

1/4 SCALE PIETENPOL SCOUT

**First Introduced In 1933 By Bernie Pietenpol
In Response To Requests for A Model "T"
Ford-Powered Full-Scale Version Of The
Popular Two-Place Air Camper, The 1/4 Scale
Pietenpol Scout Is A Winner.**

By Tim Houle

Every summer when I go to the EAA convention I invariably see (and photograph) at least three or four new Pietenpol Air Camper two-seaters. I'm always amazed at the variety of power plants used. I've seen Fords, Corvairs, even Continentals—about the only one I haven't seen yet is a Pinto powered version, and that's probably being built somewhere at this very moment! There are all sorts of Air Camper plans and kits available from peanut to R/C scale, but nowhere can one find either a plan or kit for the Pietenpol Sky Scout single-seat model. I have no idea why this is so, but until a few years ago I must confess that I too had no idea either that the Sky Scout existed.

I have never seen one at Oshkosh. I ran across the design while browsing through the EAA museum bookstore. Always on the lookout for new R/C designs for my Tom Thumb Sky Tracings plans service, this one immediately caught my eye as having quarter scale potential. At first glance it looked as if I could duplicate the structure with no weight or strength penalties. But first let me give you a little more background on the prototype before I get into the model itself.

The plans were introduced in 1933 in the *Flying and Glider Manual* by

no less than Bernie Pietenpol himself. This book, incidentally, is still available in reprint form from the EAA and is the ultimate scale presentation as it includes everything to build the actual aircraft. I strongly recommend that you buy this book before you start construction. It will allow you to go whole-hog if you wish with the details.

Bernie P. designed the Sky Scout in response to a ton of queries generated by the appearance of his Air Camper plans in 1932. Turns out there were a bunch of would-be builders who wanted to use Henry's Model T powerplant in lieu of the Model A spec'd by Bernie for the Air Camper. In Bernie's words, however, the T simply could not provide the power required "... for a two-place job." The die was cast when he received an additional batch of requests for a single seater. And so Bernie came to design the Sky Scout. An interesting sidelight in his article was his advice to builders that by all means they should learn to fly before taking their own ships into the air. This in 1933! He also notes that the Model A engine can be used in the Sky Scout but if it is, the wing should be moved forward one inch and the radiator size should be increased. (Remember this if you put an "A" into your Sky Scout.)

The Air Camper with its greater power is slightly bigger than the Sky Scout. Here is a capsule comparison:

	<i>Sky Scout</i>	<i>Air Camper</i>
Span	27 ft 3 in	28 ft 2 in
Chord	60 in	60 in
Fuselage length	16 ft 3 in	17 ft
Area	136 sq ft	140 sq ft
Landing speed	35 mph	40 mph
Seats	1	2

My objective when designing the Sky Scout was to replicate the original structure as closely as possible, deviating only where necessary to maintain the model's structural integrity. If I may say so, I think I succeeded. Comments from the local R/C community back this up to the extent that some people think it has captured the unattractive lines of the original. A pox on those who think the Pietenpol is ugly!

Bernie's wings were constructed of built-up spruce ribs and spars. I deviated to the extent that solid balsa and a few plywood ribs were used. The rib spacing and spar locations are scale and the trailing edge is very close. The traditional aluminum leading edge skin was not used on the prototype and so it was on the model. I did add 1/4 sq. balsa internal diagonal compression braces



between the spars but these are not visible when the wings are covered.

The so-called entry hinged "flop" used to facilitate getting into the cockpit was built and hinged, but finding no easy way to lock it in place for flying, I took the easy way out and glued it in place. The spars and leading edge are spruce and more than strong enough for non-aerobatic maneuvers. I would not recommend anything more violent than a big loop or roll with this plane. It is not intended for aerobatics but rather for the kind of flying you or I might have done back in 1933. Take her up easy, poke a few holes in the clouds, cruise the countryside and land. Not bad when you think about it; a nice change of pace from the run-of-the-mill hot rock sport project.

