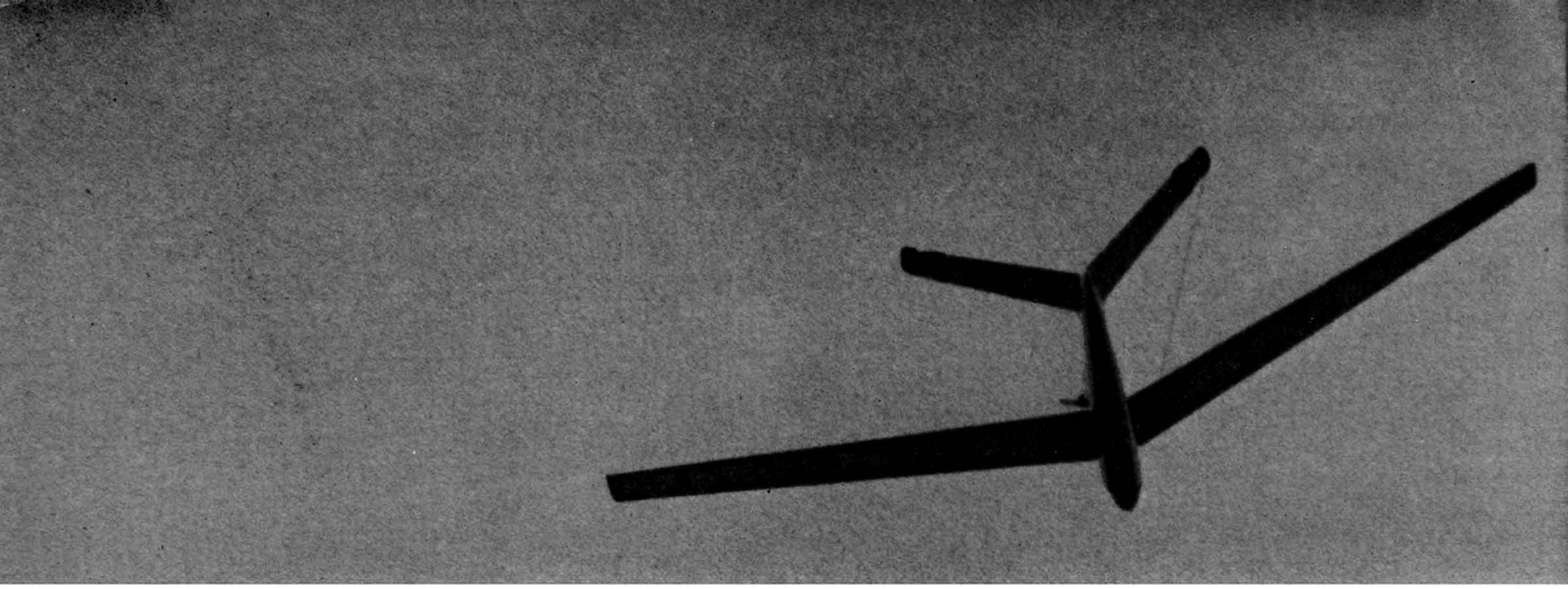


Fouga Cyclone

NICK ZIROLI

This .09-powered scale model of a famous French jet-powered sailplane is ideal for flat-land soaring.

NOT so many years ago, a flyer's greatest thrill was gliding down a hillside hanging from a sophisticated box-kite. Aviation has come a long way in the last 70 years or so. Bone-breaking hillside gliding has given way to propeller-driven and jet-powered aircraft. But to some, the challenge of gliding, or now more correctly soaring, is the ultimate in flying thrills. Flights for hundreds of miles, at thousands of feet, are made with modern sailplanes.

Radio-controlled model sailplanes have gained great popularity. Slope-soaring on the west coast has brought interest to this phase of modeling. As witnessed by the number of gliders flown at the DC/RC Symposium this year, activity is high here on the east coast. Soaring, be it slope, tow-line, or power-assisted, will become even more popular in the future. Those that like ramrodding around the sky at 80 to 100 mph should try gliders for a change of pace.

