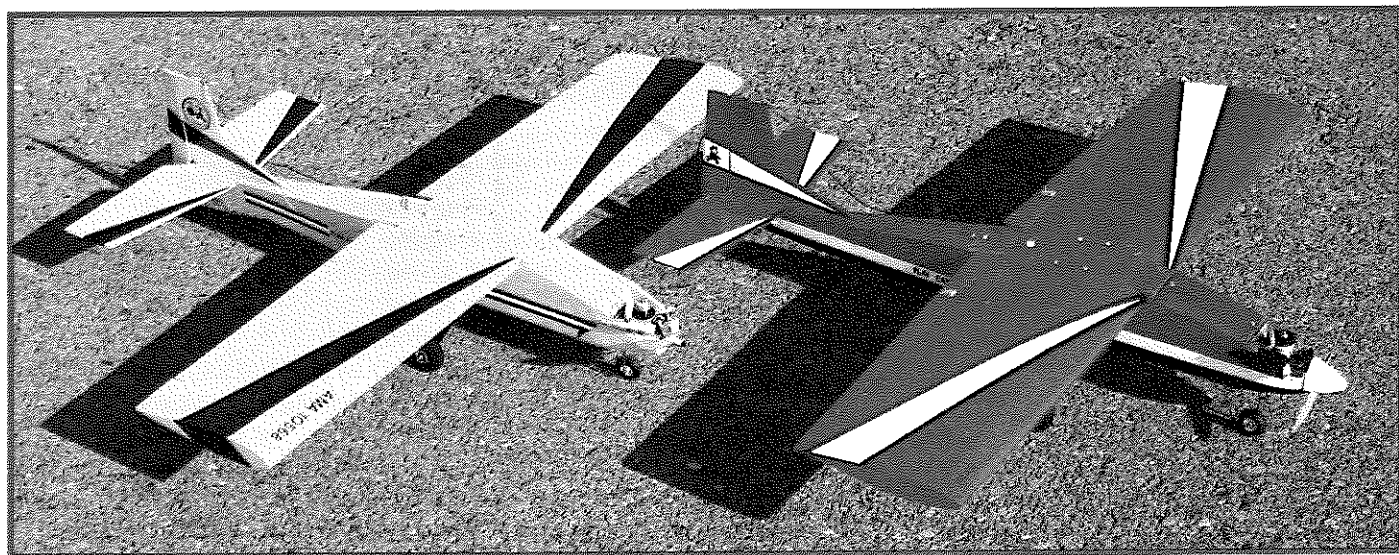


# FLAT CAT



For those who like 'em small and agile, try this full-house 1/2A RC aerobat.



When you first walk up to the flight line with your Flat Cat, nobody pays much attention. Most 1/2A airplanes are met with great disregard these days where 1/4-scale and more is in vogue, but this one really performs!

Not only will you be standing with a satisfied grin on your face when your Flat Cat lands, but you will also have a group of fellow fliers come over to take a closer look.

