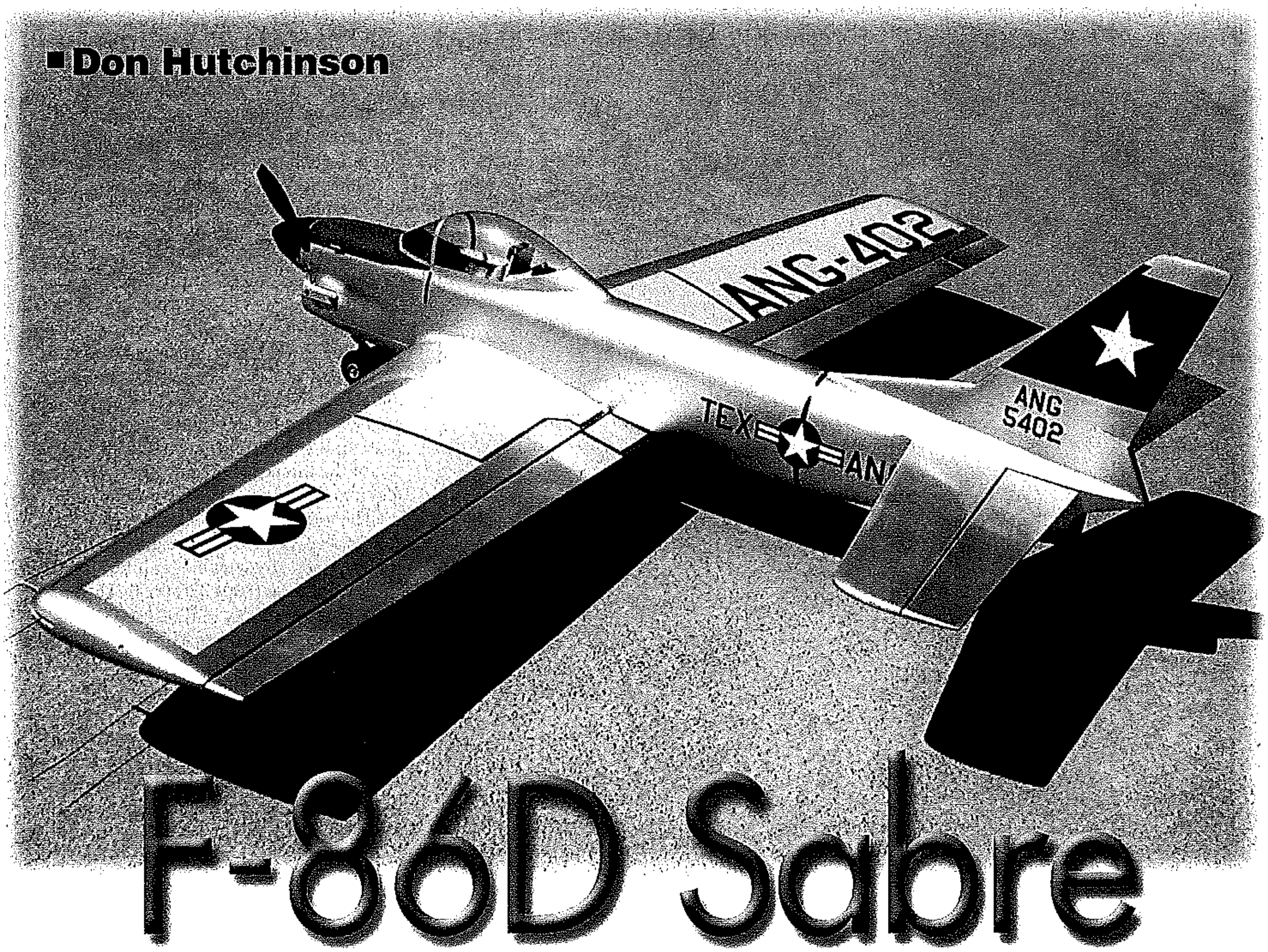
#945

■ Don Hutchinson



F-86D Sabre

Famous Korean War-era fighter is perfect for sleek CL Precision Aerobatics model

THE NORTH AMERICAN F-86D Sabre, the Northrop F-89 Scorpion, and the Lockheed F-94 Starfire were the mainstays of the Air Defense Command's fighter-interceptor force during the 1950s. The F-86 filled the bulk of the Air Defense Command role with its use in 20 of the 30 wings that made up the force. It continued to serve into the mid-1960s with the Air National Guard (ANG) as more modern equipment replaced it in the US Air Force.

