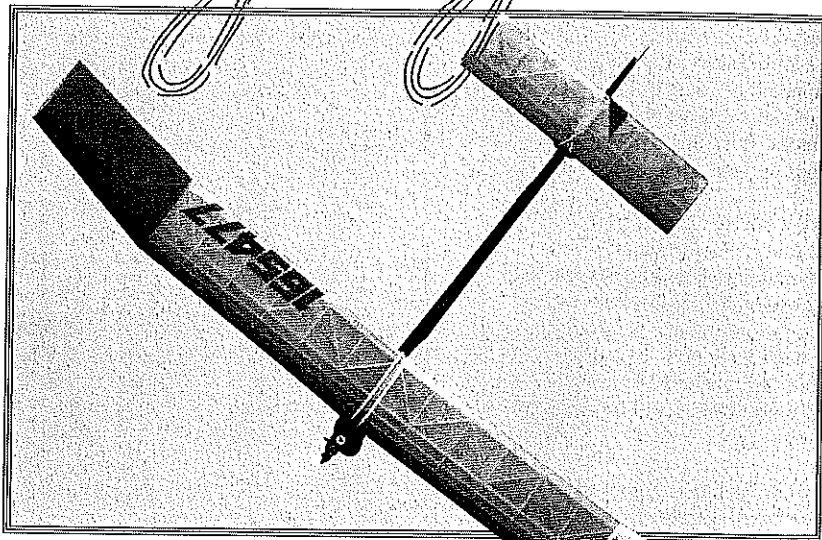


TEXAS



An easily built, "Texas tough" model for AMA 1/2A Gas and F1J

■ BOB ISAACKS

T

he Texas Zephyr was designed at the request of my flying buddy, Mike Isermann. Mike is in his 30s, with a deep-seated love of model aircraft; I am in my 50s, with the same passion.

Mike and I have spent many hours "hyper-building" models for upcoming contests. The Zephyr was created out of just such a sense of urgency, and was built (framed) in a single weekend.

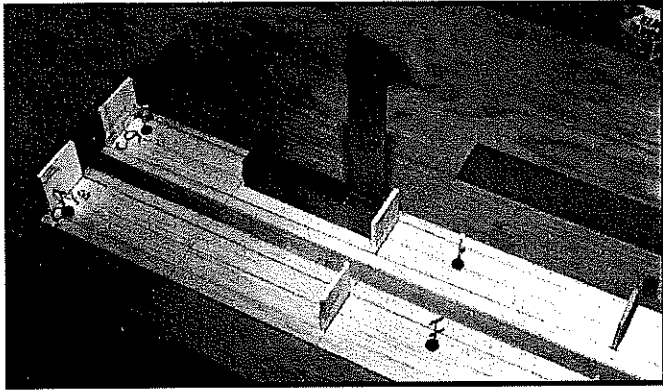
I tried to incorporate some features that provide an easily constructed, warp-free airplane. The original airfoil design, areas, and moments will provide for trouble-free flight trimming.

CONSTRUCTION

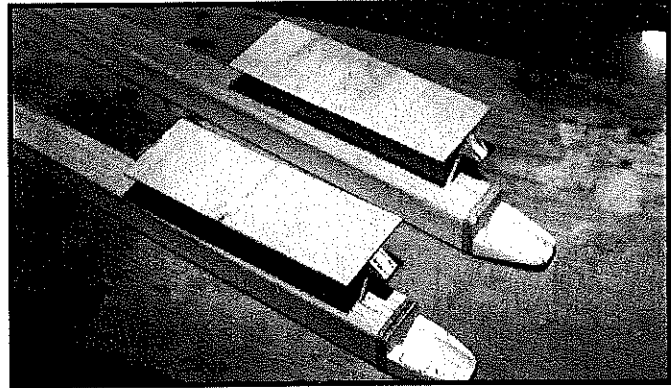
Fuselage: Select a piece of medium 3/32 balsa, draw a centerline on it with a fine-tip pen, and pin it to a flat building board. All of the 1/16 formers are centered and are erected at 90° to the fuselage bottom; fast-curing cyanoacrylate (CyA) glue was used for this step.

When you are satisfied with the alignment of the formers, add the hard 1/16 fuselage sides; use slow-curing CyA for this step. Now add the pylon, which has been glued up separately. Make sure that the pylon is centered and located per the fuselage side view.

