

Old Timer Replica: Commando

By Dr. D.B. Mathews

Blow the original up 56%, add a .40 engine, and you've got a S.A.M. natural.



PHOTOGRAPHY: DR.D.B. MATHEWS

This project represents one of the more interesting motivational stories of my Old Timer designing. The very first R/C assisted Old Timer I built was a *Buzzard Bombshell* which was converted from free flight to R/C in 1973. The old *Bombshell* had been a delightful free-flight and served me well in the very earliest days of S.A.M. fun fly activities. Its venerable and well-used Enya .29 would consistently lift it to thermal flights and provide many thrilling chases down wind over hill and dale.

By 1973 those chases were becoming less and less thrilling as the slow but relentless

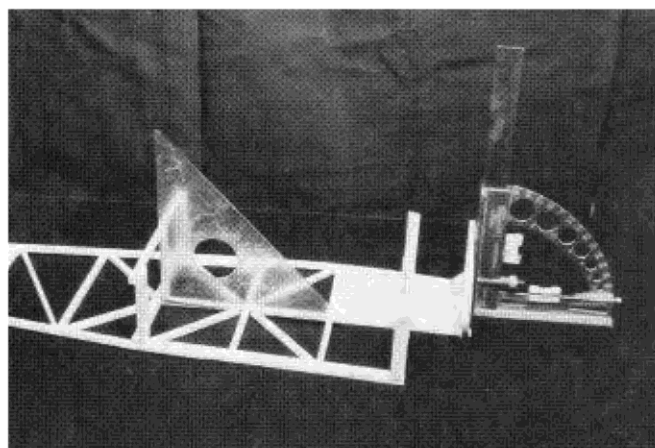
progression of time made such activities more and more an "agony of the feet". I had flown (and that term is used advisedly) R/C back in the early 1950s using *Windy Joe's*, *Rudderbugs*, and *Livewire Trainers*. Then, as my two sons came along, I abandoned the tinkering with R/C and developed a strong interest in free flight in all its forms.

When those sons were no longer available to help in chasing and recovering, free flight began to become physically and emotionally burdensome. I was ready to find some other way to enjoy the beauty of a thermalling model without being compelled to travel well into the countryside to fly and spend intermi-

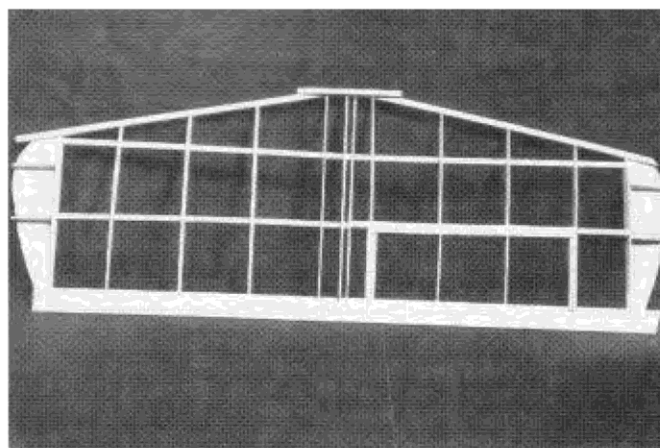
nable hours looking for the de-thermalised model in wheat fields, or worse.

Through the model press I became aware of several pioneering efforts at controlling the recovery phase of free flight with R/C units. Although the *Buzzard* cabin and empennage required some "boat in a bottle" construction techniques I managed to squeeze a three channel system in, and proceeded to have a delightful time.

Historically this was several years before any formal rules even existed for what has now become S.A.M. R/C Old Timer. S.A.M. at that time was a free flight oriented group interested in preserving the era of modeling



Each fuselage side frame is first built flat on the building board and then the front formers added (above left) while squares or draftsman triangles keep



them perpendicular. Almost complete framework of the horizontal stab (above right) shows the single elevator surface which the author favors.

preceeding WW II. The subsequent impact of R/C assist on this noble concept is not in the scope of this article.

