

FUN FLY events are big with our local clubs, and we began to feel the need for a light, nimble plane that would do well in them.

That's how the basic design roots of this model began. We named our smooth-flying, talented new sport plane Blitz.

The typical model flown at fun fly events is a Stik. Now, don't knock the Stik! I've owned a couple myself. The problem is that in Limbo and other low-to-the-ground, quick-response maneuvers this type of aircraft falls short.

What we needed was an airplane with a low wing-loading. A lightly loaded plane will turn

circles inside a heavier one, allowing those "space-saving" maneuvers that are the key to a fun fly model's survival. The design should be relatively compact, which is advantageous for Limbo-type events. It should also, when outfitted with a lightweight power plant, be able to attain a creditable range of speed.

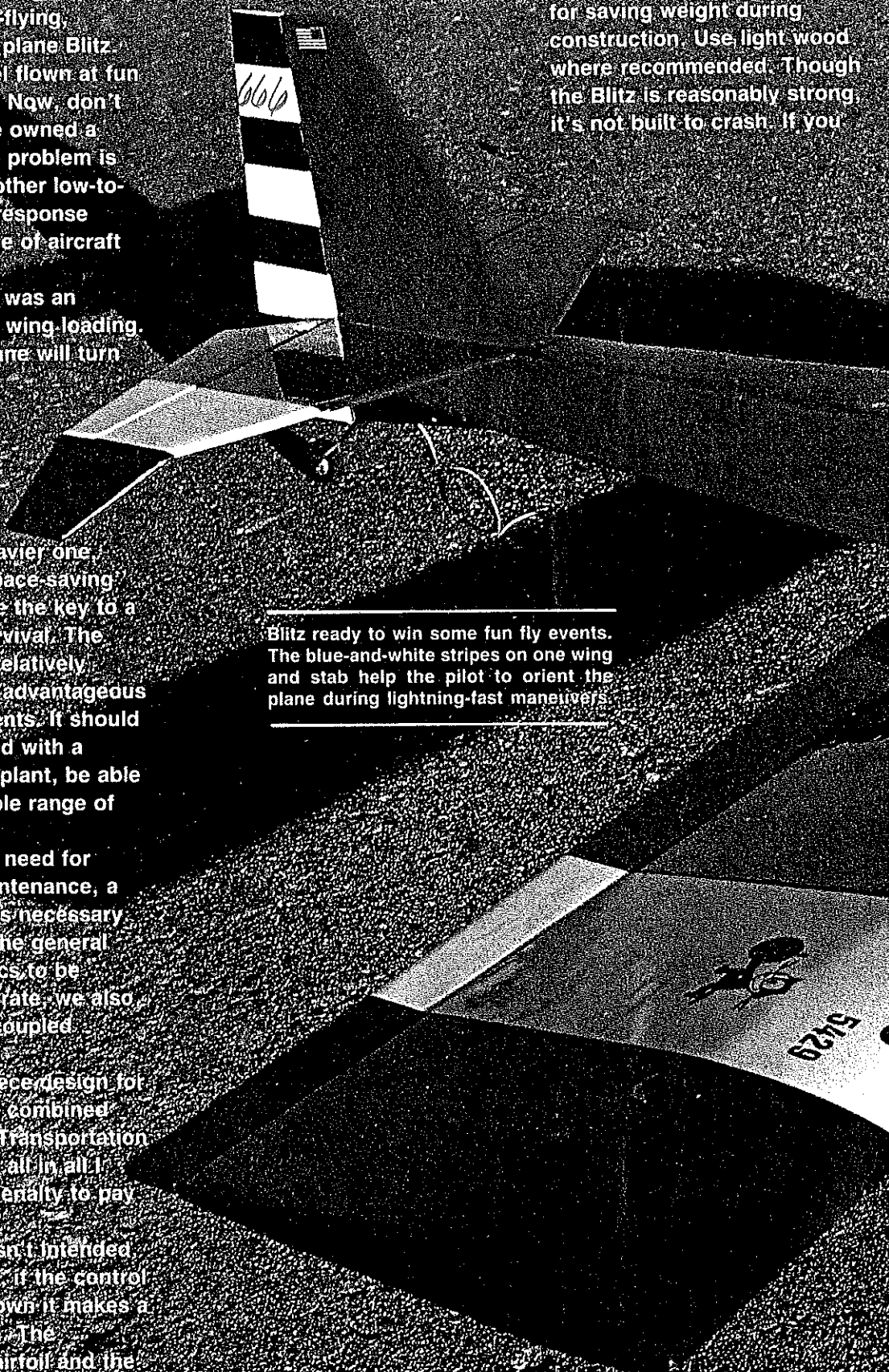
To eliminate the need for constant stick maintenance, a stable platform was necessary. Since we wanted the general flight characteristics to be smooth and deliberate, we also ruled out a close-coupled design.

I chose a one-piece design for moderate strength combined with light weight. Transportation is a drawback, but all in all I think it's a small penalty to pay for performance.

While the Blitz isn't intended as a first-time flier, if the control throws are kept down it makes a fine second model. The semisymmetrical airfoil and the anhedral stabilizer tips help to

decrease the landing speed to approximately what you'll find in most trainers. The anhedral tips also add to the top-end directional stability and increase the total area of the stabilizer without making it look out of proportion with the wing. (The drooping tips remind me of the Flying Nun.)

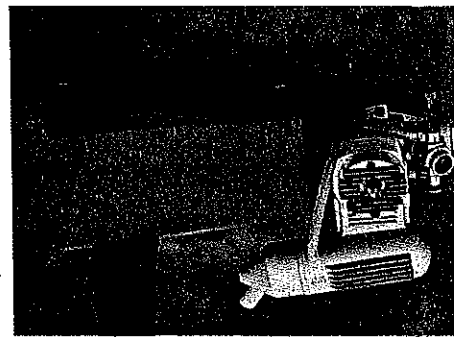
I want to emphasize the need for saving weight during construction. Use light wood where recommended. Though the Blitz is reasonably strong, it's not built to crash. If you



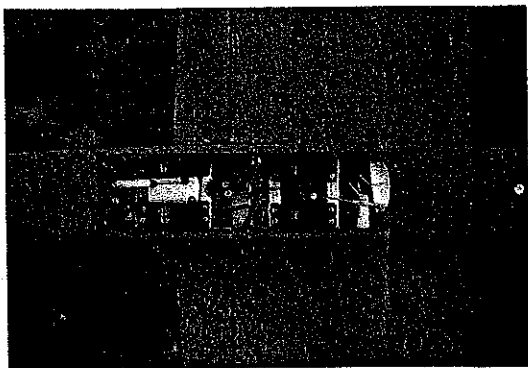
Blitz ready to win some fun fly events. The blue-and-white stripes on one wing and stab help the pilot to orient the plane during lightning-fast maneuvers.