The airfoil is exact scale Pietenpol. I took Bernie's coordinates off the plans and fed them into a CAD-AM system which popped out an airfoil at exactly one-fourth of the original 60-inch model. All of the rib patterns were taken off this master airfoil. Dubro 4-40 threaded clevises and straps provided close-to-scale lift strut attach fittings and had the added advantage that each strut is individually adjustable to get the wing in true rig. Great Planes $\frac{5}{8}$ -inch hardwood lift struts were used but Hobby Lobby struts could be used, too.

The wings were made in one piece with a servo controlling each aileron. The aileron servos were mounted out in the wings and coupled via pushrods directly to the ailerons. A two-piece wing was considered and ultimately rejected as being too much bother with the consequent weight build up and additional fittings required. I have successfully transported the entire airplane in my 1980 Mazda GLC hatchback (with the hatch closed), so it doesn't appear that the seven-foot wing is a problem. And besides, don't most serious quarter scale types have vans, trailers or trucks?

The tail feathers are standard balsa and spruce built-up stick construction and approximate the scale structure. If you are so inclined, you could duplicate the original structure using the Flying Manual plans. Since the Tom Thumb Sky Tracings prototype will probably never see a contest, I elected to simplify construction a bit. One could (albeit its heretical) use $\frac{1}{4}$ sheet surfaces for ultimate simplicity. The standard brace wires (available from Balsa USA) provide plenty of strength. Proctor brass fittings and 2-56 bolts anchor the tail brace wires.

The fuselage is an exact copy of

the original and uses $\frac{1}{4}$ -inch sq. balsa throughout as compared to the $\frac{7}{8}$ -inch sq. spruce of the original. Spruce longerons are not necessary, the balsa ones are plenty strong, particularly with the 1/32-inch ply gussets at every fuselage side joint (just like the real one).

The landing gear struts do not have the shock absorbers that Bernie put in his. With its 23-oz. wing loading I just didn't think this was required. Hardware store cable clamp U-bolts were used to attach the main $\frac{1}{4}$ -inch music wire struts. Why, oh why, doesn't someone make U or J bolts for 3/16-inch and 1/4-inch music wire? If they do, I've never seen them. Hard to figure with the popularity of this size landing gear wire. The Williams Bros. 6 $\frac{5}{8}$ -inch vintage wheels are exact scale and perfect for this project. But, geez, are they expensive! I mean, even discounted to \$21 from a mail order house, they seem to be priced awfully high. But they do look great on the Piet and there doesn't seem to be any option other than making your own.

The fiberglass cowl is available from FIBERGLASS MASTER in Virginia. I have the first cowl from his master mold and it fits the plans perfectly. Even the engine cut out line is molded in. You will have to cut one side of the cowl to accommodate your particular engine. I used an Enya 1.2 cu. in. four-cycle and added two degrees of downthrust to minimize pitch trim changes as power settings are changed. No right thrust was used. Bernie also had a couple of degrees of downthrust in his prototype and no side thrust.

The tailskid shown on the plans is an exact working copy of Bernie's original design. A fairly heavy spring was used, perhaps too heavy, but it's better than bottoming out on a tail first landing! It flexes just like the real thing—sure beats the standard tail wheel for looks.

The 5/32-in music wire cabane struts are strapped to the fuselage and with the $\frac{1}{8}$ -inch music wire cross-braces at the top, a strong birdcage assembly is provided. To attach the wing to the cabanes eight 4-40 capscrews and four aluminum brackets are used with the 4-40 screws threading into blind nuts buried in the wing center section. Full-size cabane strut patterns are shown on the plans. There are no tricky or complex wire bends anywhere, and only Sta-Brite silver soldering of the copper wire wrapped joints is required. The landing gear and cabane struts are faired with spruce strips. Actually, the original had steel tube gear and cabane struts

so one could use plain wire struts and still be scale.

