

# SKYRIDER

DESIGNED BY LARRY RENGER FOR CASUAL SOARHEADS

**F**ree, silent flight in a cool blue sky, a gull or two to keep you company — the SkyRider is for that kind of flying. Here is a model which you can carry to your flying site by a pleasant walk, soar to your heart's content, and then walk home again with it. No big-engine roar to wake the dead or neighbors, no 800 foot field required to use your winch or hi-start. In fact, you can fly for a month on a pint of gas!

This is no 8 channel, 4 engine bomber, or screaming pylon racer, not a gas gulping pattern model, or even a 14' sailplane. The SkyRider is at home bouncing on the lightest lift, letting you relax and occasionally steer it to a new thermal when the old one drifts away. Under power this model climbs out smoothly. The little tank of the Cox Pee Wee .020 is just right to gain comfortable altitude. If there is an overcast you can easily keep it lower by doing some tight turns in the power run before grabbing for some sky.

Once the engine quits, the SkyRider may be just trimmed for a nice glide circle and allowed to fly free if you wish; optimum duration comes with minimum control input

anyway. Just steer it back upwind whenever it begins to drift behind you.

This model aircraft is perfectly at home on any school field. Originally the power was a Cox Tee Dee .020. That was too much for this size model even with a digital radio in it. The model would handle it, but it kept trying to disappear straight up! The power of a Pee Wee .020 hauls the SkyRider's 9½ ounces into thermal country very nicely, thank you. With the lightest pulse radio setup you could even knock almost 2 ounces off that.

Special care was taken in this design to assure a lightweight and rigid structure without complexity. The features which make this possible are the three section wing, and the selective use of spruce, hard balsa, and medium balsa in the wing spars. Selective spar strength allows use of all identical ribs while still achieving a structure which has the correct strength distribution.

Frontal area has been minimized, and the overall weight was held to a convenient minimum. Mind you, a more complex, difficult design could be even lighter and

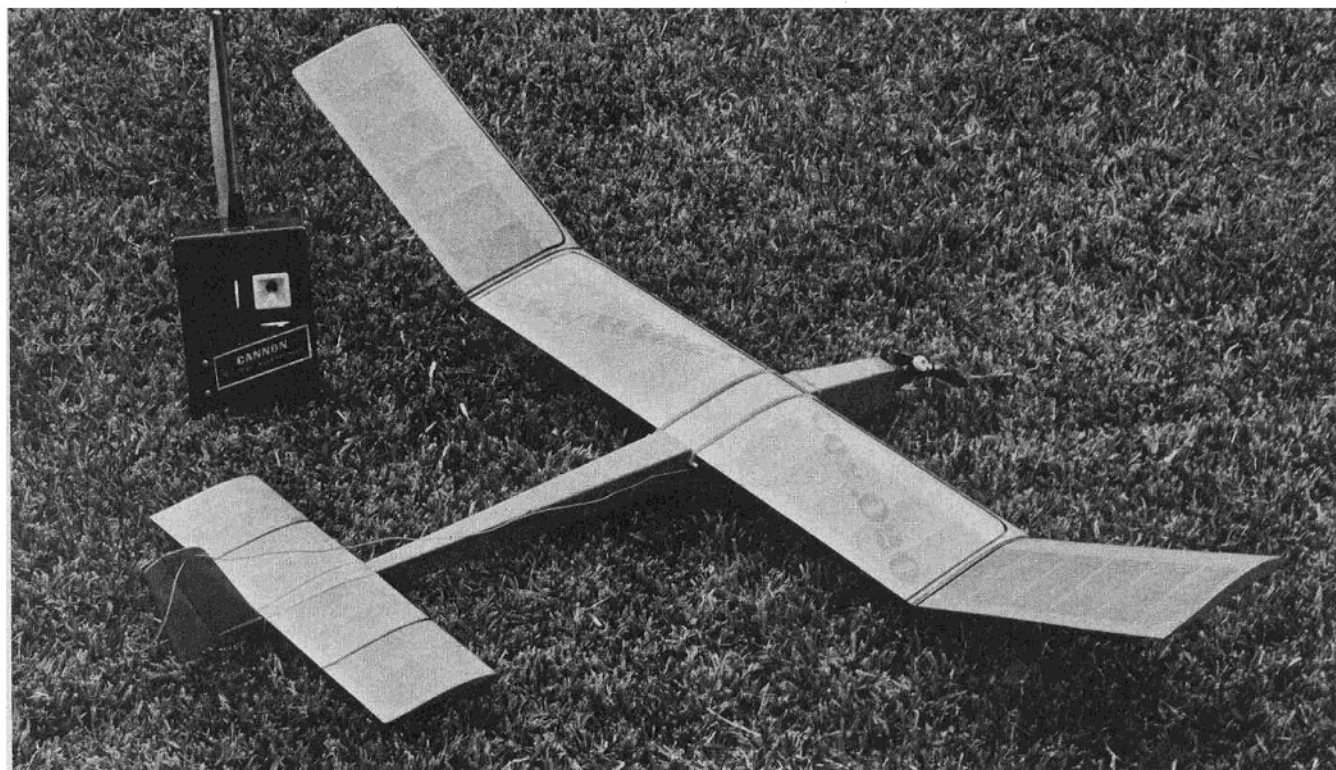
cleaner, but this is a "sport" model, after all.