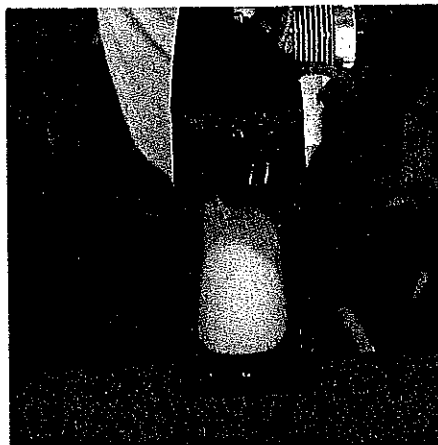
Looking down on Blitz shows its simple, boxlike construction. It's fast-building, lightweight, and relatively strong. The plane is responsive and capable of vertical maneuvers. It makes a great competitor or Sunday fun flier, and if built right should exhibit no pesky habits.



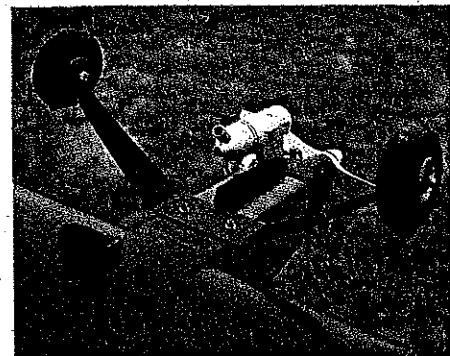
The business end of Blitz with a side-mounted O.S. .32, an ideal choice with its favorable power-to-weight ratio. Notice how the muffler exhaust points down, directing exhaust smoke and oil under the airplane.



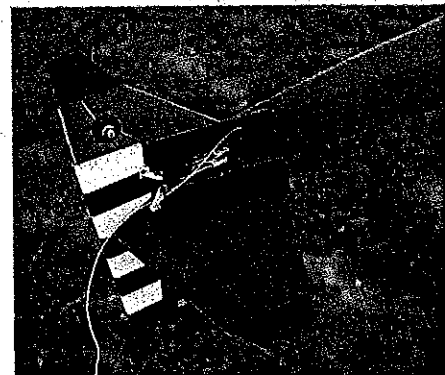
The radio compartment is tight. Miniservos are the preferred way to go, but if the budget dictates otherwise, standard servos will fit.



The 6-oz. fuel tank nestles nicely in its compartment. There is just enough room to wedge thin foam between the tank and fuselage sides to ensure nonfoaming performance.



The Halco 105-4B landing gear with Sullivan 2 3/4-in. Sky Light wheels. This combo looks good, works great, and weighs very little.



The Great Planes L-7 tail gear assembly fits nicely into the sub-fin. Both pushrods exit the same side. Note the anhedral stab tips.

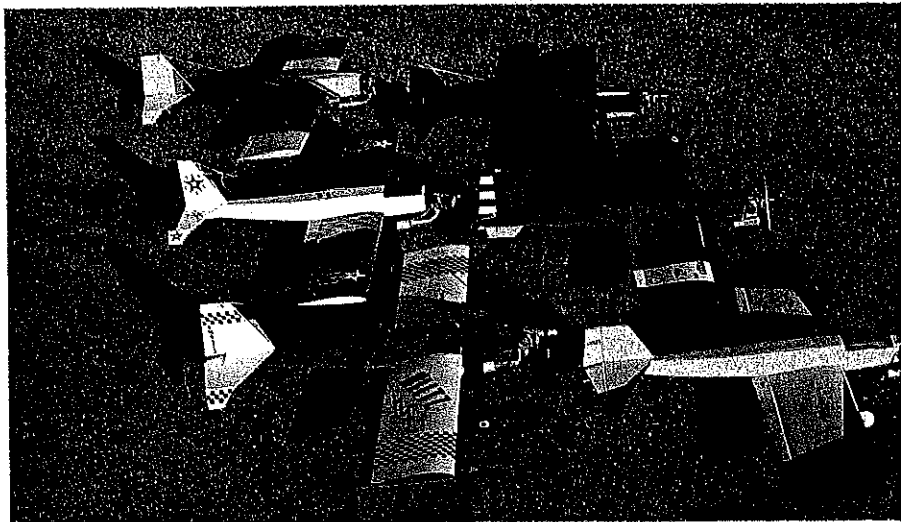
**Wing.** Build the right panel first. Cut out 22 ribs from  $\frac{1}{32}$  medium balsa. Cut the leading and trailing edges to the proper length. The trailing edge has a definite top and bottom. Use the plan as a guide if confused. Glue a root and tip rib onto the leading and trailing edge. Make sure the rib noses are centered on the leading edge, leaving equal space for the  $\frac{1}{16}$  top and bottom sheeting that will be fitted later.

Glue the  $\frac{3}{16}$  x  $\frac{1}{4}$ -in. spar onto the bottom of this assembly. Using the plan as a guide,

glue the remaining ribs in place, then glue in the top spar. Add the optional carbon fiber, if desired. Although the model has been built without the carbon fiber with no problems, I highly recommend including it.