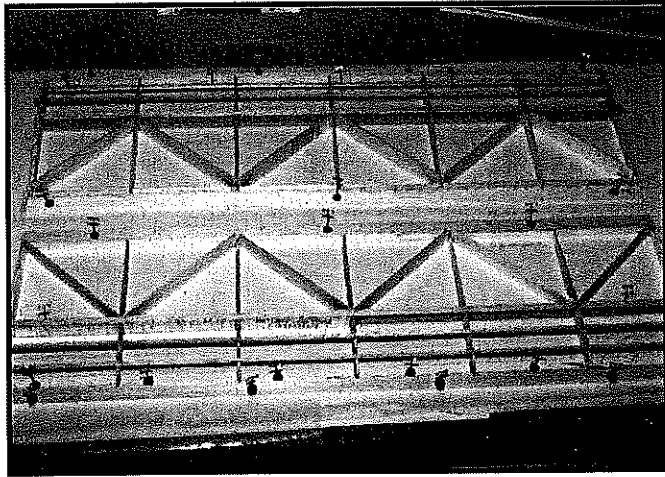
Use a long sanding block to square up the fuselage sides and bevel the top edge of the formers. Notch the 3/32 fuselage top to clear the pylon and



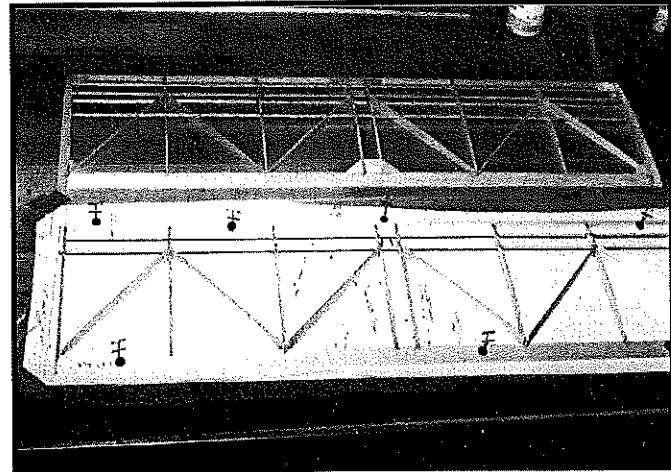
Formers are erected on a centerline drawn on the fuselage bottom. Square ensures that formers are vertical.



A pair of fuselages nearing completion. The engine pans are carved from hard balsa; engine bearers are spruce.



Wing construction includes extra "glue-lines" to prevent warps. Main straight ribs and diagonals are $\frac{1}{16}$ C-grain.



Stabilizer construction is similar to that of the wing. Wing and stab are covered with Japanese tissue.

Photos by the author Graphic Design by Heather Erdahl

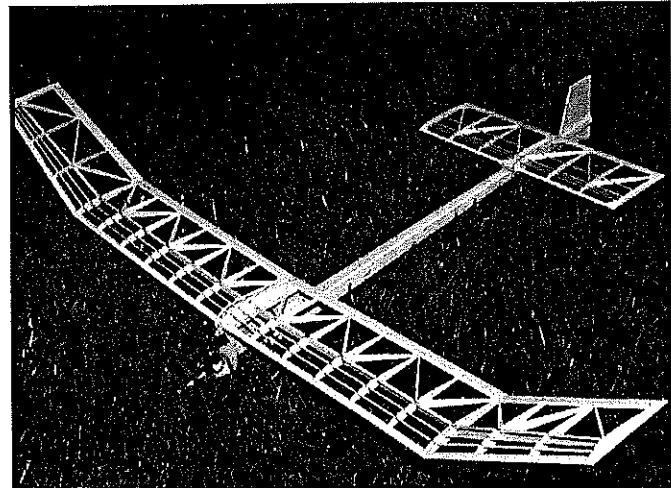
add it to the structure with slow-curing CyA. (Don't forget to unpin the fuselage bottom before adding the top!)

Trim the excess material from the top and bottom, and add the plywood firewall, the subfin and rudder, and the remaining pylon components. Attach the hard-balsa engine pan, making sure that it is hollowed sufficiently to clear the engine crankcase and thrust washer. Glue the spruce engine bearers in place, round off the fuselage corners, and fiberglass the engine pan and fuselage back to the leading edge of the pylon. Attach the $\frac{1}{16}$ plywood timer mount and stab platform.