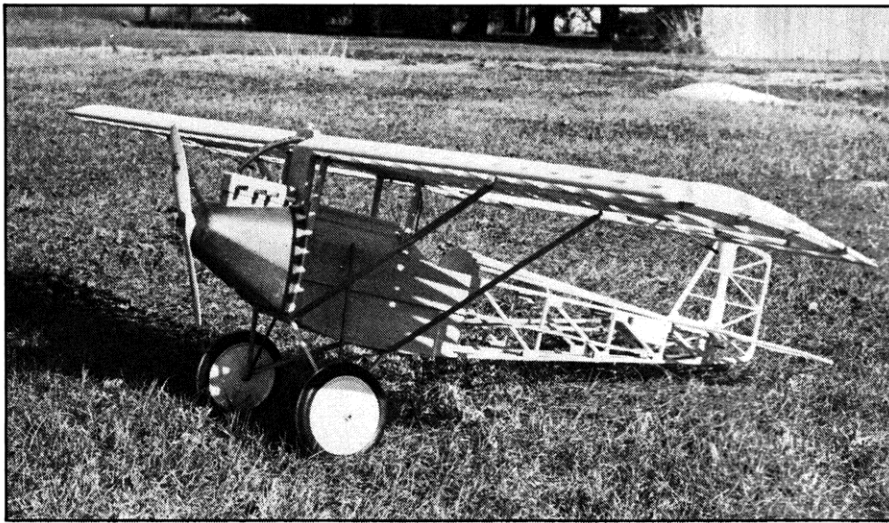
Balsa is used to simulate the fuselage aluminum covered areas (except for the "glass" cowl) and spruce stringers are used for the rear turtle-deck. The prototype was covered with preprimed Micafilm which gave a nice taut primed skin. I was a bit concerned about covering the under-combered wing but it ironed on beautifully after the required coat of Balsa-Rite. A dummy Model T engine and radiator were made up from balsa and attached to the motor mount. The plans clearly show both items in sufficient detail.

Three coats of Hobby Pox were brushed on—cream on the wings and stabilizer and red on the fuselage and fin. It was beginning to look good. With the addition of radio, bracing wires and fittings and engine it all came together. The tank and radio components are easily accessible through the cockpit. No other access hatches are needed or recommended. There's plenty of room to get your whole hand into the fuselage all the way up to the firewall.

So far I have used the editorial "we" when referring to construction of the prototype. It's time to mention and give credit to the actual builder—Don Schreiber—who may be the world's fastest builder of R/C airplanes. He appraised the structure as being exceptionally straightforward throughout. He said it's like building an old-timer or big stick model. Don always cuts out as many parts as possible first and then builds the "kit." This works particularly well with the Piet as it doesn't have too many parts to be cut; the ribs were stack-sawn on a bandsaw. Ditto for the spar hatches. Don summed it up by saying that if you have built a few kits, you can easily build the Piet. This by the way, was Don's first quarter scale project. (Since the Piet, he's also completed a Tom Thumb quarter scale Pitts S-2A.)

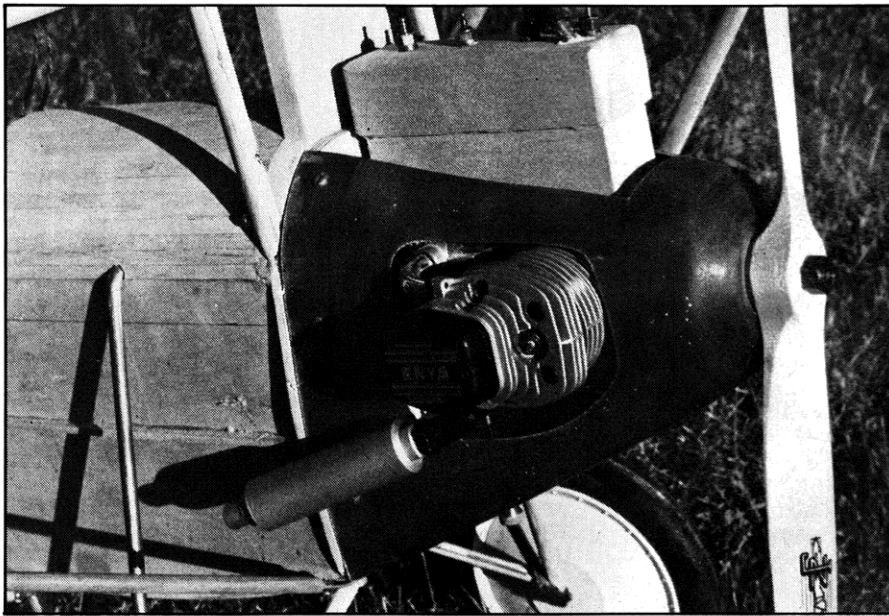
The finished and ready-to-fly airplane should be balanced as shown on the plans. Do not attempt to fly with a C.G. aft of the point shown. We did and demonstrated the classic aft C.G. stall/spin maneuver to a bunch of onlookers. The Piet has a very low tail volume number due to its small horizontal stabilizer and short tail moment. Builders should also check the wing and stab incidence to make sure both are at zero degree settings.