There are many good books available if you want to delve into this great airplane's history. My first experience with the F-86 was in 1956 when I was a crew chief on an F-86A in the California ANG, hence the paint job. Also, the ANG uses all block letters; since I cut all of my own lettering decals, it is much easier to make

Chief test pilot Bart Klapinski (L) and designer/builder Don Hutchinson after a successful test hop. Bill Heyworth photo.

this style with no curved lines.

We fly a P-40 event (for any profile model, with a .40 maximum engine size) here in Texas, so my strategy was to design an F-86A with a Fox .35 up front. It flew so well that I just had to do a full-fuselage version, and the F-86D was the natural choice with that big spinner on the nose simulating the radome. You also get a little more propeller clearance with the higher thrustline.

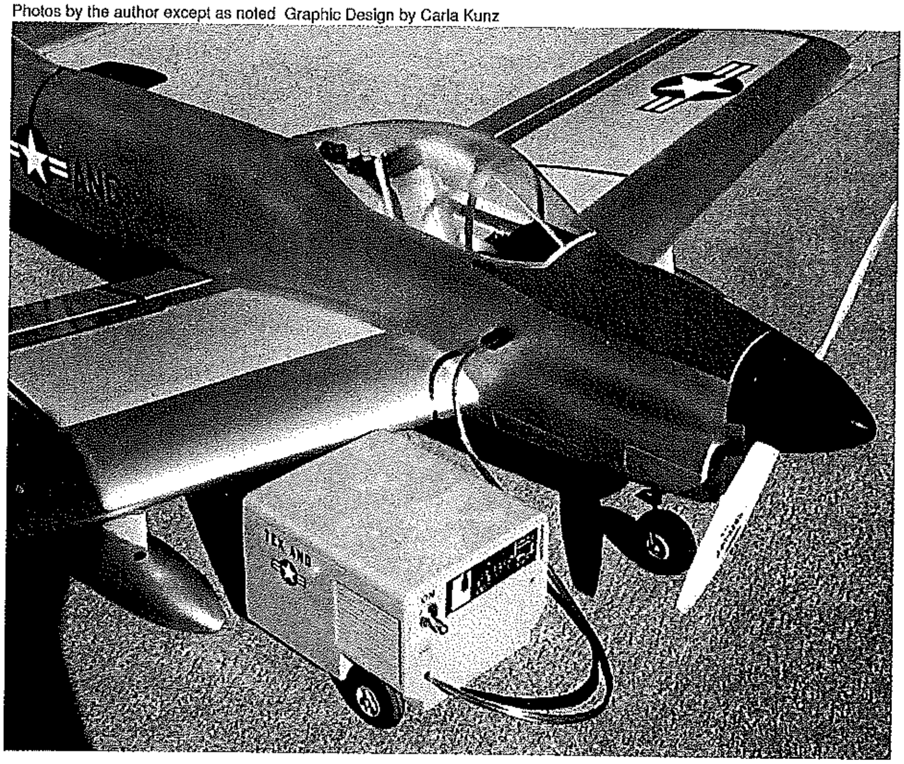
I sketched a wing and tail of the desired areas, then I scaled up the profile view from the reference (cited at the end of this section) in the proper length to fit them. The wing is not quite in the correct location, requiring an inch of built-in dihedral to get the leadouts in the right position for the proper vertical center of gravity (CG) location for Control Line (CL) flight.

The wing and tail sweeps are considerably less than the full-scale aircraft's, but the fuselage profile is accurate. The overall effect is a good caricature, and it flies surprisingly well!

The model was initially powered with an O.S. .40 FP, which I later exchanged for an O.S. .46 LA. This is a direct replacement if you swap the plastic backplate with the metal one from the .40. Another great engine choice for this model is the Magnum XL .36. It is powerful, light, and still allows use of the thinner .015 lines; the .46 requires the .018 cables.

The reference is the book *North American F-86D/K/L Sabre Jet* part 1 by Ray Wagner. If you can't get it locally, try Zenith Books at (800) 826-6600. The book's stock number is 130211C. It will help you to have a book with many photos to use for reference.

Photos by the author except as noted Graphic Design by Carla Kunz



A scale APU houses the starting battery. Judges love these little details!

CONSTRUCTION

The F-86's construction is conventional, so if you have built other CL Precision Aerobatics (Stunt) models from drawings like these you shouldn't encounter any real snags along the way.

I'm fortunate enough to live approximately 25 miles from Riley Wooten's Lone Star Balsa factory (115 Industrial, Lancaster TX 75134;

Where's the pilot? This shot shows the Sabre's great stability. It's a nicely balanced package. Elwyn Aud photo.

information: [972] 218-9663; order: [800] 687-5555; Web site: www.lonestar-models.com), so obtaining good wood is not a problem for me.