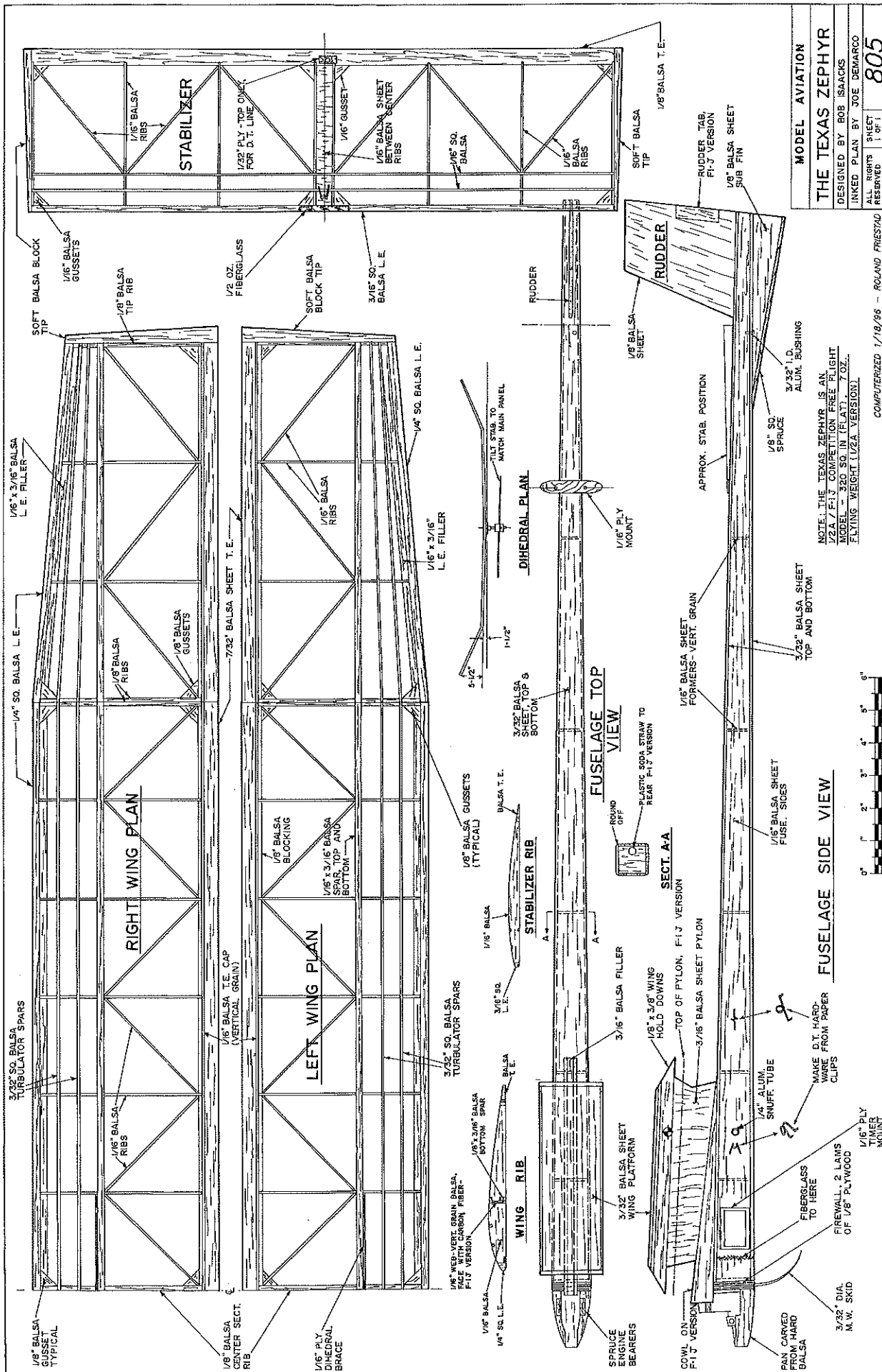
The DT hardware and music-wire skid completes the fuselage, except for the fuelproof finish. I used K&B Super Poxxy over a nitrate dope/talc base.

Wing: Begin the wing construction by making a rib template from $\frac{1}{16}$ plywood. Install pins (use slow CyA) at three places on the template; they project $\frac{1}{16}$ below the template side. The pins will hold the template on your $\frac{1}{16}$ C-grain sheet balsa while you carefully cut out each rib. Lightly sand each rib to match the template, and cut out all notches for spars, turbulators, etc. A good notching tool can be constructed from two short lengths of a fine-toothed hacksaw blade CyAed together.