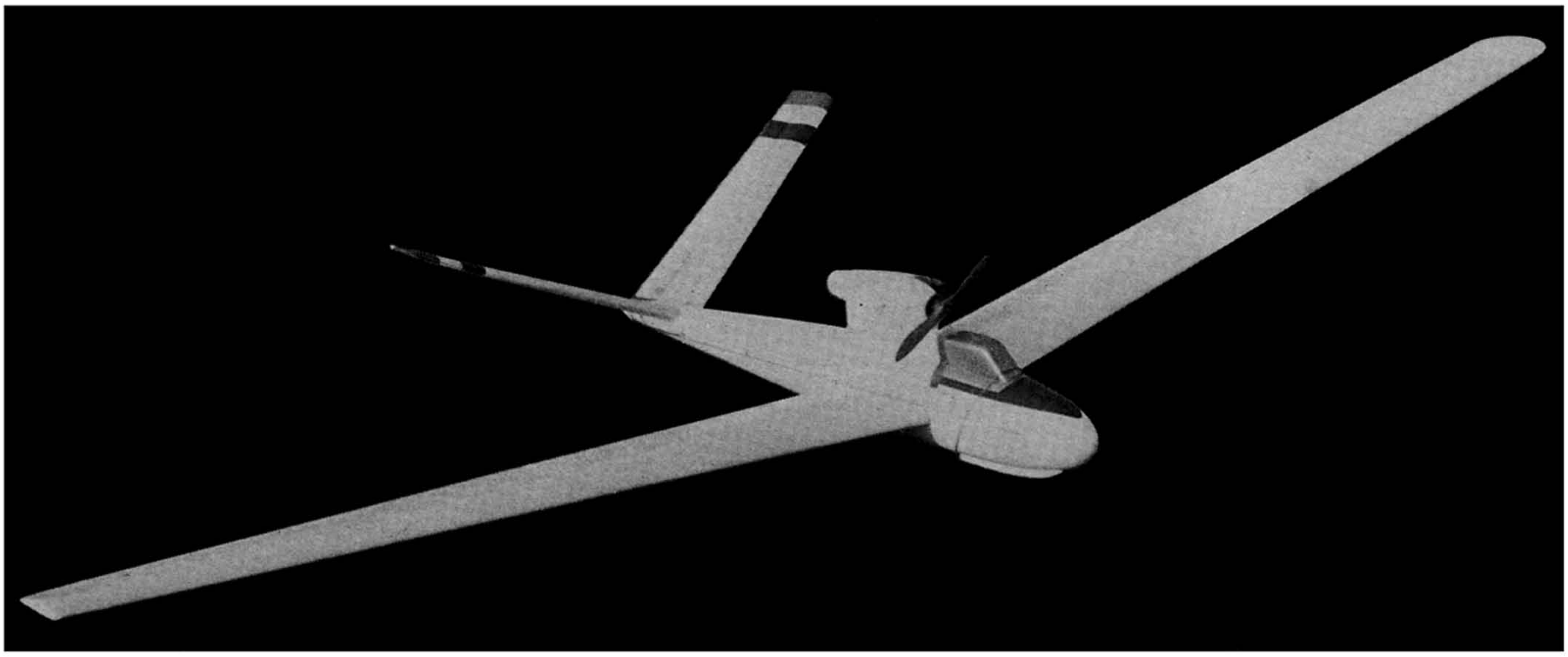
The French "Fouga Cyclone" has always been in my mind as a model to build. Everything about it is as modern today as it was when it was manufactured in 1949. The prototype was all-metal with fabric-covered control surfaces. A true high-performance sailplane, its auxiliary power was a small turbojet engine. The 100-lb. engine had a maximum thrust of 200 lbs. at 34,400 rpm. Being only 16" in diameter and 32" long, it fit easily into a streamline pod behind the canopy. The V-tail placed the tailplanes out of the way of the exhaust.