So what does all this have to do with enlarging an Ontario Model Supply *Commando*? Well quite a bit really. As those who have built *Bombshells* can tell you, the construction of that design is both complex and rather heavy. Also, for pure competition use, it is a bit of a paradox. S.A.M. rules require 225 square inches per .10 cubic inch of engine displacement. The *Bombshell* measures out as legal for a .37 cubic inch powerplant. It would need to be enlarged slightly for a .40 cubic inch engine.

The *Commando* on the other hand, is in many ways a *Buzzard* but with a much simplified structure. The airfoil, moments, tail volume, etc. of the *Commando* are almost identical. Though kitted in a small 50-inch version as opposed to the *Bombshell's* 72 inches there is just too much similarity for the *Commando* not to be considered some sort of cross between the aerodynamics of the *Buzzard Bombshell* and the construction techniques and appearance of a *Brigadeer*.

Having built and flown a 50-inch *Commando* with great fun, I became intrigued with enlarging the *Commando* rather than the *Bombshell*. The ensuing model retains the excellence of the latter while being infinitely easier to build (and less expensive since very little sheet balsa is required) as is the *Commando*.

Additionally, this version of the *Commando* is unusually versatile. Powered with a .40 four stroke it has become a legendary trainer here in Wichita having been used as a Club trainer by Mike Tallman for over three years. When I still owned it, an ST .40 pulled it nearly vertical and to such heights that it almost insured max flights had it been used in competition.

So, if you'd like a model with all the flight virtues of a *Bombshell* but with a different and much easier to build structure let's take a look at how to build one.

Construction

Cyanoacrylate (CyA) is the primary adhesive used throughout. Aliphatic resins are used to laminate the various balsa outlines and five minute epoxy to adhere the firewall and wing joints.

All wood is balsa unless otherwise specified: use medium "C" grain sheet. The strip stock should be clear of knots and be of medium density. Adhesion to spruce can be enhanced if it is lightly sanded before assembly; this seems to remove some of the resins that have worked to the surface after milling and storage.