Tape the wing plan to your building board and cover it with waxed



Bones of the Texas Zephyr. Text indicates modifications to structure and trimming technique for conversion to F1J.



MODEL AVIATION	
THE TEXAS ZEPHYR	
DESIGNED BY BOB ISAACHS	
INKED PLAN BY JOE DEMARCO	
ALL RIGHTS RESERVED	SHEET 1 OF 1
805	

NOTE: THE TEXAS ZEPHYR IS AN IZAR F-13 COMPETITOR FOR FREE FLIGHT CONTESTS. THIS MODEL IS APPROX. 12.5" LONG, 1.5" HIGH, AND WEIGHS 1.25 OZ. (1.25 G. VERSION).

COMPUTERIZED 1/18/96 - ROLAND FRIESTAD

3/32" I.D. ALUM. BUSHING

1/8" SO. SPRUCE

1/8" Balsa Sheet FORMERS - VERY GRAIN

3/32" Balsa Sheet TOP AND BOTTOM

1/8" Balsa Sheet FUS. SIDES

1/8" x 3/8" WING HOLD DOWNS TOP OF PYLON, F13 VERSION

3/16" Balsa Sheet PYLON

1/4" ALUM. SNUFF-TUBE

MAKE D.T. HARD-WARE FROM PAPER CLIPS

1/8" PLY TIMER MOUNT

3/32" DIA. M.W. SKID

PAN CARVED FROM HARD Balsa

FIBERGLASS TO HERE

FIREWALL, 2 LAMS OF 1/8" PLYWOOD

1/8" PLY ENGINE BEARERS

3/32" Balsa Sheet WING PLATFORM

1/8" x 3/8" WING HOLD DOWNS TOP OF PYLON, F13 VERSION

3/16" Balsa Filler

1/8" SO. Balsa TURBULATOR SPARS

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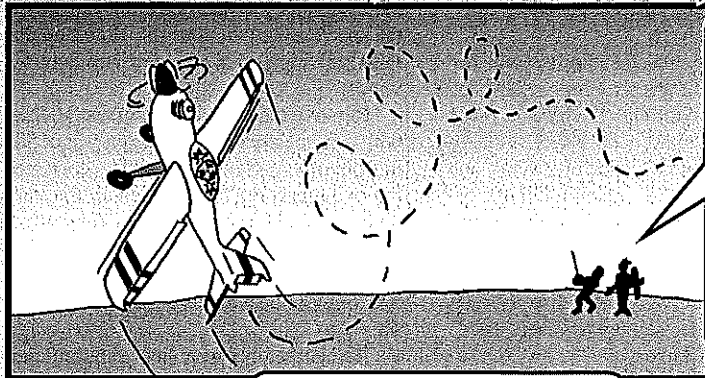
1/8" SO. Balsa TURBULATOR SPARS

1/8" SO. Balsa TURBULATOR SPARS

MODEL IMPROVEMENT

WITH RON AILER & HOBBY BOBBY

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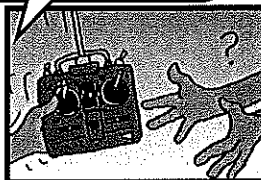
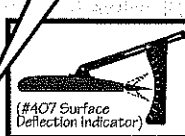


... AND IF YOU BRING HER DOWN IN ONE PIECE, I PROMISE NEXT TIME TO USE EVERY ROBART TOOL AND METER AVAILABLE!

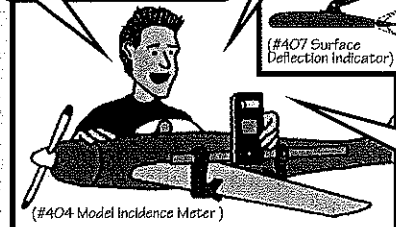
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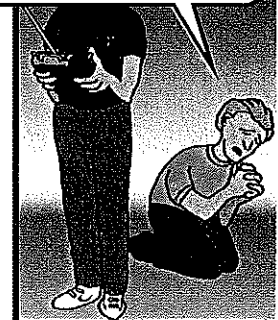
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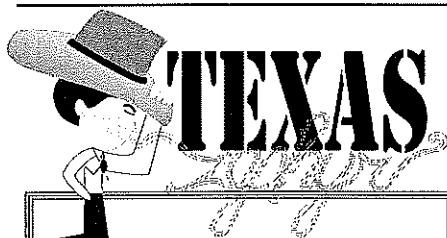


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Type: FF 1/2A-F1J power

Wingspan: 58 1/2 inches (flat)

Wing area: 320 square inches

Engine size/type: VA .049

Flying weight: 7 ounces

Construction: Built-up

Covering/finish: Japanese tissue and dope

paper. Glue up the leading edge and LE filler; also glue the 1/16 sheet (grain vertical) TE cap to the front of the trailing edge. The purpose of this style of construction is to provide a "glue line" to the leading and trailing edge components—a significant contribution to warp reduction.