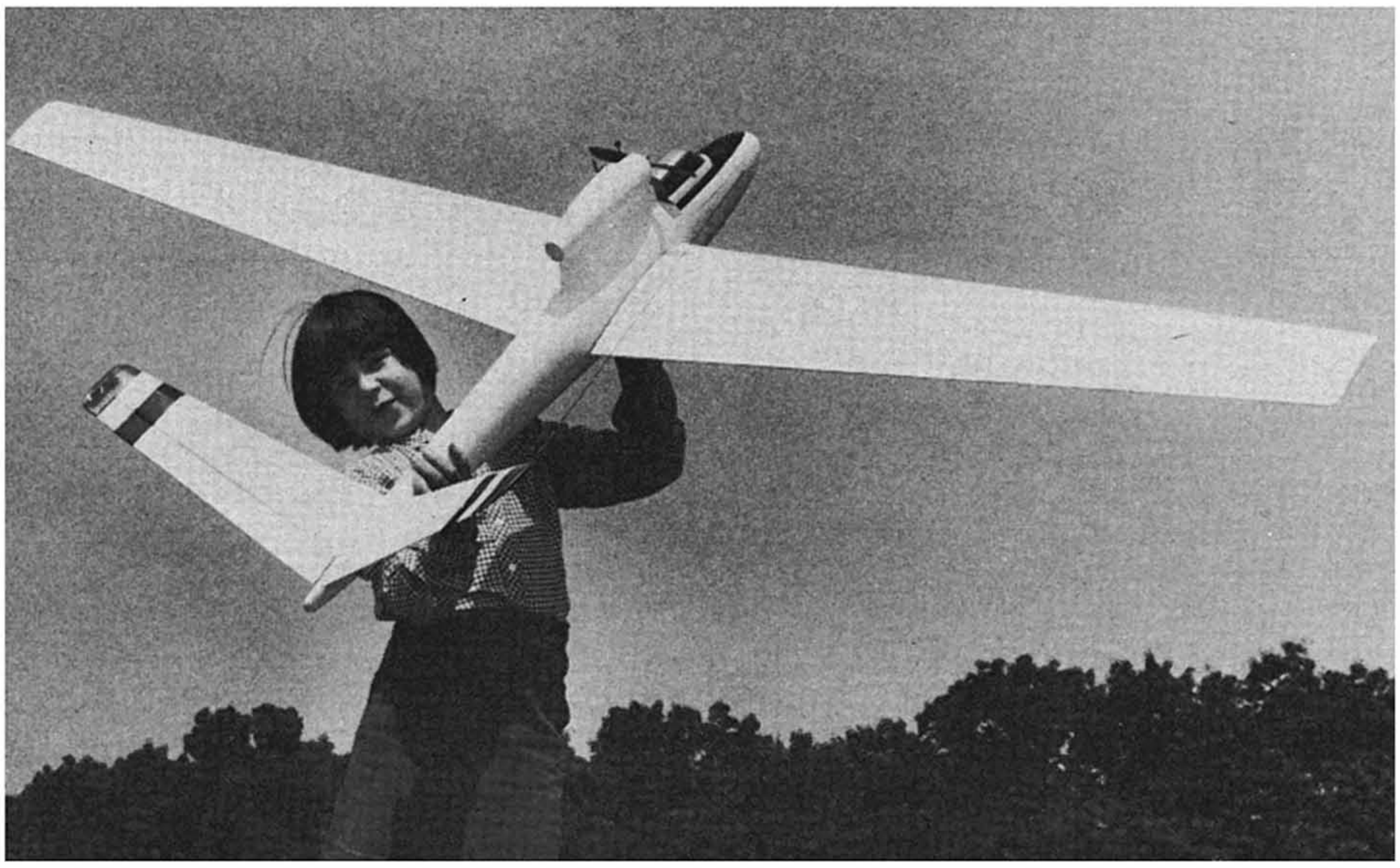
A search through my files uncovered a 3-view and details of the full-size "Cyclone." The original had a wing span of 43 feet. I wanted a model large enough to give soaring performance with proportional equipment. The plan was laid out at a 2" = 1' scale. This produced a wing span of 7' 2", not too big and unwieldy, yet large enough to perform well. Plug-in wing panels take the problem out of transportation.

A powered glider was a must. I did not want to depend upon a tow-line or hi-start, and suitable slopes do not exist on Long Island. The first thought was to place an engine in the jet-pod and raised high enough for the prop to clear the fuselage. This would upset the clean lines of the Cyclone. So the opposite approach was taken. The engine and pod were kept intact. A clearance slot was then made behind the canopy for the propeller. This no doubt cuts down on efficiency. Since all we are interested in is getting altitude, I feel the improved appearance more than offsets this loss. Maximum propeller diameter is seven inches.

The engine is an old McCoy .09 diesel. Instant starting without the help of a booster battery never ceases to amaze those that are unfamiliar with diesels. This provides ample

From any angle the Cyclone looks like a modern sailplane but actually was being produced in France in 1949. At that time it was considered a high-performance sailplane. Jet engine permitted unassisted takeoffs and sustained cross-country flights.





In spite of the engine it is aerodynamically clean. Large control surfaces on V-tail give positive rudder and elevator responses but with relatively flat turns.

power. Plans show a Cox 09. An engine larger than an .09 seems unnecessary. A two-minute engine run gets the Cyclone up high enough to seek out thermals.

The original intention was to use the throttle servo to operate an engine cut-off and spoilers. A fuel cut-off would be actuated by moving the throttle control from high to about a quarter of the way to low. The rest of the travel would operate the spoilers, full low giving maximum spoiler extension. Unfortunately, construction proceeded too far, too fast to include them. The model shown does not have this feature, but it could be added to your plane.

Radio equipment used is the new Citizenship DP-4 system. The airborne system is, I think, as up to date as any of the new digital systems. A compact receiver and plastic-cased servos with multiple outputs are featured. Servo response is fast.

Since the spoilers were not installed, only two channels were used, one for rudder and one for elevator. There are a number of ways to get the control surface movements necessary with a V-tail that is one up and one down, both up or down, or a combination of both. As can be seen from the pictures, I chose the easiest way out. The rudder servo, hooked up like ailerons only reversed, is mounted on a slide. Elevator action is produced by moving the rudder servo forward or back making each control surface go up or down the same amount. The elevator servo is connected to it to give this movement.