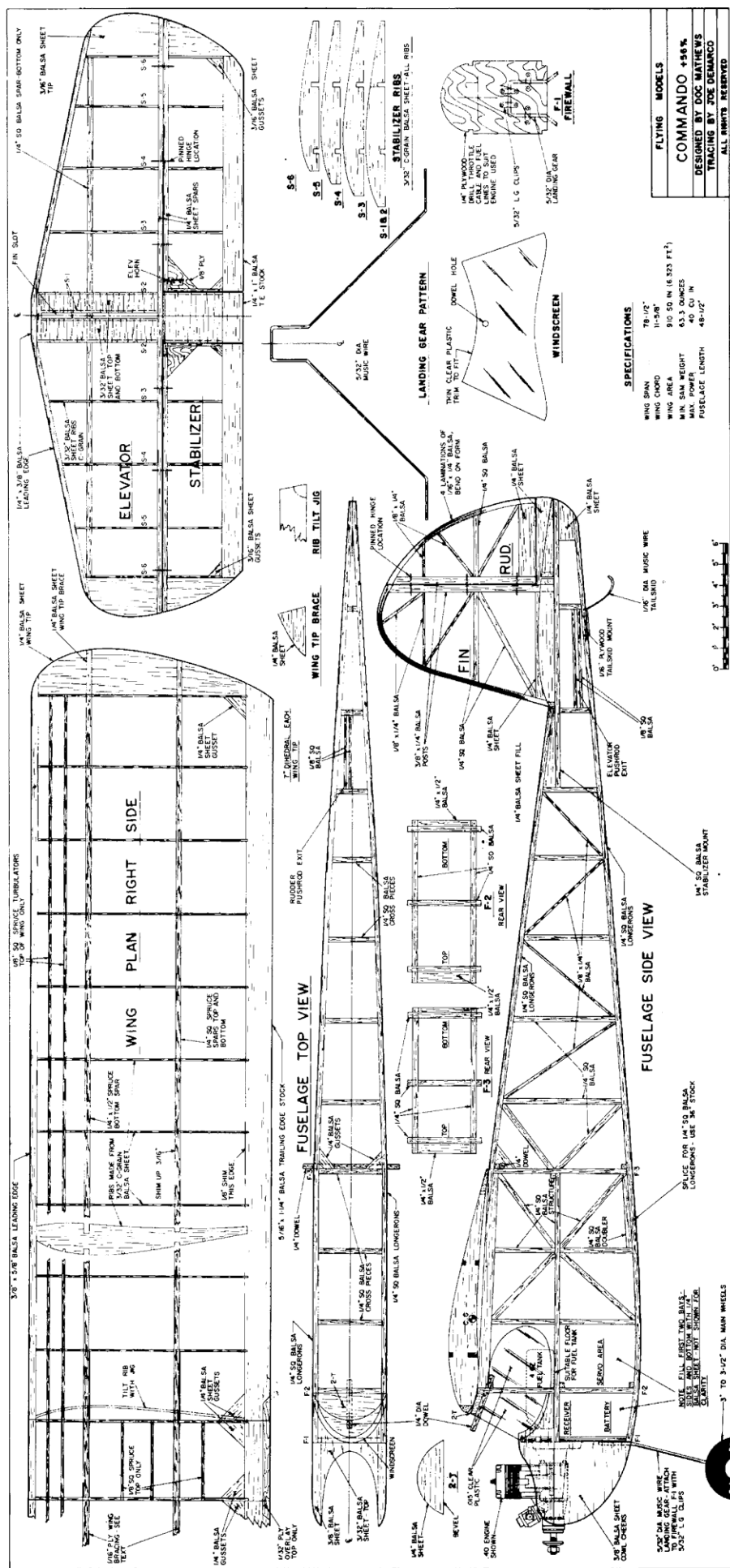
Wing. Develop a master rib of plywood and use this to stack cut ribs with a band or jig saw. This can easily be done by placing a piece of office type carbon paper under the plan and on the ply and then tracing over the outline with a hard pencil.

Notch the trailing edge stock with a razor saw or with the blade reversed in a jig saw. These add considerable additional wetted area for the CyA.

Pin the trailing edge to a flat surface, shimming it slightly. Repeat for the bottom two spars, then carefully place each rib over the drawing making sure it is at right angles to the building surface and directly over the drawing. Use the jig to set the angle of the center section rib.

Spot each joint with CyA, then add the top spars and leading edge, and tips. Remove