To keep the weight down, you will need to use discretion when choosing materials and building techniques. With the wing tanks in place the model ended up right at 50 ounces. That is more than I had hoped for, but the model seems to handle it well.

Although the construction is conventional, I may get there by methods that are slightly different from what you are used to. If you follow specifications and MIL-TP-41 (make it like the print for once), you shouldn't go too far astray. I like to start with the wing, so let's begin.

Wing: The original model's wing was built on a fixture that I made, but it can also be built using the Lost Foam method. A Lost Foam template set was used to draw the ribs accurately on the plans. You can get the F-86D Lost Foam cradle set from Robin's View Productions (Box 68, Stockertown PA 18083; Tel.: [610] 746-0106); the instructions for construction will be included. A comprehensive video about the Lost Foam wing-building system is also available.

Cut two sets of ribs using the templates on the drawing. Cut ribs 1 and 4 from hard balsa and the rest from lighter stock. Cut slots for the leadouts in the left wing ribs, and cut a small hole in each of the right wing ribs for venting. You also need to prepare two pieces of trailing edge (TE).

Get some key stock in ⅜-, ¼-, 3/16-, and ⅛-inch sizes from your local hardware store

F-86D Sabre

Type: Semiscale CL Stunt
Wingspan: 56 inches
Engine: .40-.46 two-stroke glow
Flying weight: 50 ounces
Construction: Balsa and plywood
Covering/finish: Silkspan, carbon mat, dope

Except for the wood propeller, the model could easily be mistaken for a full-scale F-86 on "the ramp." Drop tanks are a nice touch.

F-86D Sabre

to use for shaping. These are 12-inch-long square steel bars. They are inexpensive and work much better than wire.

Using the edge of the table or a smaller-size stock as a guide, you can sand balsa stock to any angle you want. I build my wings on a piece of plywood and make fixtures to hold the leading edges (LEs) and TEs. The TE fixtures are designed to be pinned along the TE line on the drawing line; the LE in its fixtures just sort of floats until you start gluing the ribs in place. Place square blocks on the wing centerline to act as stops for the LEs and TEs. Pin the TE to the fixtures, and put the LE close to the right spot.

I also use a fixture to space the ribs. It looks like the bottom half of a shoe box with the sides removed, exactly the width of the space between the ribs. Set the fixture against the centerline blocks to position rib 2, tack-glue it in place, then sequentially move the fixture and put in the remaining ribs until you get to the tip. The fixture keeps the ribs accurately spaced and vertical.

Put in the top spar, then remove the wing from the fixtures to put in the lower spar and finish-glue all of the joints. Build the other wing, then join them with an inch of dihedral at each tip rib.

Begin installing all of the sheeting. I preform my LE sheeting by soaking it with water and wrapping it around a 4½-inch-diameter plastic pipe until it's dry. This allows it to lay in place nicely. Put the aluminum leadout tube in the LE before sheeting the second surface.

I mock up the leadout guide and temporarily install the bellcrank, then I run a piece of thread through the guide and over the wing to the spot where the tube goes. Use a piece of sharpened 1/16-inch wire through the tip mock-up to pierce the LE, then drill out to 3/32 inch and put in the tube. Angle the inside end of the tube like a hypodermic needle before you install it so that you can poke the leadout through it easier later.

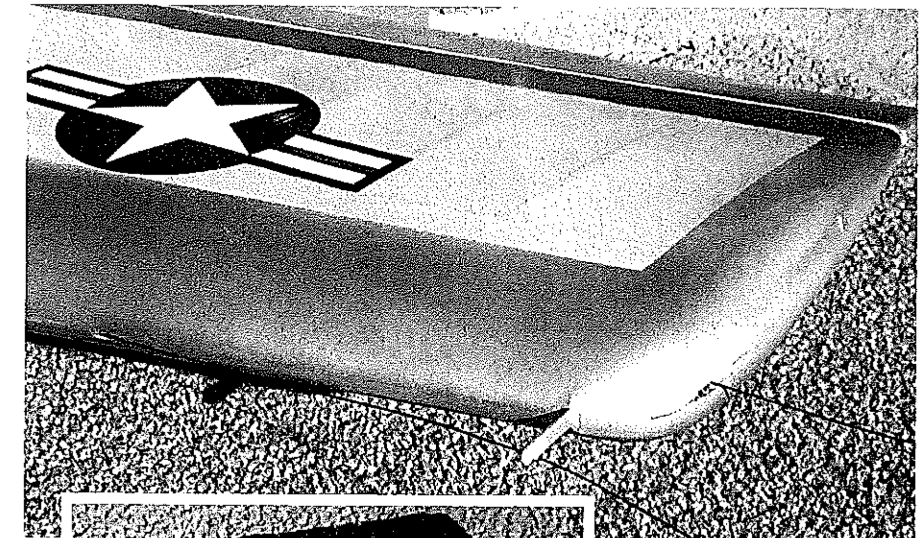
The remainder of the wing construction is clear-cut. Make sure that the plywood bellcrank mounts are flush with the edges of the ribs so that the 1/16-inch center-section sheeting can be glued to them well. The bellcrank with leadouts and pushrod assembly is installed before closing the top center-section sheeting.