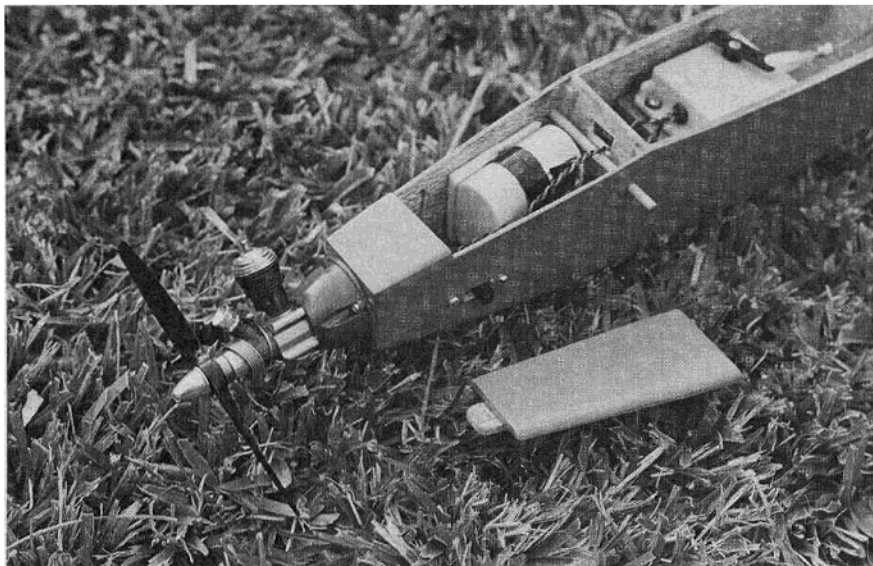
SkyRider, a very versatile model provides a pleasant relaxation on the way home from work, or diversion at a picnic, or something to teach Junior how to build and fly. You can even frustrate your R/C flying buddies by hogging all the airtime with \$3.00 worth of balsa and \$1.75 in fuel. If soaring models are your usual fare, you will feel right at home with the low wing loading of this model. You have a wing which could easily fly a model of double the weight. It is possible to use Cox's new muffler on the Pee Wee engine and then, even **you** won't be able to hear the airplane climb out. Just keep the colors bright so you can see it.

For some peculiar reason, I always build my wing first, probably because, as an aerodynamicist, I can't stand to see a nice wing just sitting around, so the rest of the model gets finished sooner. Anyway, the wing is where this article starts on construction.