Glue in all of the 1/16 ribs (excluding the diagonals) utilizing 1/8 spacers to provide a secondary glue line at the trailing edge, as well as extra gluing area for the ribs. You will have to trim the front of the ribs in the tip section to provide the leading-edge sweepback.

Add the 1/8 balsa dihedral break ribs, tilting them slightly to the approximate angles required.

Continue the wing construction by adding the spars, spar caps, webs & turbulator spars; next add the diagonal ribs, which are simply rectangular strips of 1/16 balsa, carefully sanded to match the upper camber of the conventional ribs.

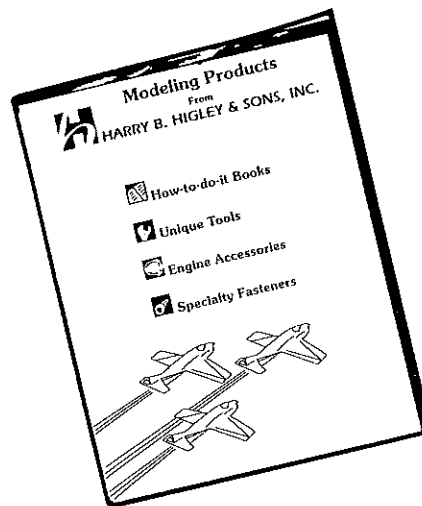
The dihedral breaks are completed in the same manner as a hand-launched glider wing, by beveling the 1/8 ribs to achieve the correct angles and butt-gluing the wing sections together using slow-curing CyA.

Install the soft-block wing tips, 1/8 gussets, and 1/16 plywood dihedral brace. Carve and sand the leading edge to shape and give the wing a careful sanding in preparation for covering. Eliminate any glue bumps or high spots that might interfere with a smooth covering job.

Stabilizer: The stabilizer ribs are cut utilizing the same method as the wing ribs. Notch the trailing edge with the notching tool prepared for notching the ribs.

Glue up the basic stabilizer assembly, including the spars; complete the stab construction by adding the diagonal ribs and soft block tips. Add the filler sheeting between the center ribs and finish-sand the stab in preparation for covering.

Covering: Give all surfaces to be covered three coats of full-strength nitrate dope,



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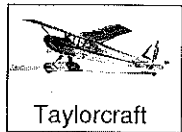
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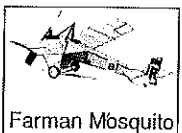
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sanding lightly between coats to remove the balsa "fuzz." By the third coat the balsa should have a smooth, shiny finish; if not, apply thinned nitrate until a smooth, glossy appearance is achieved.

Apply a good grade of Japanese tissue to all surfaces, with the grain running spanwise; use thinner brushed through the tissue around the perimeter of the part being covered to adhere the tissue to the framework. Work out any wrinkles with the reapplication of the thinner to "unstuck" the offending section before smoothing out the unsightly wrinkle.

The Zephyr is a breeze to cover, since there are no compound curves to negotiate. Use a mist spray of rubbing alcohol to shrink the tissue taut prior to doping.

After the alcohol is thoroughly dry, apply three coats of thinned nitrate dope (50% dope/50% thinner). Follow with two coats of Sig Lite-Coat butyrate dope for fuel-proofing.

Flight Trimming: After the flying surfaces are covered and the dope has cured sufficiently, assemble the airplane and check it carefully for warps. Each wingtip should have 1/8 washout (TE higher than LE). The right main panel should have 3/16 washin. Since the geodetic surfaces are difficult to warp, I used a five-inch-long strip of 3/16 TE stock reverse-glued to the right main panel to achieve the washin. The stabilizer should be absolutely flat. Do not attempt to fly the airplane until the surfaces are per the above instructions!