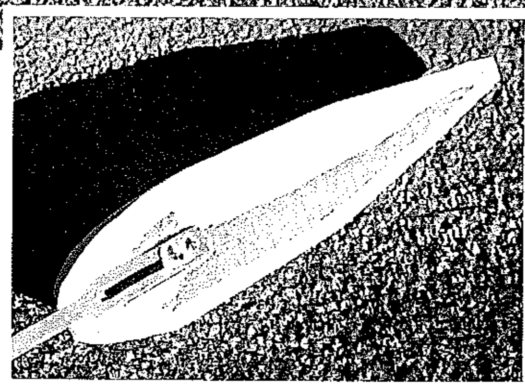
The leadout guide is epoxied into the tip block before it is stuck on. The design of the "stinger" positions the leadouts so that only the rear line needs to be adjustable. Mine ended up close to the middle of the slot.

The wing-tank hard points are made from aluminum stationary binding posts, drilled and tapped 4-40, and 3/32 aluminum tube epoxied in place. Many F-86Ds flew without the wing tanks, so they are optional on the model; I built the tanks because they look cool!

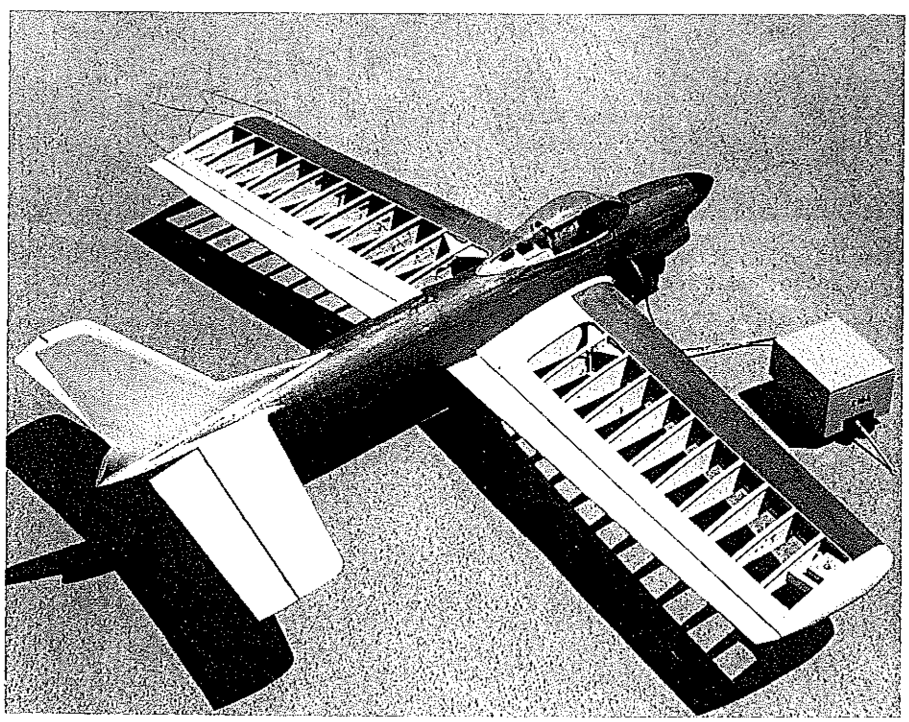
Control System: Let's discuss this since we just installed it. I make all of my own parts, including the bellcrank and control horns. The horns are made from 3/32-inch wire, 1/8-inch brass tubing, and 1/16 x 1/4-inch K&S brass. I braze the joints. The leadouts are 135-pound, seven-strand fishing leader. I buy 30-foot spools of it from fishing shops that handle saltwater gear.

