTORS

\* SPECIALIZING IN RADIO CONTROL \*

- MODEL AIRCRAFT
- MODEL ENGINES
- MODEL BOATS
- RADIO CONTROL SYSTEMS
- MODEL CARS
- MODELING ACCESSORIES

STATIC MODEL COMPETITION: Entry is free, open to all ages, no limit on number of categories entered per contestant, but only one entry per category. Contestant must be builder of model. Trophies and ribbons awarded in over 20 categories. Send SASE to IMS office for advance entry form and instructions for bringing in models.

CATEGORIES: Best of Show, People's Choice, RC Race Boat (Power or Sail), RC Scale Boat/Ship - Military, RC Scale Boat/Ship - Pleasure, RC Scale Boat/Ship - Work, RC Car/Truck - Gas, RC Car/Truck - Electric, RC Glider, RC Old Timer, RC Flyton, RC Scale - Sport - Military, RC Scale - Sport - Non Military, RC Scale - Precision, RC Helicopter, RC Precision Aerobatics, RC Sport, RC Sport Biplane, Control Line, FF Endurance, FF Scale.

SWAP SHOP: Bring your saleable items to the Swap Shop. NO DEALERS, PLEASE! Table rent; \$40.00 for two days, includes one admission. You are responsible for your own sales. IMS is not responsible for lost or stolen items.

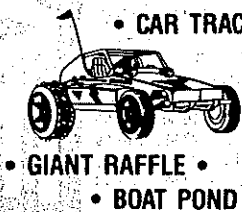
GIANT RAFFLE: Radio control systems, kits, engines, etc., to be raffled off during show. Big prize numbers to be announced, numbers for smaller prizes to be posted. New tickets sold each day. No carry-overs. Prizes must be claimed at show. Another ticket drawn if big prize is not claimed.

ADMISSION - \$5.00 (Children under six admitted free when accompanied by an adult).

\* ADVANCE TICKETS \*

Save time and waiting in line. Order your tickets in advance. U.S. only. Send check or Money Order payable to IMS Inc. (Allow 3 weeks for personal checks to clear), and include a self-addressed legal-size stamped envelope. Tickets \$5.00 ea.

Name: \_\_\_\_\_ Date: \_\_\_\_\_  
No. of tickets ordered: \_\_\_\_\_  
Amount enclosed: \_\_\_\_\_



• GIANT RAFFLE •  
• BOAT POND •



**Radio  
Control**

• SWAP SHOP •

INTERNATIONAL MODELER SHOW, Inc., P.O. Box 10127, Costa Mesa, CA 92627, Ph: (714) 548-4700

## Combat/Johnson

Continued from page 165

they're not much more expensive than wood props and they don't break if you drag a blade on the ground during landing. We had some props for the .15s but they proved to be a little too much diameter and pitch. The factory is very responsive, however, and will be modifying the prop for our needs. It looks like we've got APC in our corner; you might think about supporting the guys who are helping us. ☐

When responding to advertisers, mention that you read about them in *Model Aviation*

## Zenith/Buddenbohm

Continued from page 63

the top of the fuselage just behind the wing mount will protect the fuselage from pop-up damage.

Assembly and finish. Install the wing mount, securing the front with a rubberband. Sand the bottom of the wing center dihedral joint flat for a square fit with the wing mount. Hold the wing in proper alignment with the fuselage, and secure it with instant glue. Shape the finger rest to a wedge. Remove the wing mount so that no glue gets on the fuselage,

and attach the finger rest with epoxy.

Use Formula-U thinned 10-15% with mineral spirits. Formula-U is found in RC hobby shops and comes in a variety of colors. Never use this product on areas where a glue joint is planned—the juncture of stabilizer and fuselage, for example.

Put a blob of Formula-U on one of the wing panels using a half-inch-wide stick. Smear it around with a tissue, then wipe most of it off using another tissue, leaving just a thin residue. The process is similar to working with stain. So little finish remains on the wing that you can handle it—gently—while finishing the rest of the model.