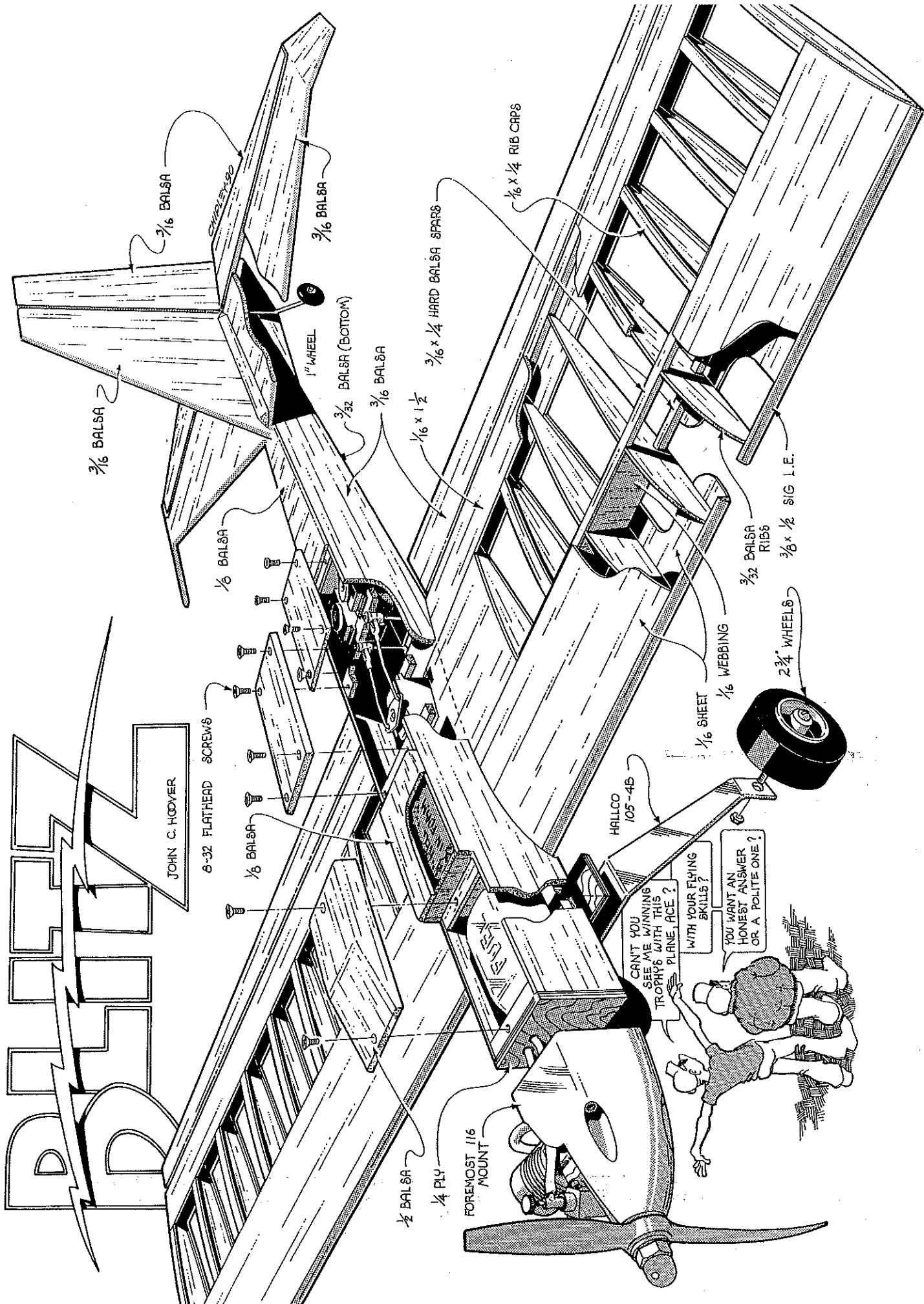
The author/designer/owner proudly displaying Blitz. That smile comes from successfully executing about 30 low-altitude knife-edge flybys for his photographer, Charles Lewis.

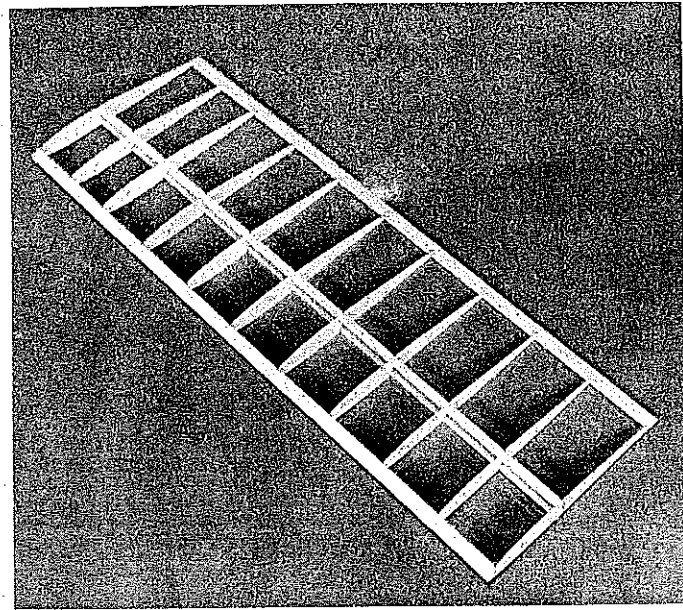
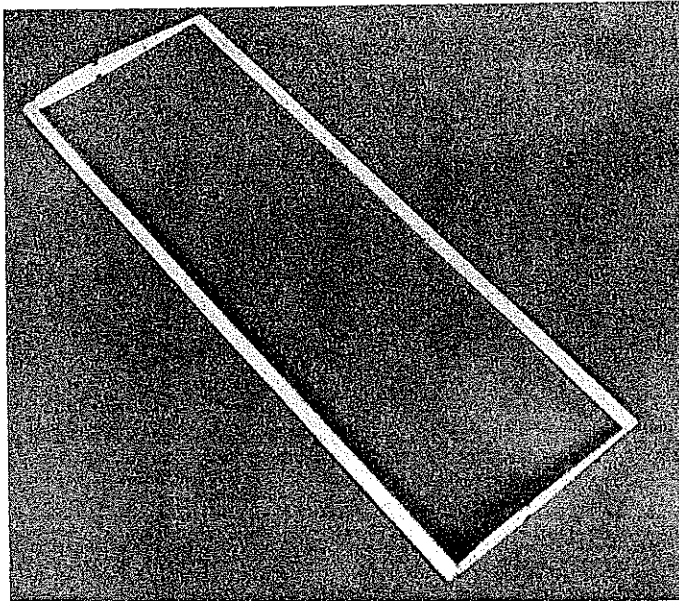


A colorful collection of Blitzes built by the author and fellow members of his flying club near Grand Rapids, MI. The first two airplanes in the front row are the author's, the third, dark red ship was built by Paul Yoakem. The first plane in the back row is the work of Bill Whitney, the second one is Marty Scharf's, and the third, dark blue Blitz is the creation of Jim Trutsch

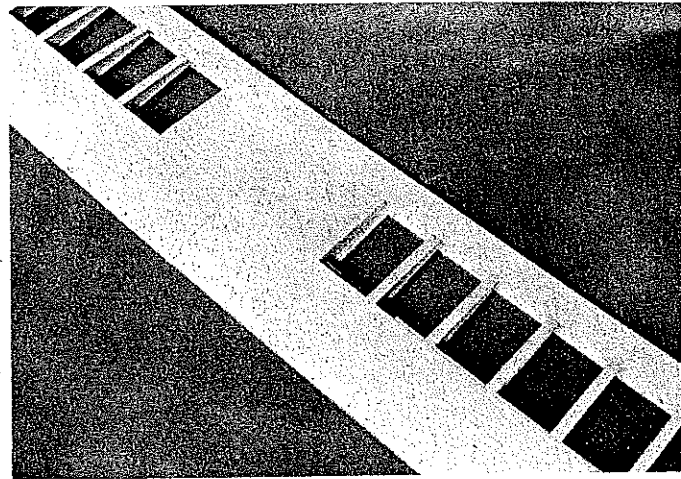
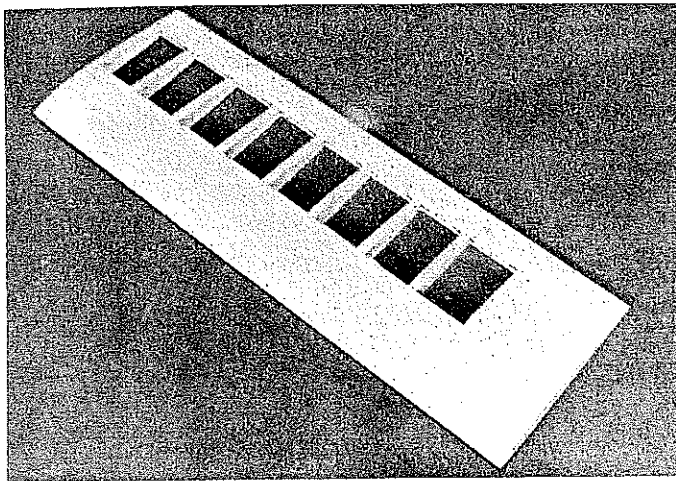
# BUILD

JOHN C. HOOVER





Left: Wing construction starts by joining the inboard and outboard ribs to the leading and trailing edges of the right panel. Right: Internal structure of the panel is almost complete. All the ribs and upper and lower spars have been installed. Carbon fiber may be added to the spars.