Remember that for rudder control the plane will turn toward the down-going surface. The other one will be up. Co-ordinated rudder-elevator turns are performed just as with conventional surfaces. This system of one servo moving another is adequate for a glider where G forces are low. I would not recommend it on a high-speed multi-ship.

Construction is easier than the seven-foot wing span might lead you to believe. The fuselage, and each wing panel, is 41" long. The model does not become large until it is assembled.

Wing construction follows the method deBolt used on his great "Live Wire" series. This is one of the best ways of building a flat bottomed wing. If the board it is built on is true, the wing will be. It is not removed from the plan until it is completed except for the leading edge.

The first piece to be made is the wing tongue. I used 1/16" hard aluminum. You may prefer plywood; it is easier to obtain and work with. Plywood is shown on the plan. Cut this to size so it can be fitted to the wing slot during construction.

The wing ribs are made by stacking 13 pieces of 3/32" sheet between 1/8" plywood root and templates. Keep the spar cut-outs perpendicular to the root rib. Drill two holes through the stack and hold together with the 4-40 screws and nuts. Carve and sand to shape. Cut the spar slots with a razor-saw. Separate them and square each one up. Cut out a new tip rib from 3/32" sheet. Use this first set of ribs as patterns and cut out a second set, one rib at a time. Make W-1 and W-3 of 1/8" plywood.

The leading and trailing edges are cut from firm 1/16 x 3 x 48" sheet. If a 48" length is not available, splice 36" together at 45 degrees. Reinforce the splice during construction. Cut four sheets to 41" long. Using a good straight edge, cut them down the center, starting 1" in from the edge on one end, and 2" in on the other end. This should produce eight pieces 41" long that taper from 2" to 1" wide. These are used for the leading and trailing-edge sheeting.

Cover the plan with Saran Wrap. Pin down the leading and trailing edge. Cut out and cement the root sheeting and 1/16 x 1/4" lower cap strips in place. Assemble the wing-tongue box on the 1/16" root sheeting. Use epoxy. Use the ribs as a guide to cement the 1/8 x 3/16" hard lower spar down. Cut W-1, 2, 3 to clear the tongue box. Cement all the ribs in place, followed by the 3/16"-sq. top spar.

Cut out 1/8" sheet leading-edge cap and cement in place. Sand down to match the ribs. Taper the bottom trailing-edge sheet again to match the ribs. Cement and pin the leading and trailing edge sheets in place. Sheet the wing root top. Cut to length and cement the top cap strips in place. When the assembly has dried, remove from the building board. Sand the front off flat and cement the 1/2 x 3/4" leading edge to it.

Rough-carve the tip blocks to shape and install. When these have dried carve and sand to shape. A razor-plane makes short work of this type of job.

Cut out the stabilizer ribs from 1/16" sheet. Pin the 1/8"-sq. lower spars down with a