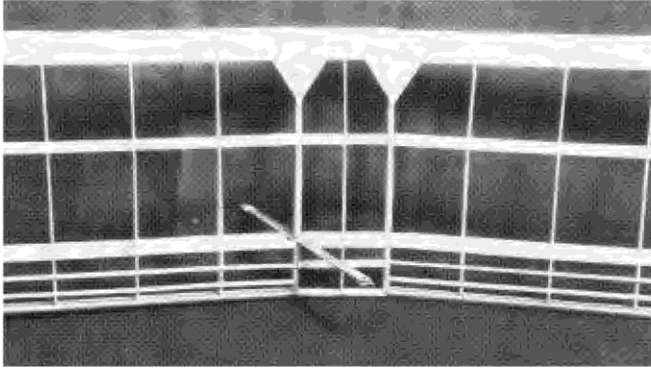
FLYING MODELS



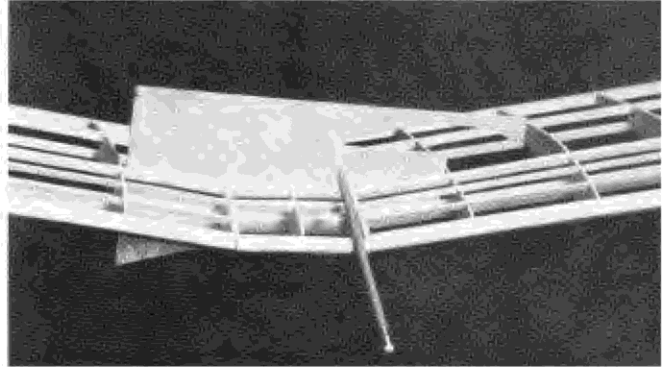
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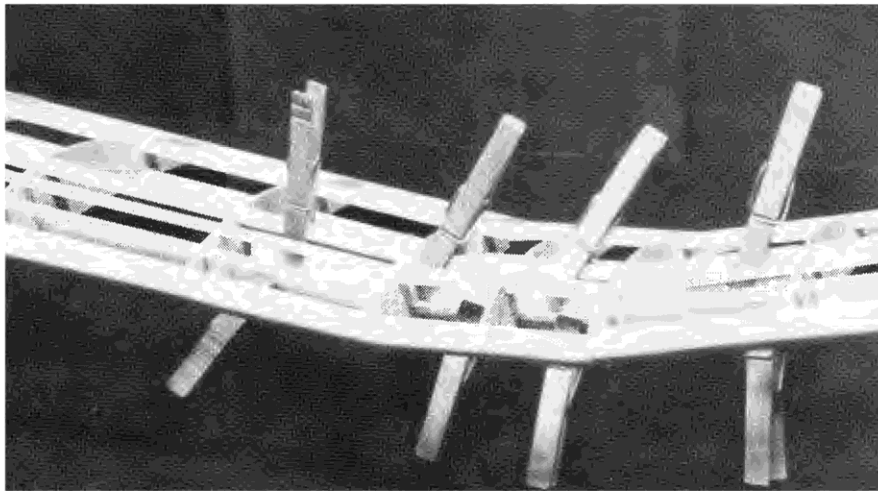
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After the wing is framed and assembled, the ply dihedral brace is added by first using a doubled hacksaw blade to cut the center section ribs (above left) away from the rear face of the front spars. Then a plate (it must be the proper