Left: All the external sheeting has been installed, the rib caps are in place, and the wing is ready for joining to the left panel. Right: The two panels are joined. All that's left is reinforcing the joint with tape and resin, cutting out and fitting the ailerons, and carving the wing tips.

Nature didn't make models, and I'd rather not have my bird's wings flap.

Add the  $\frac{1}{16}$  vertical grain shear webbing. Use Sig's  $\frac{1}{16}$  contest-grade balsa for the wing sheeting. Its exceptional lightness will contribute greatly to the overall performance of the model. Use a file to make sure there is adequate clearance for the  $\frac{1}{16}$  sheeting before adding it. Add the top  $\frac{1}{16}$  x 3-in. leading edge sheeting and the top 1½-in. trailing edge sheeting. Sheet the bottom of the wing in the same fashion as the top, again with  $\frac{1}{16}$  balsa.

Sand the root and tip flush with the ribs. Glue on the  $\frac{1}{16}$  x ¼-in. rib caps. Glue the  $\frac{1}{32}$  balsa sheet to the tip. Carve and sand the tip to the same shape as the rib.

Using the plan as a guide, cut the ailerons out of  $\frac{3}{16}$  medium-to-hard balsa stock, then round them to a nice contour.

Repeat the above steps with the left wing panel. Glue the two wing halves together with one inch of total dihedral (measured at

the tips). Using polyester resin, glue ¼-in. nylon reinforcement tape around the entire wing center. Set the wing aside.

**Fuselage.** Begin by cutting out all the parts. Using  $\frac{3}{16}$  balsa, cut the fuselage sides, F-2 through F-4 bulkheads, vertical fin, sub-fin, rudder, horizontal stabilizer, stabilizer tips, and elevator. Cut out the two FS-1 pieces from ¼ x ¾-in. balsa. F-1 is cut from ¼-in. ply, and LG-1 from  $\frac{3}{16}$  ply. Align the Fourmost #116 mount to F-1, making the two pieces fit perfectly. Mark and drill the holes for the engine mount.

Mark the inside of each fuselage half where F-2 and F-4 will be located. Using two Acme 3001 spherical elastic clamps (rubberbands), strap the fuselage sides together with F-2 and F-4 in their proper positions. Hold the rear of the fuselage together with an Acme 3002 wood-and-spring-steel high-tension clamp (clothespin).

Before gluing F-1 into place, make sure

you leave a  $\frac{3}{16}$ -in. clearance for the bottom sheeting. Release the 3002 clamp, apply a little glue to F-1, and reclamp.

Glue in the remaining bulkheads. Remove all those "high-tech" clamps and put them in a safe place for your next important project.

Glue LG-1 into place. Add the front bottom  $\frac{3}{16}$  fuselage sheeting. Glue in the ¼-in. triangular stock as shown on the plan. Make sure you leave room at the top for the ¼ x ¾-in. spruce hatch hold-down pieces. Glue these pieces in place; then glue in the ½ x  $\frac{3}{16}$  hatch support pieces. Glue the two FS-1 pieces in place. Use section AA from the plan as a fitting guide. Fit these two pieces carefully, as they build considerable strength into the fuselage.

Using the plan as a guide, drill holes for the pushrod exits at the rear of the fuselage and through F-4. I used Sullivan #503 pushrods on most of the prototypes. Use clear silicone on the inside of the fuselage at the exit