My pushrod is an aluminum arrow shaft with a 4-40 rod and clevis at the elevator end and a short piece of 1/16-inch wire at the

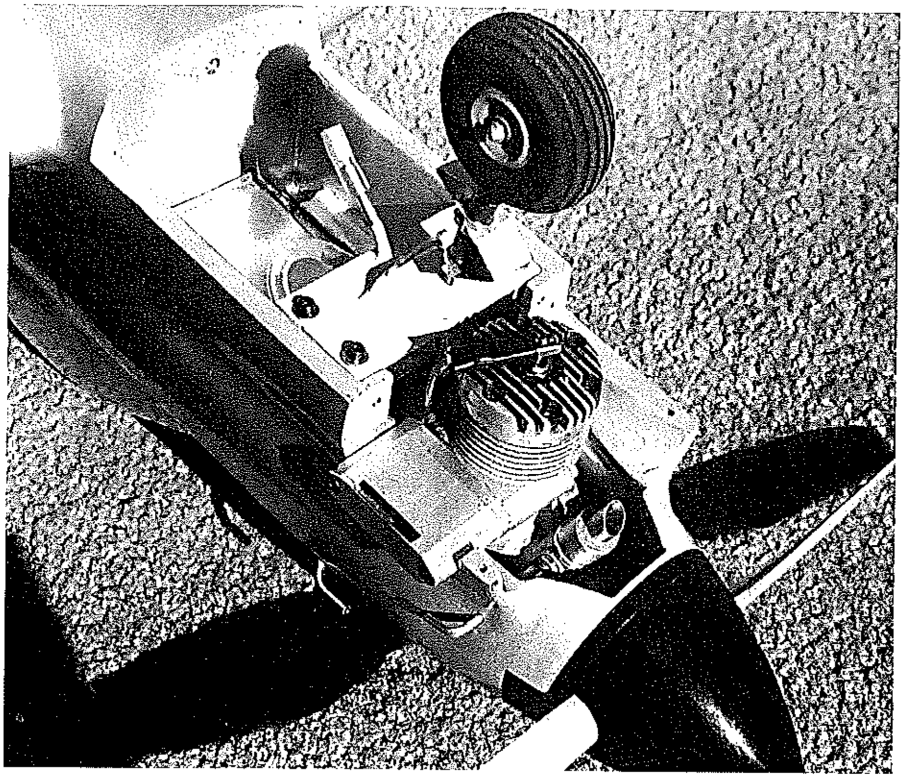




The wingtip detail shows the front leadout "stinger" and adjustable rear leadout. The inset shows the slider mechanism inside the tip block.

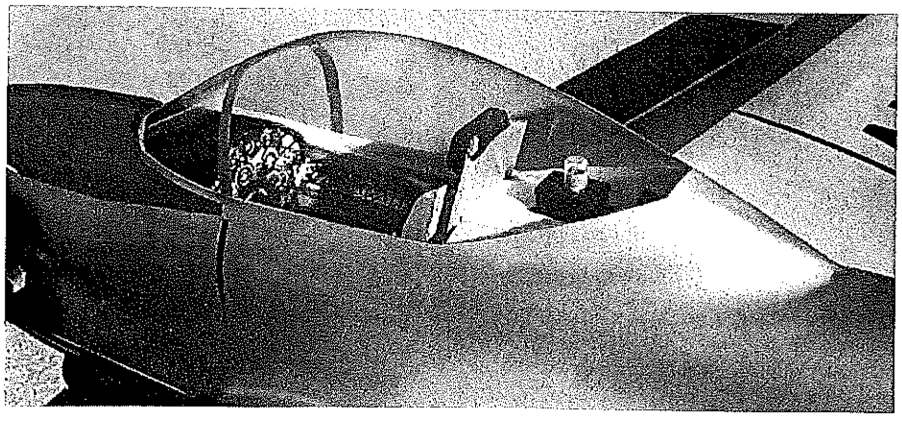


The dark areas on the fuselage and wing are where Don covered the balsa with .2-ounce carbon mat. The material was adhered with modeling dope.



The nose detail is shown with the cowl removed. Notice the removable nose gear, tank, and overflow vent. Don custom-made the "tongue" muffler.

The fuselage's contour changes from convex to concave around the stabilizer. The wide section below the rudder on the full-scale F-86 held a parachute.



Some of the cockpit details include a mock ejection seat, an ADF unit, and an instrument panel. The panel and consoles are photocopies from a book.

bellcrank end. I know that this flies in the face of conventional wisdom, but using 1-inch and longer horns reduces the control pressures to a safe point. I use a good steel clevis, which allows me to go into the tailpipe to adjust the elevators. I do *not* recommend doing this on any model bigger than an O.S. .40 FP.

About the different setup for connecting the flap horn, because the bellcrank axle is so close to the flap horn on a swept wing, a conventional setup would have larger-than-normal errors between flap and elevator travel. This system makes the flaps track the elevators accurately. It's not my idea; Bob Palmer used it in his Go-Devils in 1948!