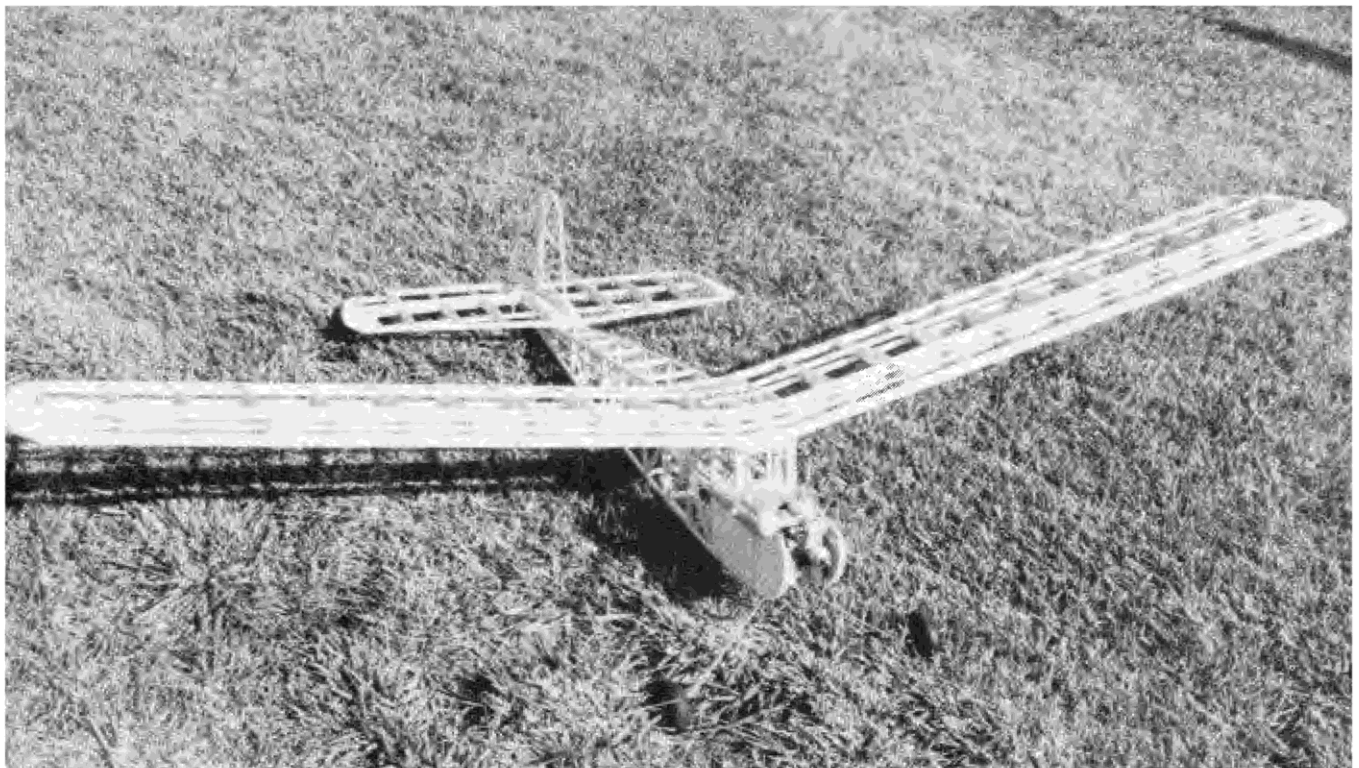
length) of the 1/16 ply is inserted in the cut-out (above right) and marked with the angles of the brace profile. When the shape of the brace is cut, it is then clamped and glued to the ribs and spars (below left).



this panel from the board and repeat the sequence for the opposite panel. Be sure you are building a *right* and a *left* wing panel.

Block up each panel seven inches (an ACE wing dihedral jig is immensely helpful). Place the center rib flush with a flat surface and coarse sand in the angle. Repeat for the opposite panel. Finish the center section in the same manner, then join the panels with five minute epoxy. When cured, use two hack saw blades taped together to cut a slot from the center section ribs and the root ribs along the back faces of the front spars. Slide a sheet of 1/16 ply down through this slot and mark an outline with a pencil. Remove the ply and cut out the front dihedral brace. Epoxy this into the slots and repeat the technique for the rear brace. This gives a custom brace that will fit your wing exactly.

Fine sand the structure and cover with your favorite material. The unit has suffi-



There's plenty of "sticks" in the *Commando's* complete framework but the author claims that it's simpler to construct than a *Bombshell*.



cient strength for any of the heat shrink covering materials. Naturally silk could be used also.

Fuselage. Standard box-type construction is employed. One frame is built over the other using scraps of masking tape to prevent sticking. The fill sheet is best precut using the technique described for wing ribs.

It is a good idea to assemble the formers and cut out the firewall while the framework is curing. Remove the frames, and pop them apart using a table knife. Sand a bevel into the tail post area, then place the right side onto the drawing table and trial fit the bulkheads. Attach them with CyA making sure they are at right angles to the frame.

Install the left frame onto the assembly, again checking alignment before adhering. I prefer to leave the box on the board and jack up the tail post by one half the total width. Cut the cross pieces in pairs using the top view as a guide.

An alternative method is to remove the box and place it over the top view, then construct the framework from that position. In either case, just be certain the tail post is right on the midline and that the stab seat is level with the wing saddle.