View the assembled airplane from the front to insure that the stabilizer is tilted parallel

with the right main panel. Check to see that the center of gravity matches the dimension indicated on the plan. If nose weight is necessary, remove the timer and add clay to the space behind the firewall. Now find that field with high grass on a day with light/no wind!

Remove the prop and begin test gliding with a firm launch at an imaginary spot 50 feet in front of you. Stalling should be corrected by removing packing from the rear of the stab; diving should be corrected by adding packing under the rear of the stab in 1/16 increments. The Zephyr should also exhibit a tendency to turn right; glide circle is determined by stab tilt.

Remember that when more shimming is required, a corresponding shim must be added to both the front and rear of the stab. Go slowly!

First power flights should be attempted with the prop on backwards at 90% power. A five-second engine run should be sufficient to discover flight trajectory.

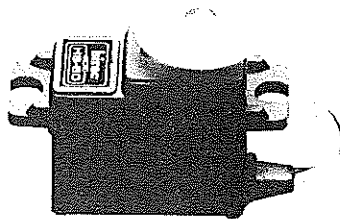
The Zephyr should climb out at approximately 60° with a definite turn to the right. A straight-up climb usually indicates a lack of incidence; correct by packing under the rear of the stab. If the Zephyr goes round & round (like a loop on its side) remove packing from under the rear of the stab.

Continue testing at 90% power, adding to the engine run time until you get the model grooved with a ten-second engine run, shimming as required.

Complete the trimming process by

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installing the prop correctly and going to full power. Reduce the engine-run time to four seconds and observe the power pattern closely.

The Zephyr should now be climbing very steeply (85%) with a definite right turn. Continue the trimming process by shimming as necessary to control climb angle and turn.

If the Zephyr shows a tendency to straighten out near the end of a 10-second run, add a slight amount of right rudder tab. Think out each change in your trimming process, and make only one change at a time.

When you are satisfied that you have optimized the trim, disassemble the Zephyr and schedule a trip to the next contest featuring 1/2A power. With its high-aspect-ratio wing and thin (7%) airfoil, the Zephyr will gain altitude in a hurry, so always light the DT fuse.

Good luck with your Zephyr; if you have any questions concerning building or flying your version, write to me and enclose a stamped, self-addressed envelope. Thermals!

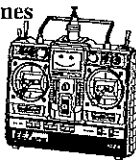
Changes for the FIJ version:

- 1) Build pylon lower (see dotted line on drawing) and build an engine cowl.
- 2) Build in a tube (soda straw) for actuating lines in fuselage (see section A-A for approximate location.)
- 3) Reinforce spar webs in wing with carbon fiber (see drawing note).
- 4) Install a hinged rudder tab (see drawing).
- 5) Do not build in stab tilt.
- 6) Trim with wing and stab at 0° incidence. Launch vertically! Use rudder tab to initiate glide pattern. This works better than bunting! About 3/16 tab was necessary to achieve a good rollout. Best glide was achieved with about 3/16 negative in stab. Actuate glide trim on stab 1 1/2-2 seconds after engine cut. ✈

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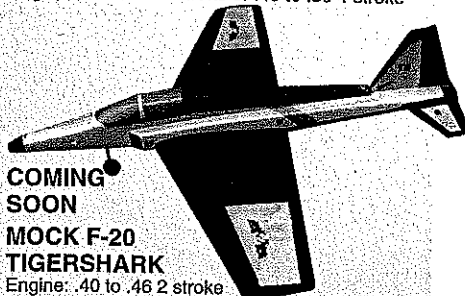
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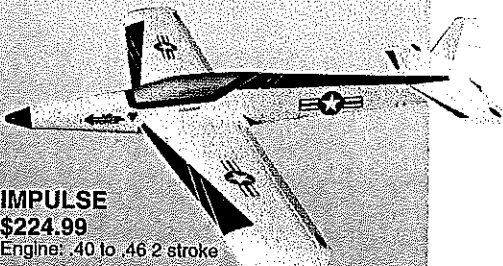
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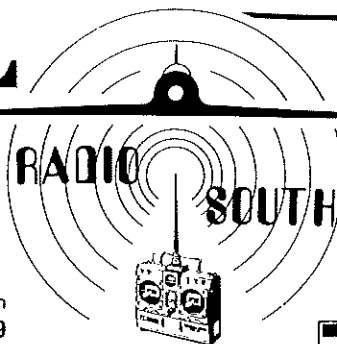
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