The tail surfaces and flaps are built up to give them rigidity and light weight. Use the key stock to bevel the top and bottom edges of the ¼ square elevator LE pieces. Place the key stock twice the width of the part from the table edge to get exactly the correct angle. Lay out the LE, bottom sheet, and ribs, sand the ribs down to the TE, then prop up the TE ⅛ inch before you attach the top sheet so they do not end up with washin built into them.

The ⅛ x ¼-inch tubing where the horns go is necessary because the control horns undulate back and forth as the surfaces move up and down, and it is easy and works well. The fin/rudder is built flat with only the rudder tapered. With all of that area and the fact that we fly in a circle, you have plenty of effective rudder offset in flight!

Fuselage: Let's go here now that we have all of the appendages covered. Start with a pair of nice 4- to 5-pound-density balsa sides. Cut them to shape, then mark the bulkhead locations. Be accurate when cutting the sides for the positive incidence in the stabilizer. Sand the taper toward the tail, then carefully hollow the insides between the bulkheads aft of F5 to what will be approximately ⅛-inch thickness after contouring the outsides later.

Lay in the 1/16 hard-balsa doublers. While they are curing, make all of the bulkheads. Assemble the fuselage upside-down, then put on the top and bottom bulkheads. All of the little pieces of sheet and blocks to do up the front end are typical, so you should have no problems with them.

I differ from the norm in that I prefer a firewall mount for the engine. This eliminates the heavy beams and leaves a great deal of room for the fuel tank. The nose gear is mounted on a removable plate so you can get the tank in and back out if necessary.

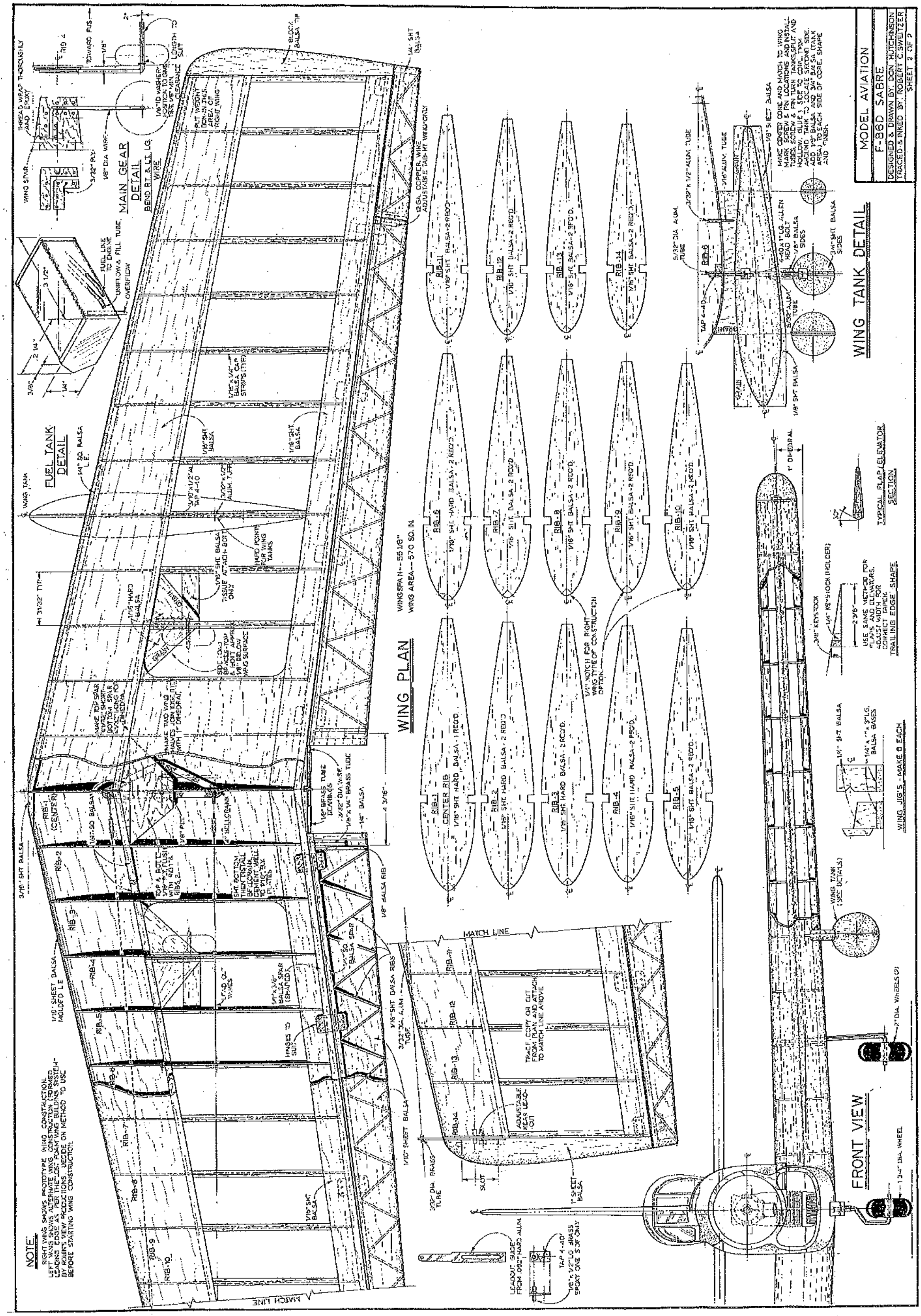
Lay in the preformed sheet-balsa pieces between the bulkheads. The cowl is blocked up and attached with the two 4-40 screws through F3B, and the whole fuselage is sanded and contoured nice and smooth.