**BLITZ**

SKETCHES FOR THE CONSTRUCTION OF THE BLITZ MORTAR ENGINE

SHEET 1 OF 2


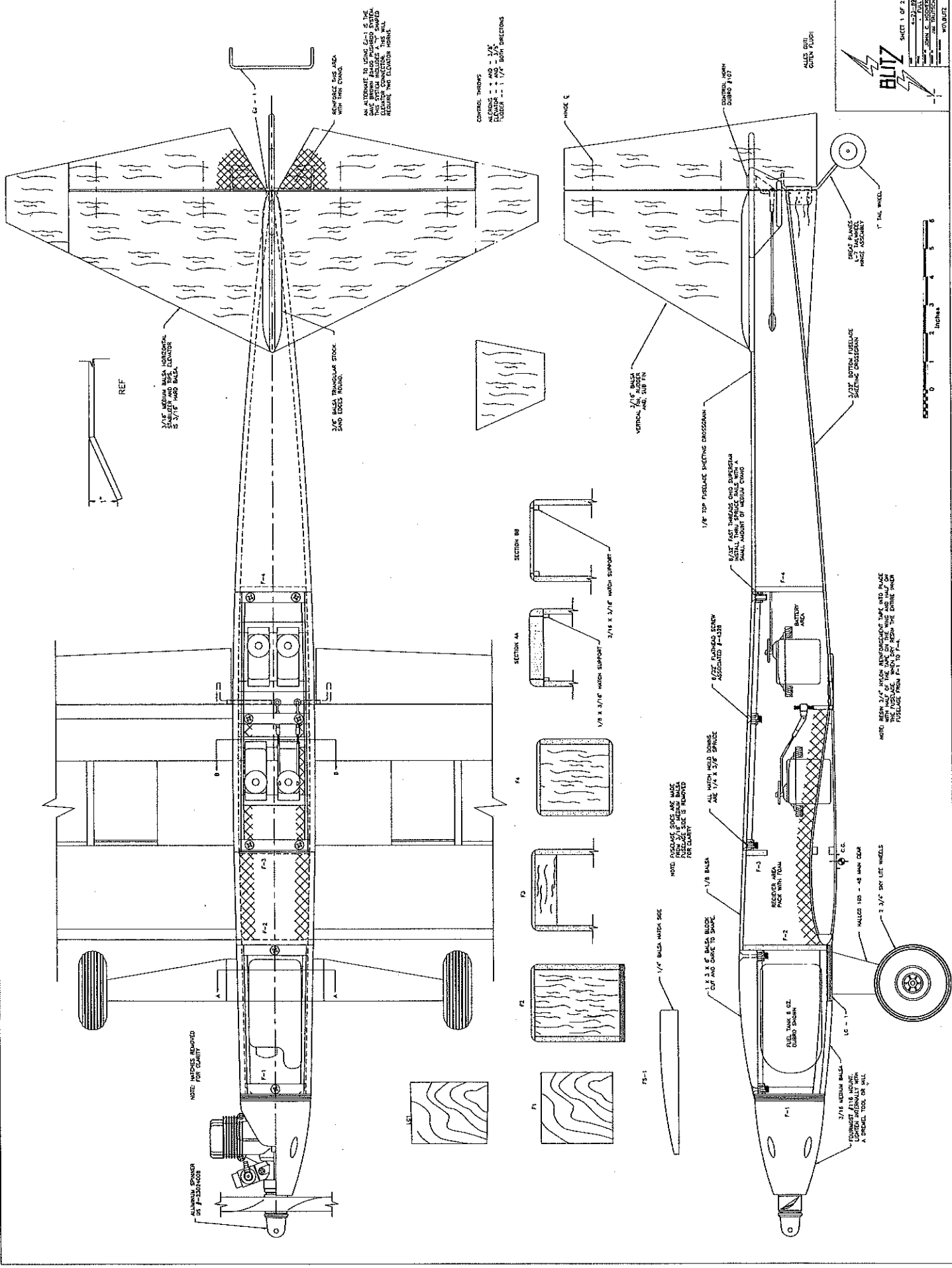
DATE: 11-15-48

DESIGNED BY: JAMES M. GIBSON

DRAWN BY: JAMES M. GIBSON

APP'D BY: JAMES M. GIBSON

WPA-1827

ALUMINUM SPINNER OR P-35214608

NOTE: MATCHES REQUIRED FOR CLARITY

REF

3/16" MEDIUM BALS, HORIZONTAL SERRATIONS AND ONE CENTER S. 3/16" HARD BALSA

3/8" BALSA REINFORCEMENT STOCK, SAND EDGES ROUND

1/8" BALSA WITH 1/8" CYLIND.

AS ATTEMPTED TO LOCATE PLACES OF THE BALSA WHICH MIGHT BE SUBJECT TO BREAKAGE, IT WAS FOUND THAT THESE PLACES WOULD REQUIRE TWO ELEVATION HORNS.

CONTROL THROBS  
 ELEVATION = + AND - 1/4"  
 CONTROL = + AND - 1/4"  
 HEIGHT = + AND - 1/4" (BOTH SECTIONS)

HINGE C

CONTROL SPARK DUBBO P-107

ALUMINUM CUTTING FLASK

1" DIA. WHEEL

BRASS PLATES AND 1/8" MEDIUM HARD BALS REINFORCEMENT

3/32" BOTTOM FUELAGE SHEETING CROSSBAR

1/8" TOP FUELAGE SHEETING CROSSBAR

8/32" PAST THREADS AND SUPERFICIAL RIVETS FOR ATTACHMENT OF SMALL AMOUNT OF MEDIUM BALSA

VERTICAL 1/8" BALSA AND SUB FIN

NOTE: BEGIN 3/4" NYLON REINFORCEMENT TAP INTO PLACE AND TIGHTEN UP ON WHEEL FOR REMOVAL OF THE DRIVE AND FUELAGE FROM F-1 TO F-4

SECTION B

SECTION A

2 1/4 x 3/16" WOOD SUPPORT

1/8 x 3/16" WOOD SUPPORT

1/8" BALSA WITH 1/8" CYLIND.

NOTE: REINFORCEMENT PLACES ARE MADE FROM 3/16" MEDIUM BALSA FOR CLARITY

1/4" BALSA WHEEL SIZE

1/8" BALSA

ALL WITH HOLE DRIVERS ARE 1/4" x 3/8" SPACERS

3/16" MEDIUM BALSA CUT AND SAWN TO SIZE

RECEIVER AREA FACE WITH 1/8" BALSA

8/32" PAST TAP ASSOCIATED P-4328

BATTERY AREA

3 3/4" DIA. WHEELS

WALLOWS 120 - 48 MAX. CLEAR

3 3/4" DIA. WHEELS

3/16" MEDIUM BALSA

FOURING 2 1/2" JOINT, LOCKED INTERNALLY WITH A SPINAL TOOL OR SIM.

12 - 1"

RECEIVER AREA FACE WITH 1/8" BALSA

8/32" PAST TAP ASSOCIATED P-4328

BATTERY AREA

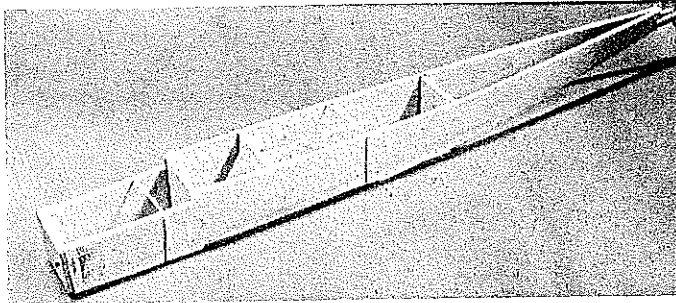
3 3/4" DIA. WHEELS

WALLOWS 120 - 48 MAX. CLEAR

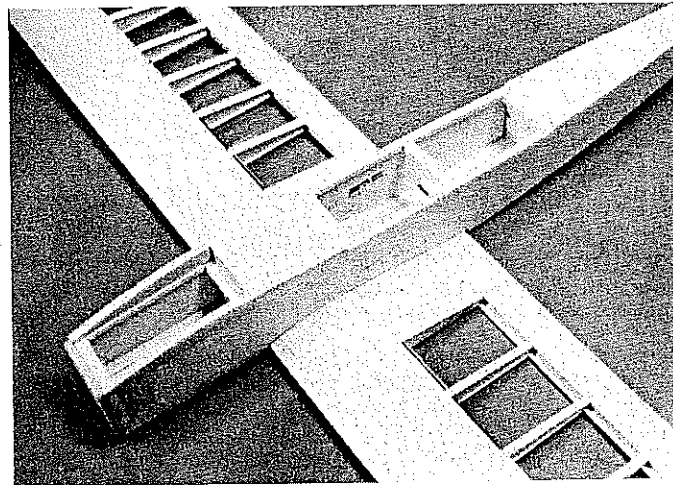
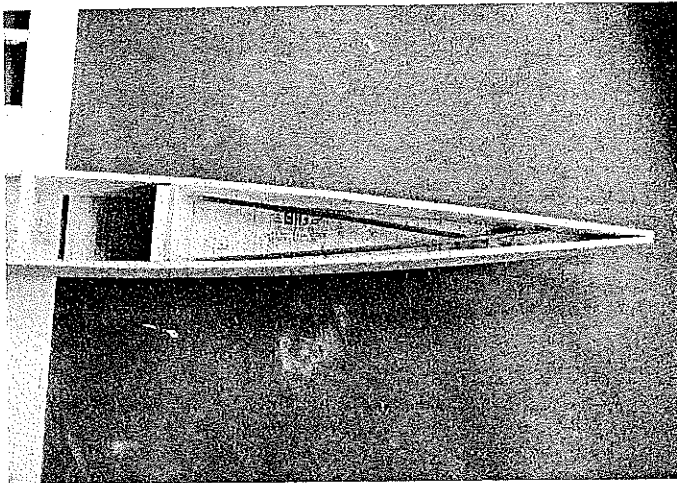
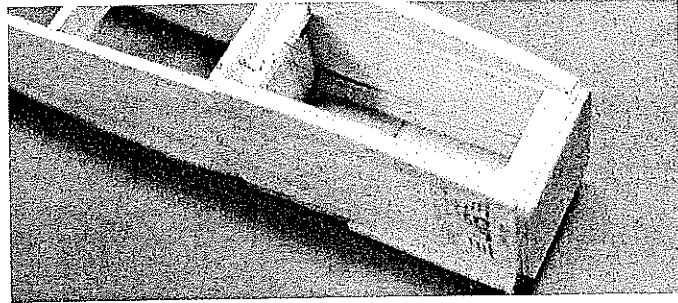
3 3/4" DIA. WHEELS