Bend the landing gear over the drawing using a large vise grip plier and a bench vise. A cut-off wheel is also most useful here. If you make an error, do not attempt to rebend, just toss the wire and start again. The unit is held to the firewall with nylon clips. It is wise to use the prebent wire as a guide to drill the appropriate holes. The same applies to the engine mount. Speaking of which, I used Hayes long mounts with a .40 stroker well back and the .40 two cycle well forward to avoid major swings in the C.G. If your model is to use only one motor, adjust its position after final assembly.

Stabilizer. Although the *Commando* stab planform is very close to that of the *Bombshell* it at least has ribs rather than over and under strip. For simplicity's sake I usually place the elevator on half the stab and this has worked very well albeit a bit odd looking.

The construction involves techniques similar to those of the wing, but we just place blanks of sheet balsa in the appropriate places, then block sand the whole unit to air-

foil and taper. For the builder who might be uncomfortable with that technique I have included rib patterns.

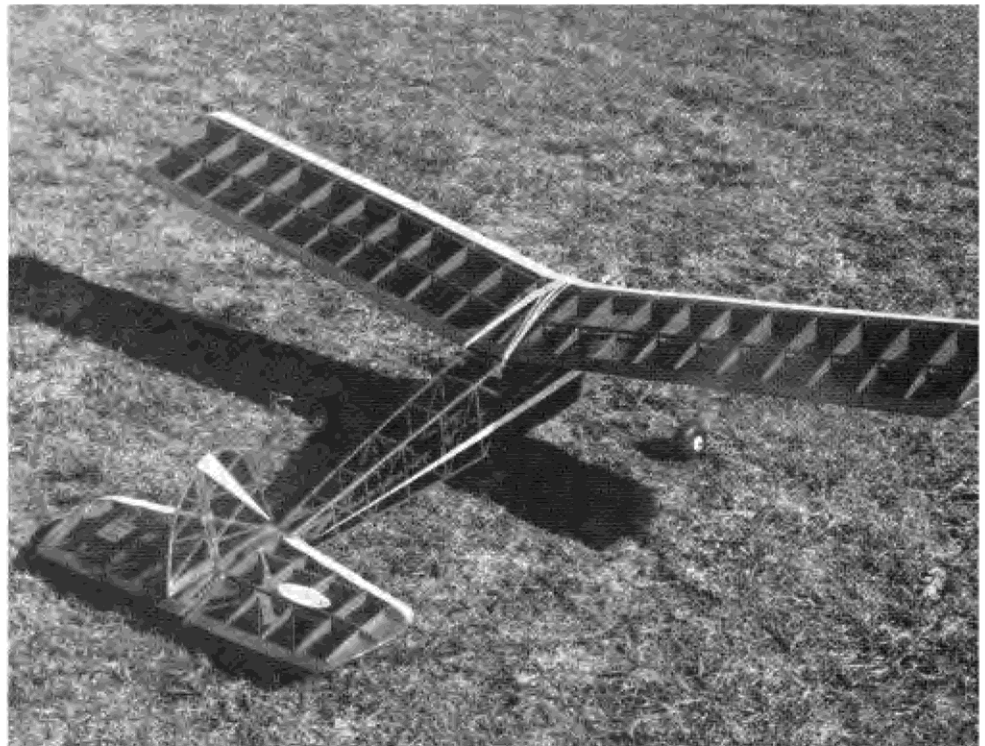
Rudder. The outlines are formed using pins on the perimeters. "A" (straight) grain light weight strip is soaked in ammonia water (one teaspoon of household ammonia to four ounces of water), coated with SIG Bond, or such, then carefully bent over the plan. The remaining framework is then built up. Note the sheet filler piece extends to the bottom of the stab through the slot.

Bevel the outside portion of the hinged surface and use your favorite brand. If you don't have one, consider the Easy Hinge from SIG.