Continued on page 172

Kit No. 111 \$319.-  
(Built-Up \$695.-)

THE ULTIMATE 10 DASH 300S

MasterCard Visa

62" Wing Span - 1300 Sq. In. - 12-16 Lbs  
1.2 to 2.3 2 Cycle or 1.20 to 2.70 4 Cycle

Conventional Built-Up Construction, All Precision Machine Cut SIG Balsa and Plywood Parts, Fiberglass Cowl and Wheel Pants, Clear Canopy, Formed Main and Tail Gear, Formed Cabanes, Full Hardware Pack, Detailed Instruction Book with 3-views, Rolled Full Size Plans. Full money back guarantee. Send three 29¢ stamps for additional kit info.

**OHIO R/C** 4008 FULTON AVE., DAYTON, OH 45439 PH: 513-299-8623

**MACS  
PRODUCTS**

FOR THE DISCERNING MODELER

**Complete Line Of  
Exhaust Systems**

- \* Tuned Pipes \* Muffled Tuned Pipes
- \* Headers \* Venturi Mufflers
- \* Expansion Mufflers \* Helicopter Ball Mufflers \* Specialized Exhaust Systems.

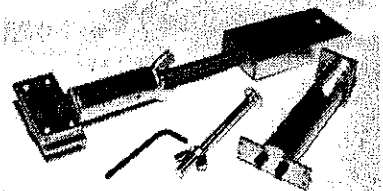
*Unsurpassed Workmanship & Performance*  
Check with your Dealer

**MACS Products**  
7935A Carlton Rd, Sacramento, CA 95826  
(916) 456-6932



# Just In Time for Christmas The ALL NEW FINISHING - FRIEND SYSTEM

12"



The **NEW** Finishing Friend System (FFS) is for **YOU!** Guaranteed to help you build **FASTER, BETTER,** and have lots **MORE FUN!** A "3rd hand" vice, the FFS securely holds your model out away from the workbench. Locks at **ANY** angle. Your hands are **FREE!** Sanding, covering, painting are **EASY** because the model is not touched on any outside surface.

**OUTSTANDING QUALITY**—comes with a **LIFETIME GUARANTEE**

**ORDER YOURS TODAY!** Join our family of satisfied customers who say,

**"BUILD JUST ONE MODEL USING THE FFS, YOU WILL NEVER BUILD WITHOUT IT!"**

only \$39.95

**CRAFTSMAN MODELS** + 3.50 S&H  
1311 East 161st St. **317-896-9043**  
Westfield, IN 46074  
M/C • Send SASE for Brochure • VISA

After a day, lightly sand the airplane with 400-grit paper to remove dust particles.

Repeat this process for two to four more coats. Don't try to fill the grain. The resulting finish, while lighter weight than most at about three grams, is also tough, flexible, waterproof, and warp-proof.

After the final coat of finish has cured,

**WORLD'S BIGGEST SCALE PLANS & DOCUMENTATION SERVICE**  
70,000 Aircraft Pictures In Stock BY SCALE MODEL PLANS  
Ducted fans, Free Flight, U-Control  
AMA Scale, Giant Scale  
**100 PAGE CATALOG**  
\$5.00 POST PAID US & CANADA  
\$9.00 AIRMAIL OVERSEAS  
**PLANS ENLARGING**  
U.S. & FOREIGN CURRENCY  
**SCALE DOCUMENTATION**

**JIM PEPPER'S**  
SCALE PLANS AND PHOTO SERVICE  
3209 Madison Ave., Greensboro, N.C. 27403  
(919) 292-6230

## THE RIGHT STUFF

LOCKHEED C-130 - HERKY-BIRD - Scale 1:30 1:18.5  
Span 51.5" 66"  
Length 38.5" 62"  
Wing area 272.00" 274.264"  
Wing load 31.5oz/sq. 31.2oz/sq.  
Engines (4) .25" 25"  
R.C. channels 3-3 5-7  
PLANS (3 sh.) \$48. 99.  
Rolled & postpaid / USA  
Balsa & lite ply construction

Plans come with Scratch Building Instruction Manual, Model Specs, Target Weight Schedule, and Source of Scale Information.