3/16" MEDIUM BALSA

FOURING 2 1/2" JOINT, LOCKED INTERNALLY WITH A SPINAL TOOL OR SIM.



Left: The fuselage begins to take shape. The major bulkheads have been installed. The fuselage sides have been pulled together at the tail and are being held in place with a clothespin. Right: Close-up details of the nose section/fuel tank compartment. The bottom sheeting is roughed in, the triangular stock in position, and the forward hatch framing and side pieces (FS-1) are in place and ready for carving and sanding.



Left: The aft fuselage section showing the bottom sheeting in place and the pushrod tubes installed. Right: The fuselage is essentially complete with the addition of the top sheeting and main hatch framing. The wing is permanently attached, forming a strong, one-piece structure.

points to secure the outer pushrod. To my knowledge, silicone seems to be the only permanent way to glue this type of material. Some of the Blitz prototypes used the Dave Brown #5400 fiberglass pushrod system. This includes a Y setup for the elevator, eliminating the need to make the  $\frac{3}{32}$  piano wire EJ-1 piece.

Install the top  $\frac{1}{8}$ -in. cross-grain sheeting, making sure to leave clearance for the horizontal stabilizer. Glue on the  $\frac{3}{32}$  cross-grain bottom sheeting.

Cut to proper length and glue into place the  $\frac{1}{4} \times \frac{3}{8}$ -in. spruce hatch hold-down rails. Glue in the  $\frac{3}{16} \times \frac{3}{16}$  balsa hatch support pieces.

Use slow-setting CyA or epoxy glue to attach the wing to the fuselage. Be certain of perfect alignment before using kicker to set the CyA, or before the epoxy sets. The leading edge of the wing should butt up against F-2.

Using soft  $\frac{3}{16}$  scrap balsa and filler, fair the bottom of the fuselage nicely into the wing. Mix up an ounce or so of polyester resin, and coat the entire fuel tank and radio compartment. Add  $\frac{3}{4}$ -in. #456 nylon tape to the wing/fuselage union area. Don't scrimp on the resin during this step. The model's strength is dependent on the resined wing-to-fuselage union.

Install the Fourmost engine mount onto F-1 using 4-40 x 1-in. bolts with blind nuts. Cut the 1 x 3 x 6-in. block to fit between the FS-1 pieces. Carve the block to shape, and sand the nose to match the mount.

Cut the  $\frac{1}{8}$ -in. hard balsa hatch to shape.

Glue the  $\frac{1}{8}$ -in. scrap balsa pieces on top of the fuselage next to the hatch. Be careful not to glue the hatch down in the process. CyA takes on extraordinary powers when you don't want it to stick!

Drill the hatches, and install Ohio Superstar 8-32 Fast Threads. Use a large drill bit to chamfer the hatches to clear the heads of the 8-32 screws.

**Stabilizer, elevator, and pushrods.** Glue the anhedral tips onto the horizontal stabilizer. Make sure they both measure exactly one inch. Glue the horizontal stabilizer assembly into place, making certain the stabilizer is aligned with the wing. Glue in the vertical stabilizer. You can add the triangular stock now, or after covering the model.

Cut a slot in the sub-fin for the L-7 tail wheel assembly from Great Planes. Epoxy in the sub-fin. Since this is a high-stress area, you'll want to apply the epoxy liberally. Drill a hole in the rudder to fit the L-7 wire.

Unless you're using the Dave Brown pushrods, make EJ-1 using  $\frac{3}{32}$  piano wire. Drill the elevators and slot them to fit this piece; use the plan as a guide to assure that the assembly is the proper size. Lay the assembly on a flat surface to check for alignment. When satisfied, glue the pieces together with slow-setting CyA. Soak the elevator with thin CyA in the area shown on the plan to help improve its strength. Carefully sand the entire model.

Cut and bend the #402 strip aileron linkages to the proper length and shape. Drill

the ailerons and slot them to accept the control rods.