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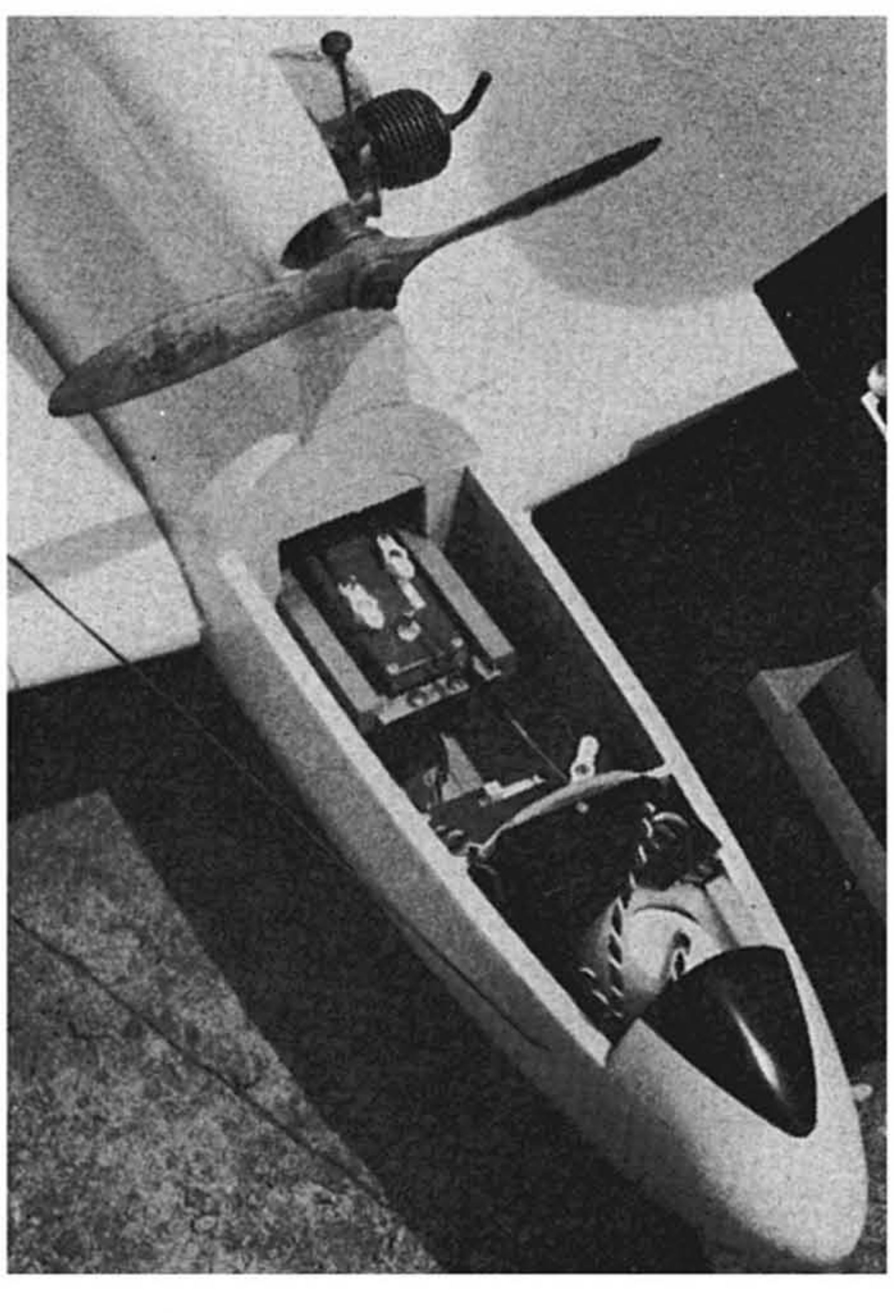
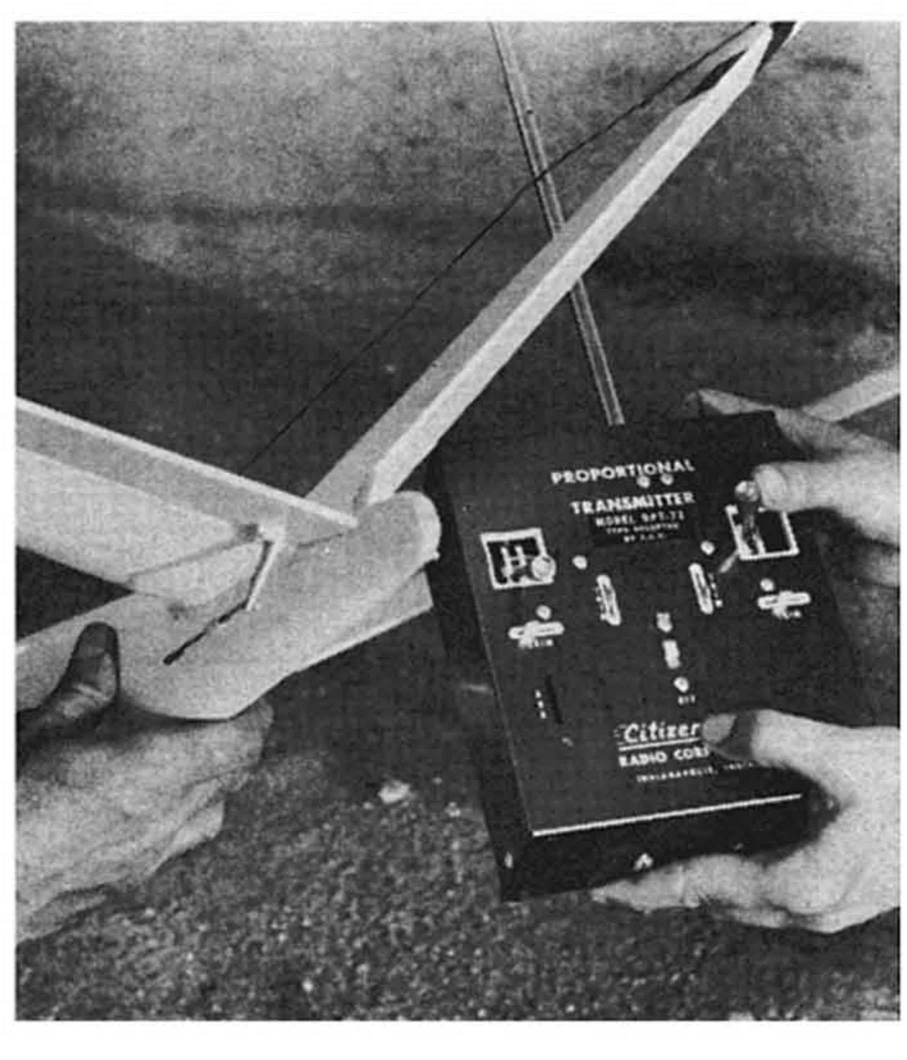


Servo positions show full-right rudder and full-down elevator. Pitch adjustments are easy with an R/C Craft link between servos.