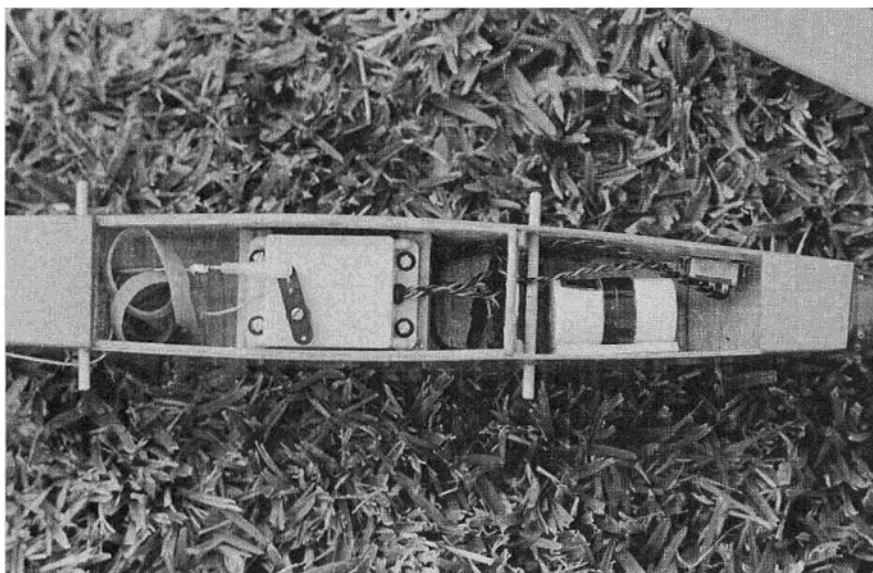
Cut out the airfoil templates and cement or glue them to thin metal or plywood. Cut out 26 ribs of 1/16" balsa and 2 from 1/8"

*Even beside the tiny two channel Cannon transmitter, SkyRider looks small!*

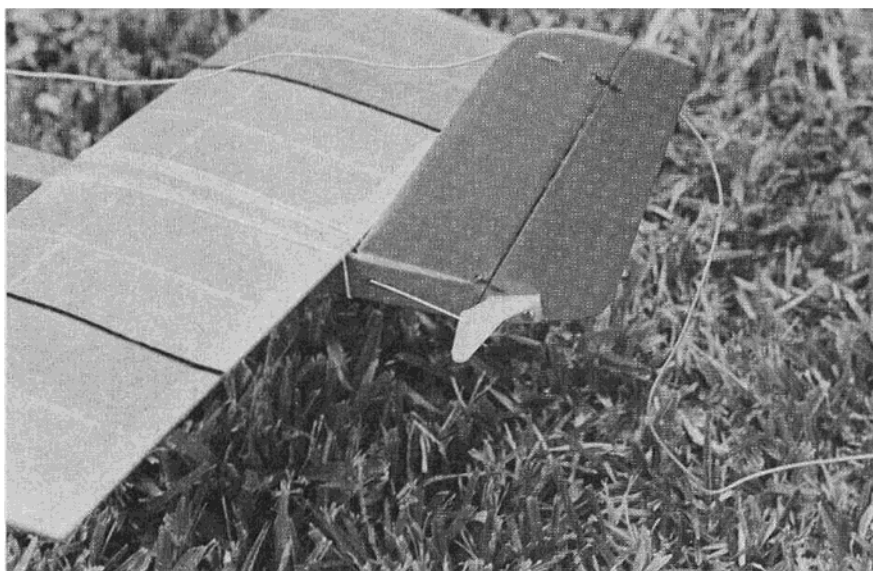




Close-up of Cox .020 and Cannon battery pack.



Plenty of room for single servo or pulse proportional.



Pushrod wire runs through Teflon tube in fuselage.

balsa. Sort the 1/16" ribs into two piles by your guess of the relative weight. We want to use the lighter ribs at the tips. Throughout the wing, use lighter stock at the tips, and heavier in the center.

The most important "tool" you can own in model building is your building board. It must be flat and true in all directions, of good size (at least 4' x 1 1/2'), and with cork, cardboard, or best, Cellotex bonded to one