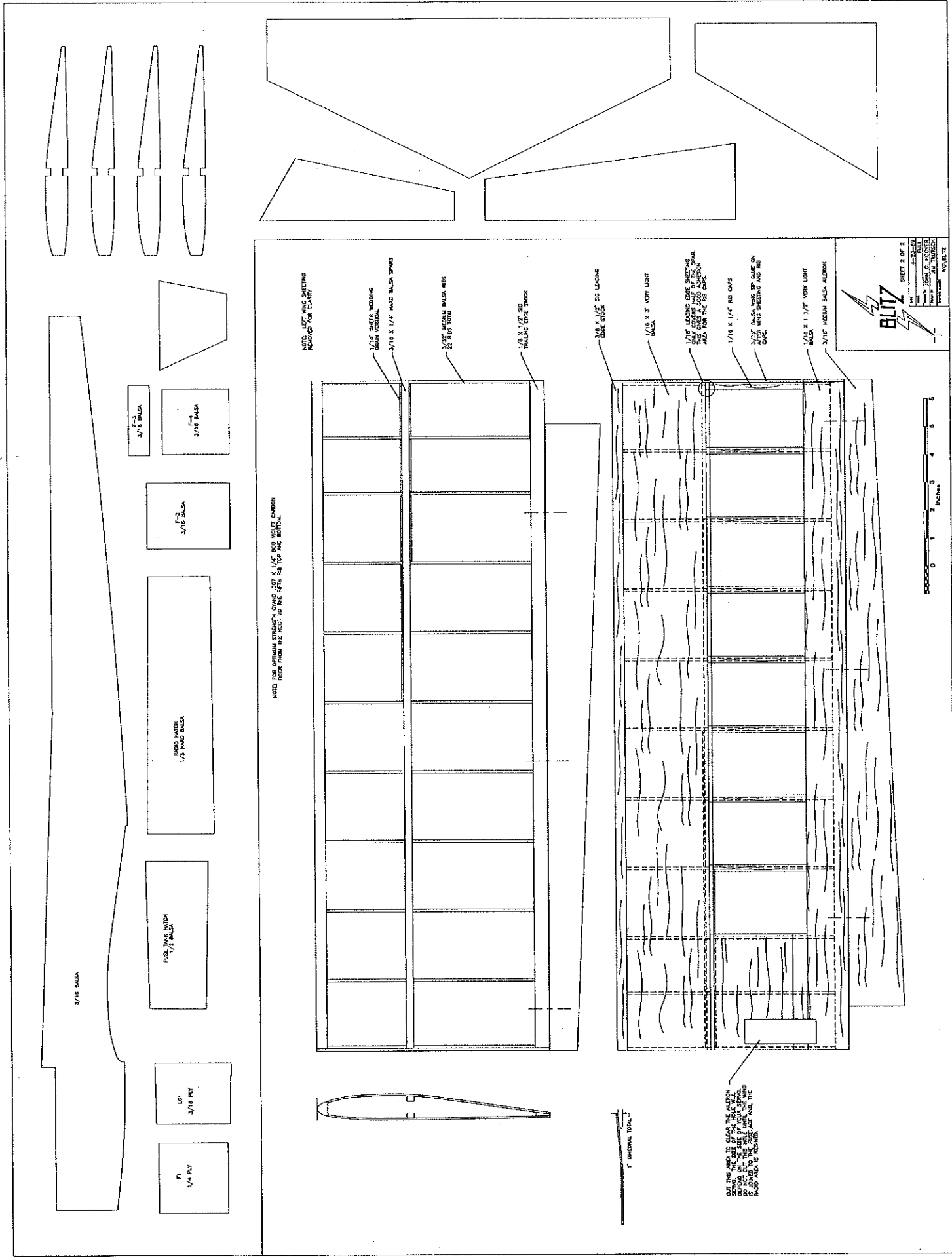
**Covering and finishing.** Give the model a final sanding, then cover it with the material of your choice. Use thin CyA to attach the Sig E-Z hinges at the locations shown on the plan. Use epoxy to glue the ailerons to the torque rods.

Drill the Hallco 105-4B landing gear. Bolt it to the fuselage with 8-32 bolts and blind nuts. (I use Goldberg #302 axles with the Hallco gear for a superior setup.) Mount the wheels on the axles, and secure them with  $\frac{3}{32}$  wheel collars.

Install the Du-Bro 100 TW tail wheel on L-7, retaining it with  $\frac{3}{32}$  collars. Drill and tap the engine mount for the 4-40 mounting screws. The mounting holes run a little close to the edge of the mount but are anchored into a beefy part once they get through the beam. Drill holes in the firewall for the fuel lines. Drill a hole for the Sullivan #508 throttle cable. I like to use E-Z line by Standale since it's bendable by heat.

**Radio installation.** Although I use small equipment in my models to keep the weight down, the plan shows standard-size servos. While the installation is a bit tight, they will fit. It's a matter of what the budget will allow.

Cut  $\frac{1}{4} \times \frac{3}{8}$ -in. spruce servo rails to the proper length, then install all four servos. Install Du-Bro #107 control horns onto the rudder and elevator. Hook up the rudder and elevator, using Z-bends on the servo



NOTE: LEFT WING SHEETING REQUIRED FOR CORNER

NOTE: FOR OPTIMAL STRENGTH, CHANG JOIST X 1/4\"/>

- 1/4\"/>
- 3/16\"/>
- 3/32\"/>
- 1/8\"/>
- 3/8\"/>
- 1/4\"/>
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**BLITZ**

SHIRT 2 OF 2

DATE: 10-1-90

BY: J. J. BLITZ

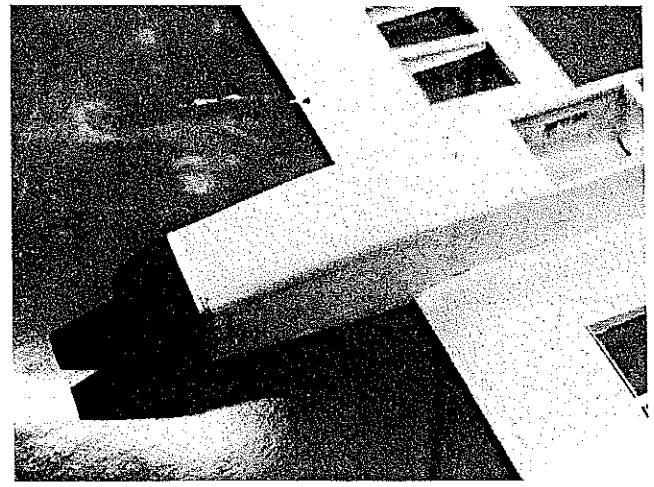
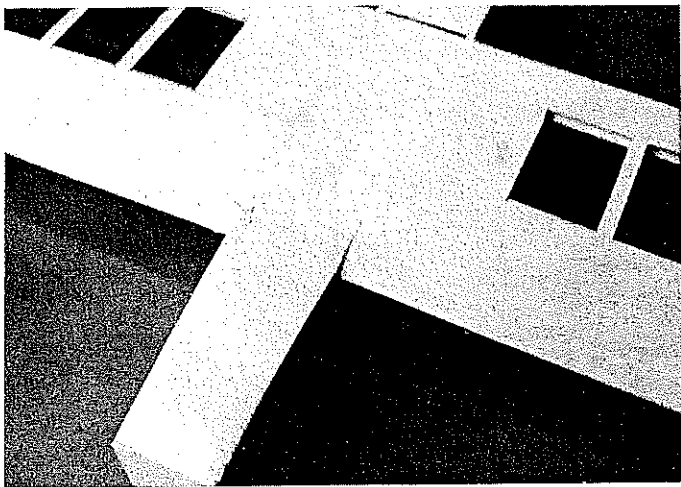
PROJECT: SHIRT 2 OF 2

SCALE: 1/8\"/>



GET THE HOLES TO CLEAR THE ALUMINUM STRIPS. THE EDGE OF THE HOLES WILL BE MADE WITH THE FILE. PARTS THE HOLES SHOULD BE REAMED AND THE BLIND HOLES REAMED.

1\"/>



Left: The forward bottom sheeting being faired and sanded to blend smoothly with the bottom of the wing. Right: The forward hatch is fitted and sanded to shape, and the Fourmost No. 116 engine mount has been temporarily installed so that the fuselage can be faired to it.

side and a 2-56 clevis on the other end. Try to set the amount of control surface throw shown on the plan.