This shows left-rudder command — don't get your controls reversed. Both surfaces move up or down together for pitch control.

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1/16" shim under them. Cement S-2 and S-7 in place. Line up even with the plan. Cement the 1/4"-sq. trailing edge to the ribs. Block up to keep it straight from root to tip. Add the remaining ribs, omitting S-1. Cement the leading edge and top spar in place. Use the angle template to install S-1 in the correct position. Make one right-hand and one left-hand panel. Cement the two panels together at S-1. The angle of the Vee should be 120 degrees. Sheet the bottom and the center section with 1/16" sheet. Add the tip blocks and sand to shape. The wings and stabilizer may be final sanded and covered at this point, if desired.

The fuselage sides are made from 1/4 x 2 x 36" medium sheet. Cut the two sides from a 4"-wide sheet if necessary. Cement the 1/8 x 3/8" hatch doublers where shown on the plan. Epoxy the wing-tongue braces in place. Use epoxy on all the wing-tongue joints.

Mark former locations on the inside of each fuselage side. Join the sides with formers, F-3, 4 and 5. With these in place, the sides should be parallel and square to each other. When dry, pull together at the nose and tail and install the remaining formers.

Cut the skid from 1/4" plywood. Bend the 1/8"-diameter wire wheel mount to shape and secure to the skid with metal straps. Retain the wheel permanently in place. Cover the tape. Epoxy the skid and wing tongues in place.

Cement the 1/4" plywood motor-mount plate and lower block in place. The block should overhang F-4 at least 1/16" on either side. Cement the three N-1's in place. Recess the top one to lay along the motor mount. Install N-2 and N-3. Cut out the center of N-2 to accept a wedge tank on edge. Epoxy in place after modifying the filler, vent and feed to suit.

Plank the nacelle and bottom of the fuselage with 1/8 x 3/8" strips. Drill the motor mount for the engine to be used and install with blind-nuts. Remove the engine and cement side block next to the motor mounts.

Trim the sides at the tail so the stabilizer is a good fit. Maintain a zero-degree incidence setting in relation to the centerline. Cement in place, checking all angles to assure it will be on correctly.

Before the top of the fuselage is planked install the servos and pushrods. Get the linkages working as required and then remove the servos. Plank the top with 1/8 x 3/8" strips. Do not cement them to the sides along the edge of the removable hatch. Cover the nacelle pylon with 1/16" sheet with the grain vertical.

Cement the nose and tail blocks in place. When dry, carve and sand the fuselage to shape. Cut the hatch free and remove. Cement the prop-arc block between the planking and to F-3A. Temporarily install the engine and prop. Check that there is clearance through the cut-out for the prop.