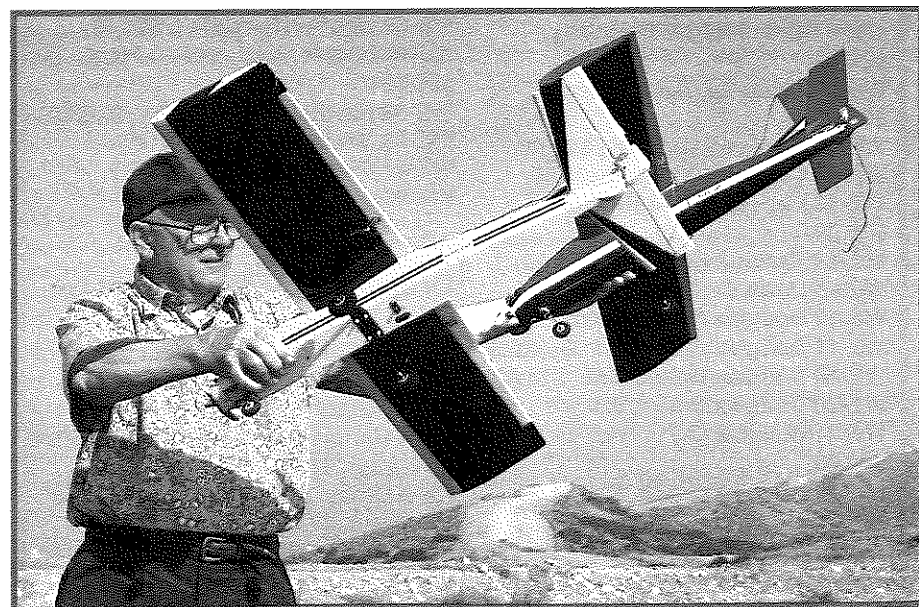
Flat Cat was designed around the new Cox .05 RC engine. The goal was to have a fully aerobatic model that would avoid the usual nervous high-speed flight that most 1/2A RC models exhibit. The 'Cat will do anything you think you can handle but will do it smoothly and at a rate that allows you to see what you're doing and make those necessary corrections. In the air it is a joy and on the ground it handles like a gentleman.

Most of the success of Flat Cat can be credited to a low wing loading and a high-lift symmetrical airfoil. The two prototype models weighed in at just under 24 ounces; with a wing area of 255 square inches, this yields a wing loading of about 13 ounces per square foot. The thick, low aspect ratio

wing lets the airfoil work in a favorable regime and makes the structure quite sturdy.

The fuselage dimensions were dictated mainly by the equipment it had to house.

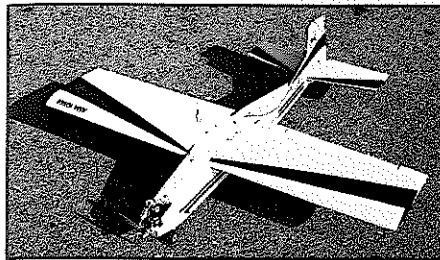
The engine and the fuel tank defined the nose section, since I wanted to use a 2-ounce fuel tank for 12-15 minute flights, and it had to be placed such that the proper



Jose with his two prototype Flat Cats—virtually identical except for some minor fuselage structural details. Both are covered in bright colors of MonoKote and Oracover with black on the undersides for good visibility.

# FLAT CAT

Designed by Jose M. Tellez



WINGSPAN ..... 34 in.  
WING AREA ..... 255 sq. in.  
FLYING WEIGHT ..... 23.5 oz.  
WING LOADING ..... 13 oz./sq. ft.  
OVERALL LENGTH ..... 30.5 in.  
AIRFOIL ..... 16 percent  
symmetrical.  
POWER ..... Cox .05 RC or  
MP Jet .061 recommended.  
RADIO ..... Four-channel  
micro RC system required.

height relative to the engine was met. This resulted in a rather wide nose which required a notch in the side to accommodate the muffler, but it works well. Should you be satisfied with shorter flights, you may opt to use a 1-ounce tank and narrow down the nose. I recommend not touching any of the other dimensions since either by design or luck, they seem to be simply ideal.

The radio used is of the micro variety. I used both Futaba (S-133 servos) and Hitec RCD (HS-80 servos and 535 FM receiver) in my prototype models, but equally good components are available from other

manufacturers. The battery pack shown on the plans is rated at 270 mAh; I've used it as well as a 150 mAh pack which will save some weight provided you can maintain the proper balance point. I usually keep my airplane on a field charger between flights so the small battery has never presented a problem.

If you've elected to build this model you are obviously a scratch builder, so I won't insult your intelligence by telling you which stick to glue where. A few pointers, however, might clarify the plans or suggest a way to speed up your progress.