Bend and cut to the correct length two 2-56 rods. Z-bend one end, and use a clevis on the other to hook up the aileron, again attempting to attain the proper control throw. Hook up the throttle using the Sullivan #508 flex cable. Use a Du-Bro E-Z connector on one end and a Du-Bro #190 on the other.

Install the Du-Bro #406 fuel tank, packing ¼-in. foam rubber around it to reduce any likelihood of fuel foaming from engine vibration.

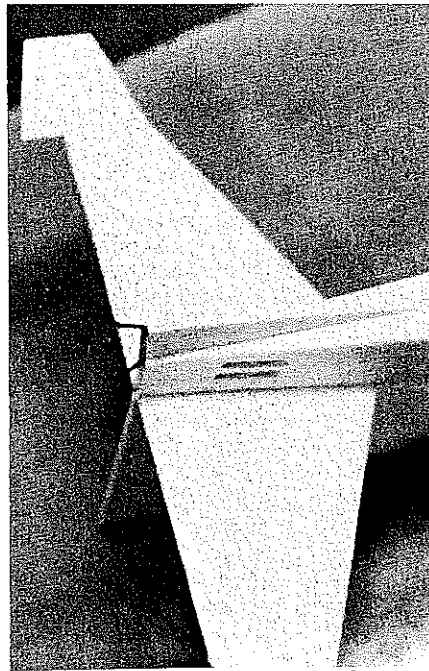
Pack the receiver with ½-in. foam, and install it in the location shown on the plan. Install the switch. I usually put the switch between the two groups of servos. Exit it through the fuselage side opposite the exhaust. The battery should rest between F-4 and the rudder and elevator aft servo rails in order to retain correct CG (center-of-gravity). Again, isolate the battery with foam to save it from vibration damage.

With the radio installation complete, check the model for balance. Add weight to the nose or tail if necessary to achieve the proper CG. Your Blitz should now be ready to fly!

**Flying.** If balanced properly and given the control throws as shown, Blitz isn't an overly touchy model. I like to fly smooth maneuvers that look as if they're done on purpose. If you like a bit of ultraviolence, set the control throws up.

There really aren't any bad habits to watch for. If you've built Blitz as a second model after your trainer, let an experienced pilot take it up for its first flight. Cut the throws to about ¼ in. on all control surfaces until you get the hang of how the model responds. Assuming the use of a power plant in the recommended range, the more experienced flier will have no trouble performing knife-edge loops. I've done them many times with this airplane.

Built as lightly as possible, this sprightly model can put a bit of extra fun in your fun flying. Any questions or comments? Send them to me: John C. Hoover, 1416 Bradford St. N.E., Grand Rapids, MI 49503.



The almost-finished tail section showing the sub-fin with its tail wheel assembly installed. The anhedral stabilizer tips have been installed, and the pushrod cutouts are completed. The rudder, elevator, and hinges will be installed after the model is covered.

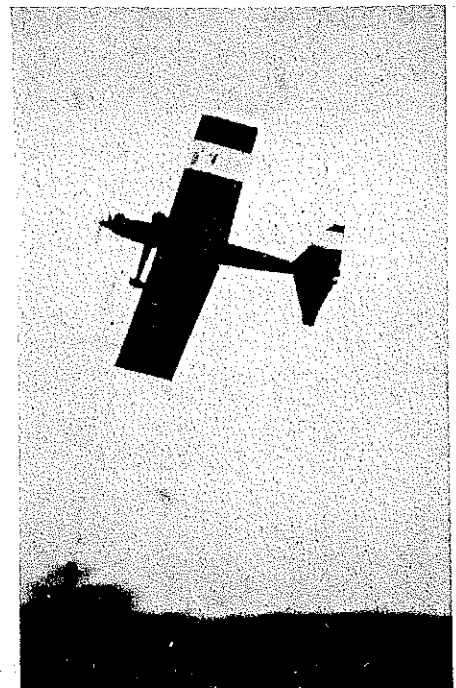
Verfertigen alles gut! Gut Fliegend mit dem Blitz!

#### Materials List

(Wood is all Sig balsa unless noted)

- 4— $\frac{1}{16}$  x  $\frac{1}{4}$  x 36 in.
- 6— $\frac{1}{16}$  x 3 x 36-in. contest balsa
- 5— $\frac{3}{32}$  x 3 x 36 in.
- 1— $\frac{1}{8}$  x  $\frac{3}{16}$  x 36 in.
- 2— $\frac{1}{8}$  x ½-in. trailing edge
- 1— $\frac{1}{8}$  x 3 x 36 in.
- 1— $\frac{1}{8}$  x 3 x 36-in. hard balsa
- 1— $\frac{3}{16}$  x  $\frac{3}{16}$  x 36 in.
- 4— $\frac{1}{16}$  x  $\frac{1}{4}$  x 36 in.
- 5— $\frac{3}{16}$  x 3 x 36 in.
- 1— $\frac{3}{16}$  x 6 x 12-in. plywood
- 1— $\frac{1}{4}$  x 6 x 12-in. plywood
- 1— $\frac{1}{4}$  x  $\frac{3}{8}$  x 36-in. spruce
- 1— $\frac{1}{4}$  x  $\frac{3}{4}$  x 36 in.
- 1—¼-in. triangular stock
- 2— $\frac{3}{8}$  x ½-in. leading edge
- 1—1 x 3 x 6-in. block

- 2—Associated #4328 8-32 aluminum screws
- 1—Bob Violett #1100 .007 x ¼ x 36-in. carbon fiber
- 1—Du-Bro #100 1-in. tail wheel
- 1—Du-Bro #121 B-Z connector
- 1—Du-Bro #133 ½ wheel collar
- 2—Du-Bro #140 ½ wheel collars
- 4—Du-Bro #176 4-40 x 1-in. bolts with blind nuts
- 1—Du-Bro #190 ball link
- 1—Du-Bro #406 6-oz. tank
- 2—Goldberg #302 axles
- 1—Goldberg #331 rod and clevis
- 1—Goldberg #402 strip aileron
- 1—Goldberg #456 ¾-in. nylon tape
- 1—Goldberg #482 foam
- 1—Goldberg #525 8-32 x ¾-in. bolt
- 1—Goldberg #573 blind nut
- 1—Great Planes L-7 tail wheel assembly
- 1—Hallco #105-4B landing gear
- 2—Ohio Superstar 8-32 Fast Threads
- 1—Standale Easy Line
- 1—Sullivan #508 flex cable
- 1 set—Sullivan 2¾-in. Light Flight wheels
- 1—½-in. piano wire



Blitz doing what it does best, a low altitude knife edge. Note the rudder deflection. This model is great for honing your flying skills.