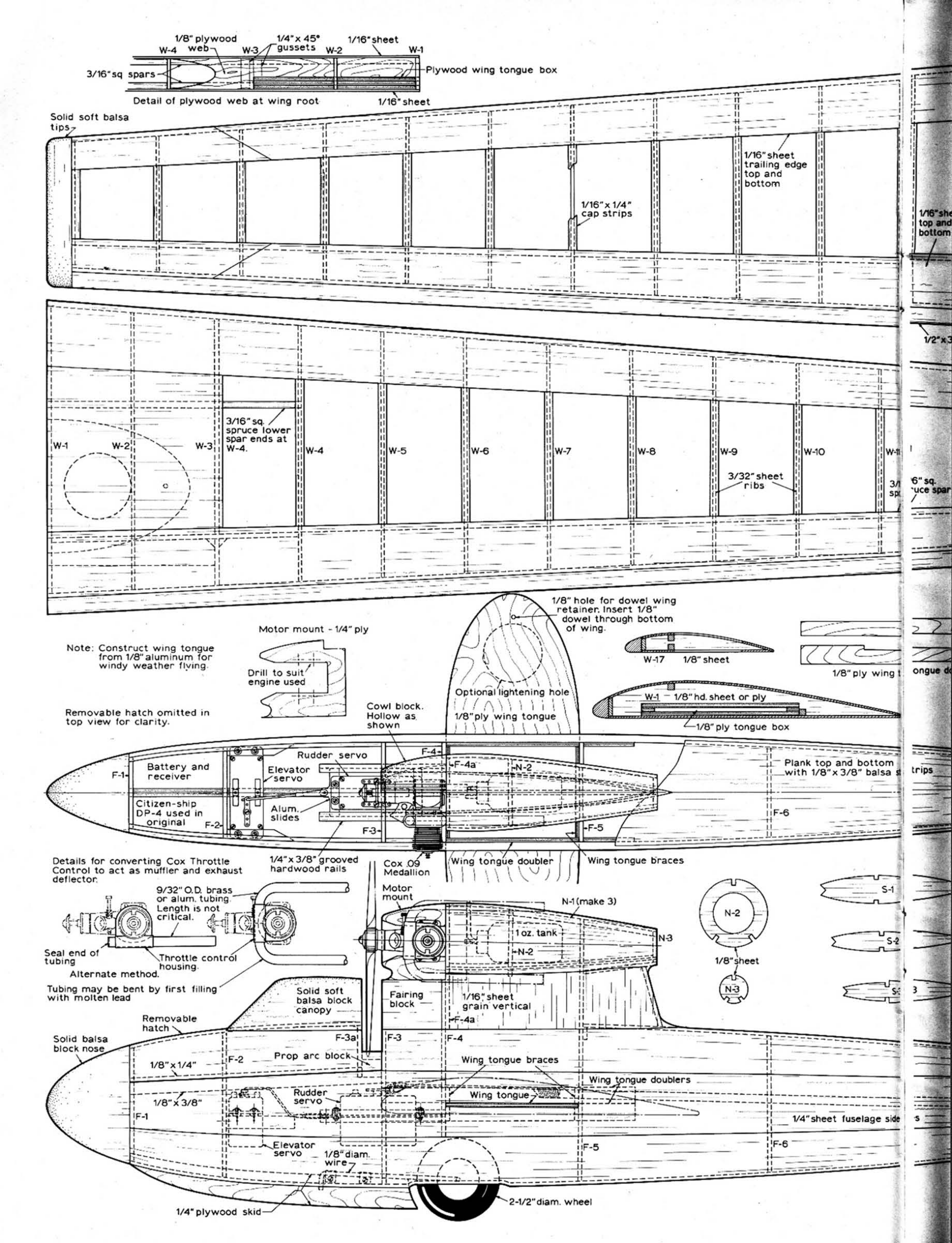
Final-sand the fuselage, and finish with whatever material and procedure you prefer. I used a coat of clear dope followed by a couple of coats of dope-talc sealer, sanding between each coat. The fuselage was then covered with light Silkspan and four coats of dope applied again, sanding between each coat. Color dope was sprayed on. Two coats are adequate.

The wing and stabilizer were covered with Coverite, with three brushed coats of clear and two coats of color sprayed on. My model was painted all white with a red and blue stripe on the stabilizer tips. The canopy is metallic blue, and anti-glare panel dark blue. The engine nacelle and pylon should be silver, but I left them white.

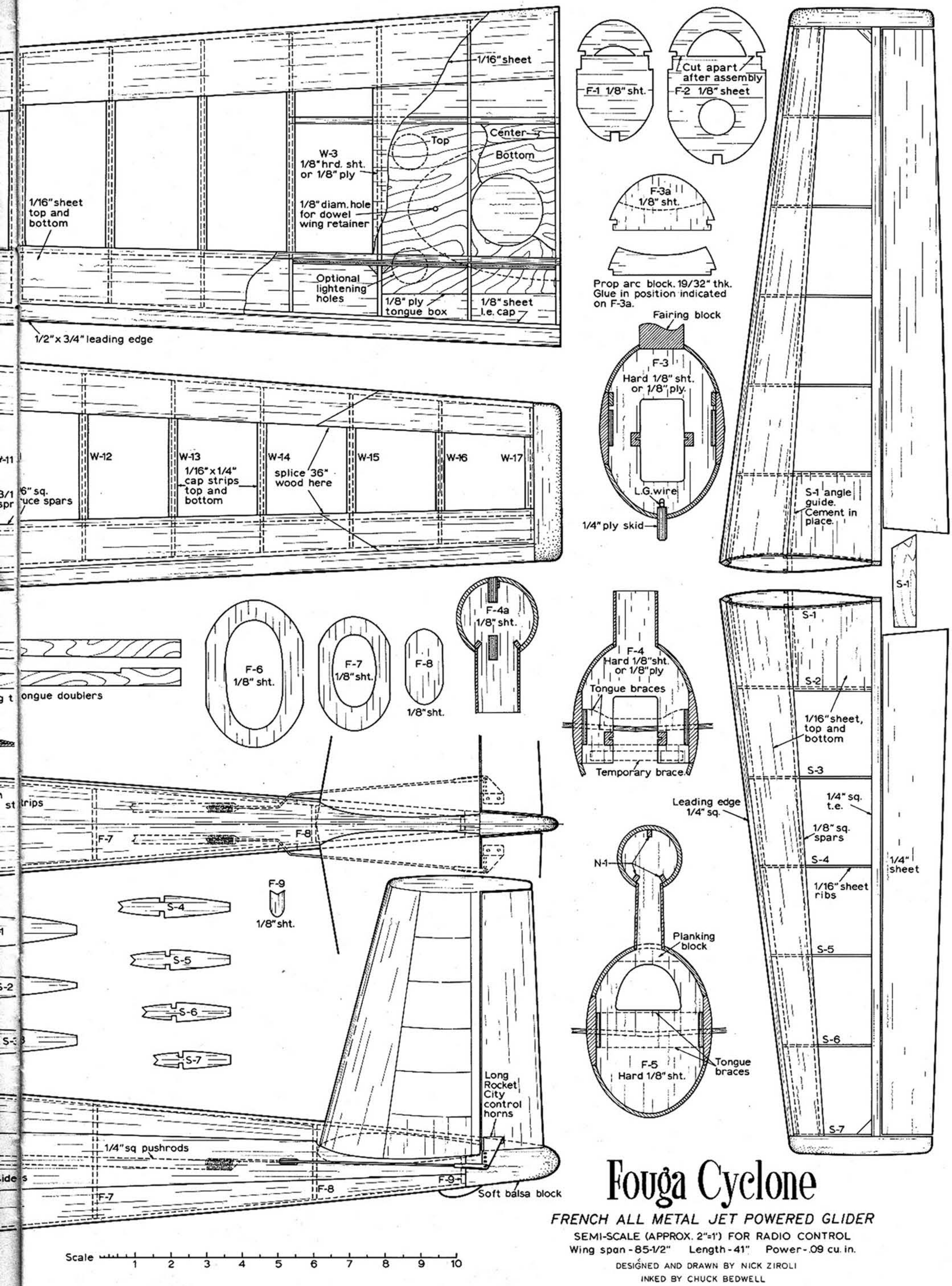
When the finishing is complete install the engine and radio equipment. Add weight to the nose if necessary to place the center of gravity as indicated on the plan. Mine did not need weight.