**DOUGLAS A-26 - INVADER - Scale 1:12**  
Span 70"  
Length 51.25"  
Wing loading 22.9oz/sq.  
Two engines .25" 25"  
R.C. channels 5-7  
PLANS (4 sh.) \$58.  
Rolled & postpaid / USA  
Balsa & lite ply construction  
Filerglass cowls available

**PALMER PLANS**  
210-17 EL CAMINO DRIVE  
BEVERLY HILLS, CA 90212  
213 / 274-2456

**Easily transportable THE RIGHT SIZE**  
For economical components

glue the rudder to the stabilizer and the stabilizer to the fuselage at the offset and angle shown. Be careful to get this accurate. Put the model in a jig, and measure the stabilizer tilt before gluing.

**Silly Putty Dethermalizer (SDT).** I have been developing this device since the mid-1970s. There are no fuses to cut or burnt fuses to dig out, no fuse lighter, and no snuffer tube. The SDT weighs about three grams, takes only a few seconds to reset, can be set for a range of 10 seconds to three minutes-plus, is activated simply by pulling a pin, and is accurate to within about 15 seconds. With it you need never again launch and lose a Glider because it's a bother to use the dethermalizer, and you can practice fly on small fields without worries. In competition flying, the frustration of watching the thermal go by while you fumble with fuses can be a thing of the past.

The SDT is available from Gary Buddenbohm, 5652 Meinhardt Road, Westminster, CA 92683. The cost is \$5 plus \$1 shipping and handling. It can also be ordered from F.A.I. Model Supply. Instructions are included.

**Pop-up spring and hold-down line.** Push the short end of the pop-up spring into the cavity until the coils are just below the surface and the spring arm is centered. If the arm is not centered, check whether the coils are wound backwards.

Twenty-pound braided Dacron fishing line works best for the hold-down line. Monofilament line or any other type that stretches will not serve. Tie a loop in one end, and thread a No. 8 rubberband back upon itself through the loop. Place the rubberband over the timer release arm, and pull the line so that the rubberband is stretched about double. Pull the line to the leading edge of the wing, opposite the finger rest, and then down. Wrap the line once around the fuselage, and glue it to the body where it meets the bottom a second time.

**Flying.** Be sure to add washin as shown on the plan; it's essential for stability in turbulent lift. The center-of-gravity (CG)

location depends on how hard you throw. The harder you throw, the less incidence you should use—and the farther aft the CG should be. A balance point 55% from the leading edge is about right if you throw hard. On the first few flights, however, move the CG forward about 1/8 in. to provide enough incidence for a level glide. If the throw is off, the model will have a better chance of pulling out before hitting the ground. Zenith should turn in 50-to-70-ft.-diameter circles in the glide.

The high speed of launch increases the effects of rudder and washin while reducing the effect of stabilizer tilt. Enough rudder offset is needed to counter the bank of the launch, but too much will make the model spin from a bad launch or turbulent lift. The stabilizer tilt produces the turn in the glide and also improves the roll at the top of the launch. If there's too little turn in the glide, adding wing tip weight will help.

Zenith is best launched at about 20° right bank and 60-80° up angle. Enough incidence should be warped into the trailing edge of the stabilizer so that the Glider will be just past vertical—about 95°—at maximum height. That way it will roll to horizontal and glide without stalling.

Fliers commonly misjudge in adjusting the incidence. If the model never gets past vertical in the launch and then dives, it has too little incidence. If the model speeds past the 95° angle before slowing, it has too much incidence. When a plane banks too much in the launch, pilots often add opposite rudder instead of decreasing the incidence to straighten the climb and overcome the bank with the proper roll.

If you build and fly a Zenith, I'd be delighted to hear of your experiences. Write to me at 5652 Meinhardt Road, Westminster, CA 92683 (the same address as for my brother Gary).

## Sport & Scale/Warner

Continued from page 65

"Fly it Light—Fly it Free Flight" is the motto of SAMS, George Wallbridge's mail-order house in England. His 58-page catalog, with lots of pictures and drawings, is an inspiration, and is free (except you need to send \$2 in U.S. currency to cover postage). SAMS has over 1,600 goodies in stock, including just about everything that's available in the U.S., plus plenty of stuff that's not.

Continued on page 174