## FUSELAGE

The 3/32 balsa fuselage sides are indicated on the plans by a bold line. The easiest way to transfer the outline to the wood is to cut up the side view from the plan, spray it with 3M "77" spray cement (wait at least 1/2 hour before adhering it to the balsa sheet to avoid permanent adhesion), then have at it with your X-Acto knife. The same pattern will be used four times; twice for the balsa sides and twice for the 1/64 plywood doublers, but you need not respray with the contact adhesive. Use a slow-set epoxy to join the ply doubler to the sides but be very stingy with the epoxy—remember, you want this model to be light.

I strongly suggest that you drill all the bulkheads and the firewall for fuel line, pressure line and pushrods prior to assembly, since the small dimensions would make it very difficult after the fuselage is assembled. The plan shows notches in the appropriate bulkheads which allow for the wiring installation. The on-off switch and charging jack are not shown since this will depend on your equipment selection. In my case, I installed both the switch and the jack on the bottom of the fuselage just ahead of the landing gear.

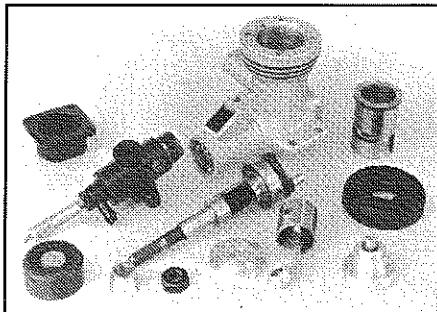
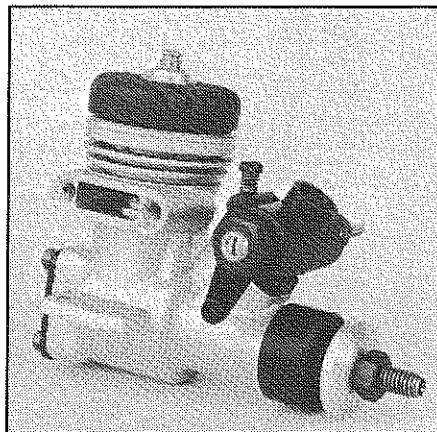
In addition to the removable wing, the plan shows four removable hatches. One provides access to the battery, another

## THE MP JET .061

After flying Flat Cat over the last year and a half, I came across a glowing report on the Czech MP Jet engines being handled by Carlson Engine Imports. Being an enthusiast of small engines, I paid my dues and was soon admiring a splendid little .061 specimen.

I found the MP to be very well behaved. It starts readily, idles like a four-stroke and since the muffler seals well at the exhaust, it is cleaner running than most 1/2A engines I've tried.

One problem I did have with the installation was that the muffler runs straight back, parallel with the thrustline, and in most cases will not clear the side of the fuselage. A phone conversation with Ed Carlson solved the problem when he