If there are no warps and the C.G. and decalage are correct, test flights should be straightforward. My first flight was made with an engine run about 30 seconds, just in case it was badly out of trim. It is easier to fight the stick for 30 seconds than for two minutes. This first flight proved that the anticipated trim was close enough to try a full tank. The second flight was terminated over a half hour later because I thought my neck was going to break if I had to look up for another minute. After a rest a second flight was made for about 20 minutes.

These two flights alone convinced me I had been missing a lot of fun that gliding has to offer. When I bring the Cyclone to the field now, a chaise longue goes with me.



1/8" plywood web
W-4
W-3
1/4" x 45° gussets
W-2
1/16" sheet
W-1
3/16" sq spars
Plywood wing tongue box
Detail of plywood web at wing root
1/16" sheet
Solid soft balsa tips
1/16" sheet trailing edge top and bottom
1/16" x 1/4" cap strips
W-1
W-2
W-3
3/16" sq. spruce lower spar ends at W-4.
W-4
W-5
W-6
W-7
W-8
W-9
W-10
3/32" sheet ribs
1/8" hole for dowel wing retainer. Insert 1/8" dowel through bottom of wing.
Motor mount - 1/4" ply
Note: Construct wing tongue from 1/8" aluminum for windy weather flying.
Drill to suit engine used
W-17
1/8" sheet
Optional lightening hole
W-1
1/8" hd. sheet or ply
Removable hatch omitted in top view for clarity.
Cowl block. Hollow as shown
1/8" ply wing tongue
1/8" ply tongue box
Rudder servo
F-4
F-4a
N-2
Plank top and bottom with 1/8" x 3/8" balsa
F-1
Battery and receiver
Elevator servo
Citizen-ship DP-4 used in original
F-2
Alum. slides
F-3
F-5
F-6
Details for converting Cox Throttle Control to act as muffler and exhaust deflector.
1/4" x 3/8" grooved hardwood rails
Cox .09 Medallion
Wing tongue doubler
Wing tongue braces
9/32" O.D. brass or alum. tubing. Length is not critical.
Motor mount
N-1 (make 3)
1 oz. tank
N-2
N-3
N-2
S-1
S-2
Seal end of tubing
Throttle control housing.
Alternate method.
1/8" sheet
N-3
Tubing may be bent by first filling with molten lead
Solid soft balsa block canopy
Fairing block
1/16" sheet grain vertical
Removable hatch
F-4a
Solid balsa block nose
F-3a
F-3
F-4
1/8" x 1/4"
F-2
Prop arc block
Wing tongue braces
Wing tongue doublers
1/8" x 3/8"
Rudder servo
Wing tongue
F-1
1/4" sheet fuselage side
Elevator servo
1/8" diam. wire
F-5
F-6
1/4" plywood skid
2-1/2" diam. wheel



Fouga Cyclone

FRENCH ALL METAL JET POWERED GLIDER

SEMI-SCALE (APPROX. 2"=1') FOR RADIO CONTROL

Wing span - 85-1/2" Length - 41" Power - .09 cu. in.

DESIGNED AND DRAWN BY NICK ZIROLI

INKED BY CHUCK BEDWELL