Ground handling, quite frankly, amazed me. I expected the model to have a mind of its own because of the fixed non-steering tail skid. On the contrary, it is quite docile. Don demonstrated 360-degree, 180-



The Pete is built very light, and is a convenient size, yet is still a full quarter scale.

The Model "T" engine with its upright radiator gives the scale modeler many opportunities for adding scale details.



Many homebuilders built Petes in the early 30s, and kept them down on the farm along with their tractors and plows.

degree and S-turns with absolutely no loss of control. It turns much like the real thing; rudder hard over followed by a quick blast of power. The propwash and rudder bring it around fast. Flying weight of the test model is 12 lbs. complete with fuel.

The first flight was a washout through a dumb mistake by yours truly. I calculated the starting C.G. as being 33 percent and this is where Don set it. Seconds after liftoff we knew we had a problem when it rolled hard to the left and spun in. A TV tape of the crash showed full right aileron while it stalled to the left! After much head scratching I rechecked the C.G. location and found the C.G. was one inch further back than it was supposed to be! Incidentally, the crash proved that the airframe is plenty strong. Three outboard ribs were broken, the landing gear needed tightening up plus some fuselage repair, but Don had the rework done in a few days. (I told you he was fast!) Everything else was left intact, proving once again that old adage, build for flight—not crashes.

When Don repaired the Piet he stripped the Micofilm covering from the wings to check for internal damage. It was a good thing because he found a few items that definitely needed fixing. To save repainting time and expense we decided to use Balsa USA SOLARTEX brand covering. Antique color was chosen because it was a close match to the original cream paint. Honestly, it looks more like an early homebuilt now than it did before and we cut some weight too! There was no need to seal the material as the exhaust never comes near the wings. In retrospect I think I'll use this stuff to cover my next antique airframe. It comes awfully close to simulating the clear doped grade A cotton of the real thing.

With the center of gravity placed where it was supposed to be, ground handling remained the same, but what a difference in the air. It now flies like a real Pietenpol; a little sensitive on the elevators and very slow in aileron *only* turns. Rudder must be fed in to get the model through a turn. We recommend a coupled-aileron-rudder setup for relaxed flying. And don't move the C.G. aft of the point shown on the plans!

The Enya puts out enough power to handily haul it around the patch. It can be looped by building up airspeed, but while the airframe will certainly withstand aerobatics, please remember that the real Pietenpol was not intended for aerobatics and the Tom Thumb model seems to

have inherited the same reluctance for violent maneuvers. It's a real treat to fly a giant scale antique. Get those goggles out and spin up your old Model T!

Fully detailed and tested plans are available now at \$19.00 which includes postage and shipping of rolled plans in a sturdy mailing tube. A bill of materials is also included. Send checks or money order to: Tom Thumb Sky Tracings, P.O. Box 84, Mequon, WI 53092. ●



Author Tom Houle on the flight line with his 1/4 scale Pietenpol which should have very easy-flying characteristics, with its parasol wing and generous dihedral.