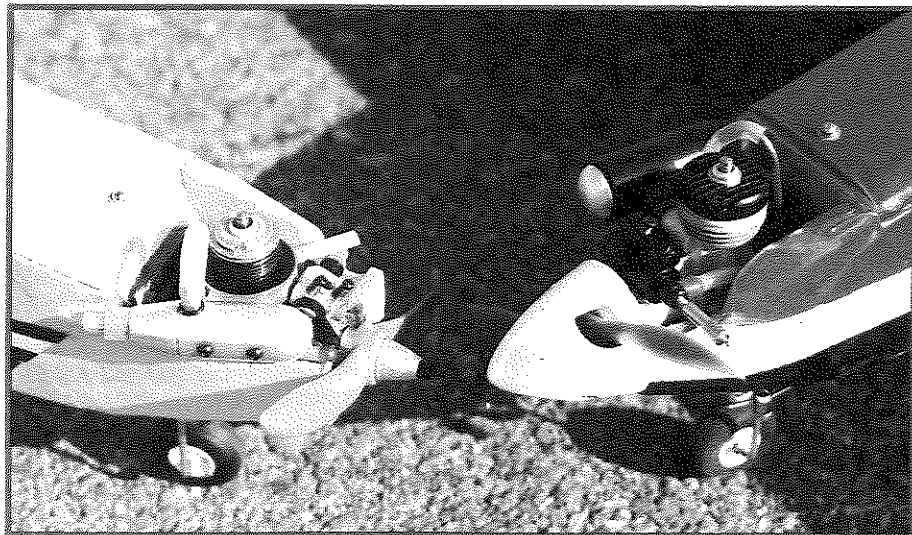


For these photos, Ed Carlson of Carlson Engine Imports loaned us an MP Jet .061 ball bearing glow engine (one of five different versions offered), and we found it to be an exceptional piece of work. Features Schnuerle porting, dual ball bearings supporting the crankshaft, cast iron piston and steel liner, one-piece cast aluminum crankcase, and a button-type glow head. Nice touches include a locating pin in the crankcase for the cylinder liner, bronze bushing at the bottom of the conrod, and wire circlips to retain the wrist pin in the piston. Engine comes with muffler, three head shims, a wrench, and instructions.

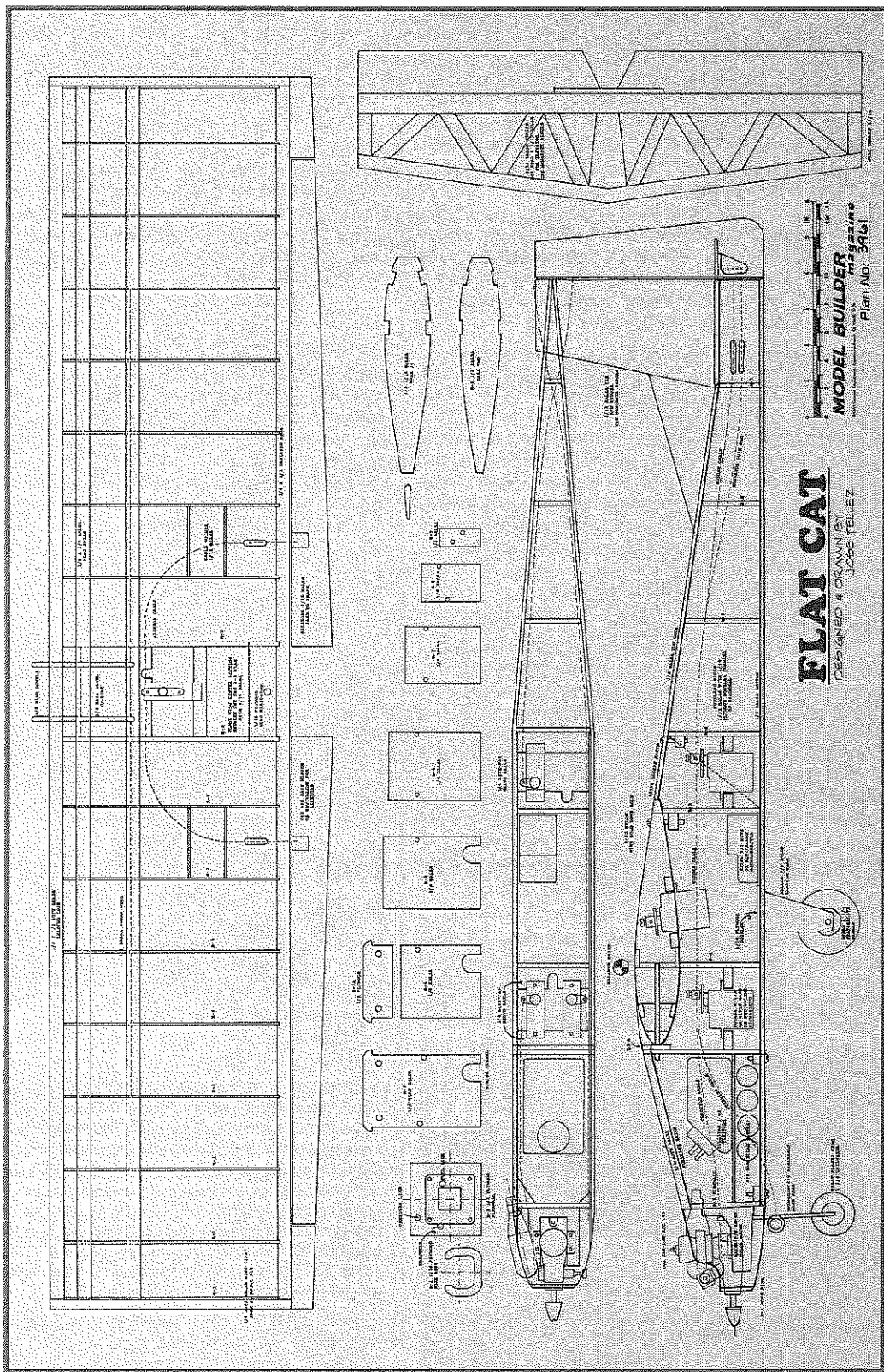
remembered that the marine version of the MP has a muffler extension, which he shipped me post haste and which fit to perfection!