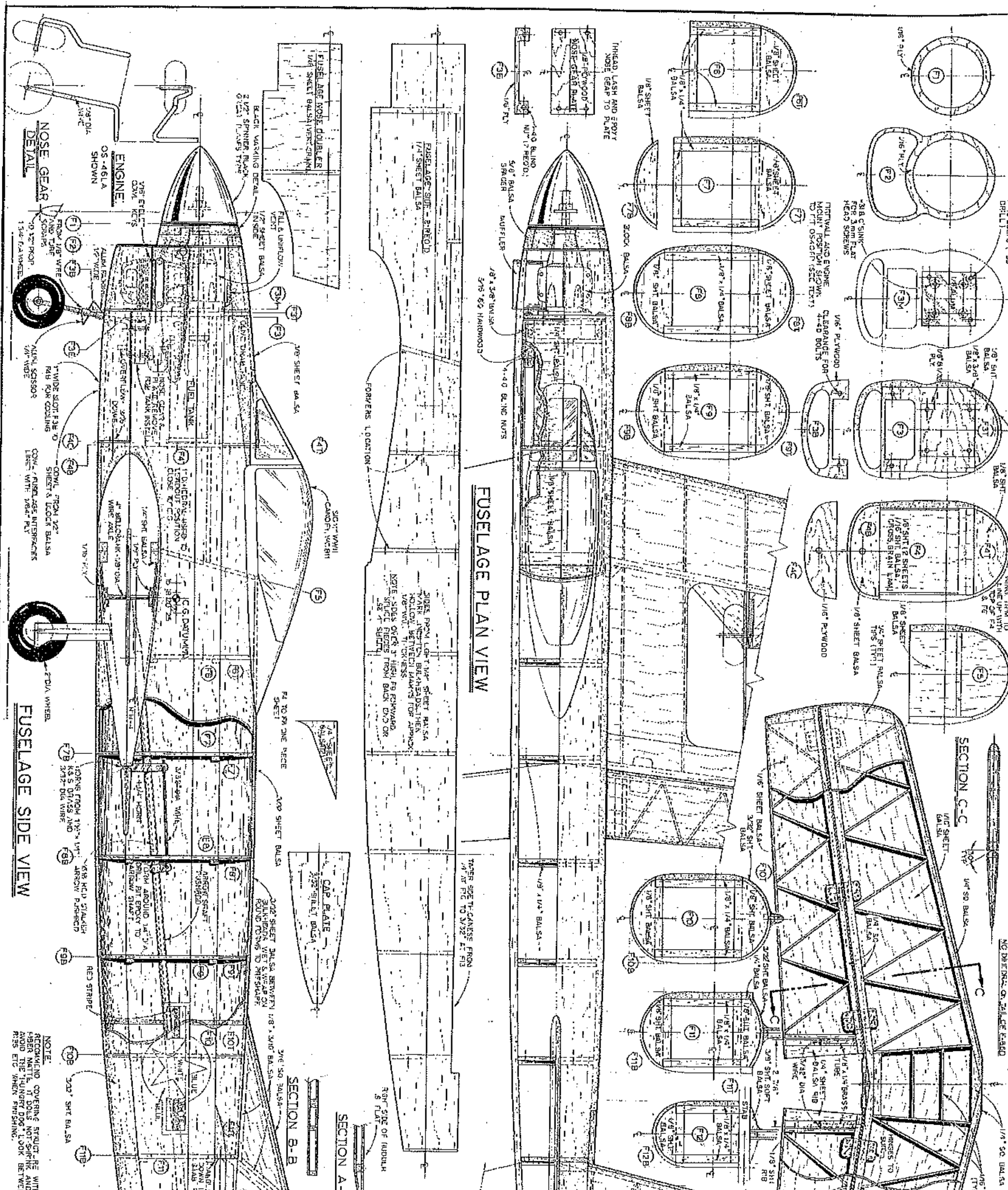
I covered the wing LE sheeting with .2-ounce carbon-fiber mat all the way to the center and covered the stabilizer with silkspan all the way across before attaching it to the fuselage. Using the mat instead of silkspan gives me almost no sagging sheet between the ribs when doping later.