Hook-ups and installations

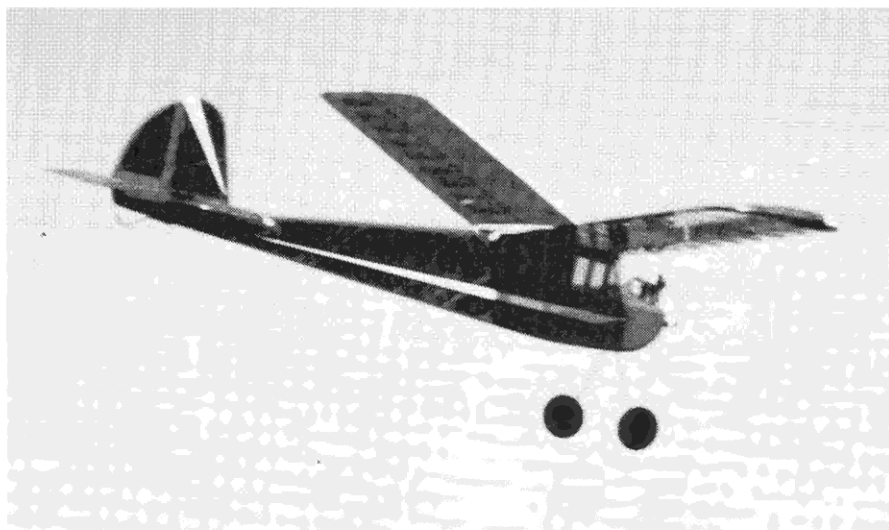
Hard balsa pushrods or nylon tube-in-tube can be used. Just be sure the system is adequately braced against flexing, and runs without binding. Nylon horns and clevises are advised. The rudder rod will need some adjustments to pass out the slot in the fuselage top.

The tail skid can be bound to the ply plate with carpet thread and CyA or $\frac{1}{16}$ inch nylon clips used if you can find them. Wheels need to be light if the model doesn't need the additional weight up front. The lightest and most durable I know of are the Lite-Flites from Dave Brown, although they look a bit



If you want a real smoker put a .40 2-cycle in the nose but a .40 four stroker like that in the author's plane (above) will give a more realistic, leisurely climb. Why hide all the lovely geometry of that framework (below). Cover the *Commando* with some translucent plastic film. Also is very light weight.

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Old Timer designs have been overlooked as good, sport primary trainers. They have excellent flight stability and recover quite easily if the student pilot should get scrambled. They also are potent thermalling machines!

strange. Trexler inflatable units are still available for an authentic look if you wish.

Since this is a duration model, a small tank is plenty. Keep it and the foam-wrapped battery and receiver well forward. Mount the servos on basswood strip held against the fuselage wall with scraps of light ply.

The dowel wing holdowns and windshield

are best installed after covering.

Flying

If a .40 two cycle is used, be aware that the *Commando 40* will be a real smoker. I'd suggest starting out with an 11-6 wide-blade prop and less than half throttle on the first flights, cause you're going to tend to go

straight up, very rapidly. As you get comfortable, use a normal 10-6 and be prepared to shut the motor off before the allotted engine run is used up. This thing can get very high in 20 seconds in the limited engine run events.

With a four cycle .40 the model will behave and fly in a manner much more realistically to the era represented. Climbs are more leisurely, the angle of attack more realistic, and the thing thermals just as well once it's to altitude. For that matter the sound is much more like a Super Cyk or O&R 60.

Needless to say this design would fly very nicely with a good .25 two cycle if the nose were ballasted to compensate for the lower weight.

If you have a desire to be competitive in S.A.M. events this design will hold its own with most any cabin design around. If, on the other hand, you enjoy nostalgic trips back into an era when skys were bluer, thermals more prevalent, and miles closer together, under power the *Commando* a bit and have a ball. There is something sort of neat about parking this thing with the ultra sleek gliders and thermalling away with the best of them. Causes some odd reactions now and again.!

Finally, as a sport model or trainer this design is superb. It has excellent built-in stability and if the student becomes totally scrambled, he can just release the transmitter (or set it on the ground for that matter) and let the model work out its attitude while the flyer works out his.

So build one and enjoy!

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