So now you have two brilliant options to power your Flat Cat: the speedy little Cox .05 or the somewhat more powerful, slightly heavier and more expensive MP. Take your choice and pay your price, but if you opt for the MP, don't forget to also order the muffler extension.

A complete 10-page catalog of engines and accessories is available for \$1 from Carlson Engine Imports, 814 E. Marconi Ave., Phoenix, AZ 85022. MB



The Flat Cat was originally designed for the neat little Cox .05 RC (left), but on his second model, Jose chose to go with the slightly larger MP Jet .061 (right). See sidebar for his impressions of the latter.



exposes the fuel tank, the third lets you tinker with the elevator servo and the antenna leadout, and the fourth provides access to the aileron servo through the top of the wing. All this accessibility means a bit more work, but remember that as soon as you make any component inaccess-

sible, it is a guarantee that it will need adjustment or service. The servo rails shown on the drawing are made from lite-ply. After they are cut to size, mark where the servo screws are to go and drill with a 1/8-inch bit. Next, cut a short length from the yellow fluted inner tube from a Sullivan #508 or #515

pushrod and insert it into the hole (it will fit tight). Apply a drop of thin CA to the assembly to secure the tube—allow plenty of time for the CA to set—then trim the plastic flush with the top of the ply surface. Since these tubes are made to accept 2-56 threaded rods, you can mount your servos with

2-56 machine screws which will thread in easily. If you've never used the above scheme I urge you to try it—I bet you'll use it from now on for all your servo mounts. I used the same scheme to hold down the three hatches.

For the ailerons, throttle, rudder and nose gear I used Sullivan #507 flexible cable pushrods. They are very light and have adequate rigidity to handle the small control surfaces. It is key, however, that you start with a minimum friction installation. The setup shown on the plans works quite well. For the elevator (which handles the heaviest loads), I used a Sullivan #503 pushrod. Note that the elevator and rudder pushrods cross over towards the tail end of the fuselage to provide a better exit angle.

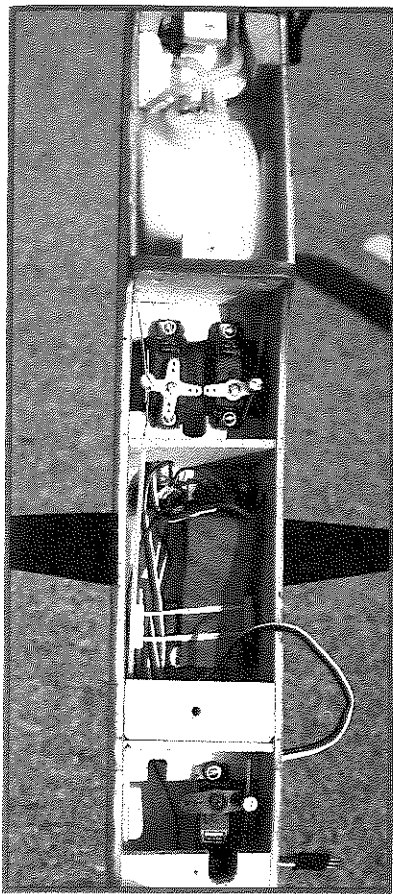
Once you've assembled the basic fuselage box, temporarily install the motor mount, then fill in the nose around the mount with small balsa blocks. Place the engine on the mount and determine where the nose should be cut off to install the nose ring. Now you can remove the engine and shape the nose to a nice rounded blend from the firewall to the nose ring. Next, install a triangular piece of balsa just behind the firewall as shown on the drawing. This piece will allow you to grind out a notch for the muffler.