Install the wing and stabilizer, then install the rudder and the curved sheet pieces under the wing. I also covered the fuselage with the mat to avoid sagging between bulkheads. I covered the open bays of the wing with Polyspan, and I used silkspan on the rest.

For cockpit detailing I made photocopies of

Full-Size Plans Available—see page 191




FUSELAGE SIDE VIEW
FUSELAGE PLAN VIEW
STAB. PLAN DETAIL
SECTION A-A
SECTION B-B
SECTION C-C
NOSE GEAR DETAIL
ENGINE
OS-46LA SHOWN
FUEL TANK
CAP PLATE
MODEL AVIATION
F-86D SABRE
DESIGNED & DRAWN BY DON HUTCHINSON
TRACED & INKED BY ROBERT C SWEITZER
SHEET 1 OF 2
PHOTO REFERENCE
NORTH AMERICAN F-86D/K/L
BY RAY WAGNER

an instrument panel and side consoles from the reference book. I made a simple ejection seat and a dummy ADF (automatic direction-finder) unit and cabin-pressurization regulator that are mounted behind the seat. The Sig WC 811 canopy turned out to be an ideal fit for this model.

I recommend mixing epoxy and microballons for fillets. The full-scale aircraft didn't have fillets at the wing/fuselage joint, so keep these to a small radius. The filleting at the stabilizer/rudder location flows from concave to convex. Check the many photos in the reference text to get this area looking realistic.

Finish: I finished my F-86 with modeling dope. I started with Randolph nitrate clear, applied filler coats of nitrate/zinc stearate, then followed with several coats of silver butyrate dope. I painted the center parts of the F-86's wings gray for corrosion control. The antiglare panel is olive drab.

I made the lettering using blank decal paper; it is blue with only the glue on it. I get mine from T&A Hobby Lobby (3512 W. Victory Blvd., Burbank CA 91505; Tel.: [818] 842-5062). I believe that shop gets it from Sig Manufacturing, although it is not listed in the Sig catalog.

I spray four coats of butyrate dope on the paper, then I lay a paper pattern over it. Using a new #11 X-Acto blade, I cut through the paper, just into the dope, like when making tissue letters for a Free Flight model. I cut away each letter or pattern with approximately a ⅛-inch border around it, and I have nice water-soluble decals without the clear background around them.

I use a little decal set when applying the characters, and I wipe up any excess decal glue with a damp rag after they have dried. They lay down great, and you can spray butyrate clear over them with no problem! I also did the insignia this way because I wanted them to be the correct size.

This model begs for ink lines, but I can't seem to get into the right mind-set to do it; and I don't have the Rapidograph pens. Once all of the decals are in place, I spray roughly four coats of Randolph butyrate clear all over the model, including the canopy, and follow it with a little bit of polishing—another area I tend to take lightly!

Flying: How does it fly? I don't feel that I'm qualified to say; I rarely practice and have never flown an acknowledged "great" model. I did take the F-86 to the Golden State Stunt Championships in October 2000 and had the opportunity to have resident expert test pilot Bart ("Wheaties Welch") Klapinski evaluate it. (George "Wheaties" Welch was the North American Aviation test pilot who flew the first flights in the full-scale F-86A and D aircraft.)

Bart reported that "The F-86 flies quite well, as it does nothing funny at all. It's a groovy airplane, tracks well in both round and square maneuvers, is a good-looking model, and could easily win some contests."

Canadian F2B (Fédération Aéronautique Internationale Stunt) team member Chris Cox also gave it a go, and he gave the following review.

"Ease of making round maneuvers round. I have flown many high-end competition models that would not do as nice a round maneuver. All in all, an absolute joy to fly! More than capable of winning. The only advice I need to give is hold some down-elevator to keep the nose wheel on the ground until the model is about ready to lift off. This will keep the nose from turning in on you as the model is released."

The F-86D builds into a nice-looking model that is different from the usual "Stunt machine." There are dozens of different paint schemes you could use. If you make a dummy APU (auxiliary power unit) that plugs into the side of the fuselage for starting, as I did, and have former Air Force personnel for judges, you can have a great deal of fun with your Sabre and maybe even take home some hardware with it! MA

Don Hutchinson
4 Mistywood Ct.
Mansfield TX 76063