The plan shows an 8-32 nylon wing bolt going into a strip of 1/4-inch lite-ply. Use a plastic or metal thread insert in the lite-ply. Ohio Superstar Products Inc. (204 5th St., Chester, WV 26034) makes some neat little plastic inserts they call "All Threads" which work beautifully.

My models' fuselages were finished with fiberglass cloth and epoxy, which makes for a very strong structure. If you think you can handle this finish with minimum weight, it is ideal; otherwise just use MonoKote or prime and paint.

### FLYING SURFACES

The wing and tail surfaces are quite simple and require no special explanation. I might just comment that you won't find a notation on dihedral on the plans; there is none, but don't worry, the aircraft is quite stable



without it. The aileron hinges are Sig (or equivalent) Easy Hinges split to half width, four half-hinges on each aileron. This gives an easy working aileron that works well with the Sullivan #507 cable. The drawing calls for MonoKote hinges on the tail surfaces; these allow for maximum flexibility, but small pieces of Easy Hinge could be used as well.

For control surface deflections, you can start with the following and

The wing and two fuselage hatches provide access to the fuel tank and radio. A lightweight RC system is a must for a small model like the Flat Cat; this shot of Jose's #2 ship shows a Hitec RCD 535 FM micro receiver, Hitec HS-80 micro servos for the rudder/nose wheel, and a Futaba S-133 micro for the elevators. Another S-133 is mounted in the wing for the ailerons. A 270-mAH receiver pack sits up front under the fuel tank.

then tune them to you like: Ailerons—3/8-inch up and down measured at the inboard edge. Elevator—3/8-inch up and down measured at the inboard edge. Rudder—1/2-inch left and right measured at the elevator intersection.

### FLYING

This is not a ferocious airplane that will make you sweat the first flight. It's responsive but not jittery. Since it has a symmetrical airfoil and when sitting on its wheels there is a small negative angle of attack, the model will have to run until it achieves enough speed for the elevator to rotate the fuselage for a positive angle of attack, so don't let a slightly long ground run alarm you. It tracks beautifully on the ground and will lift off gracefully with a bit of up elevator.

From there on, just enjoy it; it does a nice axial roll, will do round loops from straight and level, and is just as happy right side up as inverted. Snaps are quite showy and therefore the spins are also, but the model

recovers as soon as you relax the rudder pressure. Slow it down for a landing and it again tracks nicely back to the pit. You can, as a matter of fact, slow it down so much that at high angles of attack the bottom of the rudder will drag on the runway. The plan does not call for a tailskid, but if you like these high-nose landings, favor the tail with a small plywood skid.

Because the muffler on the Cox .05 covers the exhaust, it is no longer possible to use the familiar start procedure of feeding raw fuel into the exhaust port. I found that feeding raw fuel into the venturi and using a 1/2A starter does the job nicely.

The only warning I may make is that because the Flat Cat flies so well, you may forget that it is a small model and if you let it get too far away, you may lose orientation, so keep it in close and enjoy!

You may direct any comments, questions, kudos or knocks to Jose M. Tellez, P.O. Box 733, Laguna Beach, CA 92652. MB

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