**SKYRIDER**  
Designed By: Larry Renger

**TYPE AIRCRAFT**  
Sport Powered Sailplane

**WINGSPAN**  
48 Inches

**WING CHORD**  
5"

**TOTAL WING AREA**  
240 Square Inches

**WING LOCATION**  
Top of Fuselage

**AIRFOIL**  
Flat Bottom

**WING PLANFORM**  
Constant Chord

**DIHEDRAL, EACH TIP**  
5 1/2 Inches

**O. A. FUSELAGE LENGTH**  
29 1/4" (incl. rudder)

**RADIO COMPARTMENT AREA**  
(L) 6" X (W) 1 1/2" X (H) 1 7/8"

**STABILIZER SPAN**  
14 Inches

**STABILIZER CHORD (incl. elev.)**  
4 Inches

**STABILIZER AREA**  
56 Square Inches

**STAB AIRFOIL SECTION**  
Flat Bottom

**STABILIZER LOCATION**  
Top of Fuselage

**VERTICAL FIN HEIGHT**  
3 3/4 Inches

**VERTICAL FIN WIDTH (incl. rudder)**  
2 1/2" (Average)

**REC. ENGINE SIZE**  
Co: Pee Wee .020

**FUEL TANK SIZE**  
Furnished on Engine

**LANDING GEAR**  
NA

**REC. NO. OF CHANNELS**  
One Chan. Digital or Pulse

**CONTROL FUNCTIONS**  
Rudder Only

**BASIC MATERIALS USED IN CONSTRUCTION**

Fuselage .....	Balsa, and Ply
Wing .....	Balsa, Ply and Spruce
Empennage .....	Balsa
Weight Ready-To-Fly .....	9 1/2 Oz.
Wing Loading .....	5.7 Oz./Sq. Ft.

side for pinning parts down. Such a board is cheap, easy to make and lasts for years if you use a separate cutting board. Cut out the wing drawings and pin them down to your building board. Use plastic wrap over them to keep the glue from sticking your wing panels down permanently.

At last, ready to build! Pin the bottom spars in place using pins to surround the spar, not go through it. Be sure to use hard

balsa for the center section lower spar and light balsa for the tips. Pin the leading edge in place. After cutting 1/16" deep notches in it for all but the end ribs, pin the trailing edge down too. Cut the 1/8" ribs and two of the hardest 1/16" ribs down 1/32" slimmer aft of the spar to allow for the top center section sheeting. Cut 1/32" off the entire bottom surface of these ribs too. Cut 1/16" from the front of the 1/8" ribs and glue a 1/16" x 1/4" x 3/8" plywood brace to the center section leading edge. Glue in the 1/32" bottom center section sheeting.

Use Titebond or Wilhold Aliphatic Resin to attach each rib in position, lightly coating all mating surfaces in each joint to assure the greatest possible bond area. If your joints fit smoothly but not sloppy, and you have the entire joining areas coated, the joints will be far stronger than the surrounding wood. Note that the dihedral joint end ribs must be slanted 12 1/2 degrees (toward the rest of the panel) to give you the correct tip dihedral. Use the rib angle gauge to get this slant exact.

When the ribs are dry, you may add the top spars. This time, select spruce for the center section and light balsa for the tips. Angle the edges of each of your gussets to fit its own location tightly, then glue each one in place. Fit a piece of wood at 45 degrees for each wing tip and carefully cut horizontally to match the other ribs. Sheet the leading edges and center section; use harder sheet on the center panel, lighter at

the tips. Add the vertical 1/32" balsa shear webs. Allow the completed wing panels to set for at least 24 hours before unpinning from your building board.

The next task requires some care, since we want to glue the tips to the center panel. It is vital that the dihedral angles be accurate, the joints strong, and the bottom surfaces match at the joint to avoid misalignments equivalent to warps. First, trim the leading and trailing edges, spars and sheeting to match the plane of the end ribs. Pin the center panel back down over protective plastic wrap and wet both joint ribs with glue. Pin the tip in place with the top of the outer end braced up just 5 1/2". Be sure the tip exactly matches the pinned center panel at the joint since a trailing edge high or low acts just like a warp. Repeat for the other tip and allow to dry thoroughly before unpinning. Use a bit of silk, nylon, glass, or gauze over the sheet joint, and around the trailing edge. Inlet a piece of 1/8" scrap next to the lower spar joint to complete the wing.

By the time you get this far you can figure out the stabilizer for yourself. Just use the harder spar on top.

The fuselage goes together easily. Take some care to select matched wood for the sides. Assemble the fuselage upside down over the plans with care to get both sides curved equally. Add all formers, the firewall, skid and braces, then plank the bottom.

After the fuselage shell has dried, add your control sleeve (I use .045 wire run through electronic teflon "spaghetti" tubing). Plank the top and nose, make a hatch, and glue the fin in place. Trim the stabilizer mounting area to assure that the wing and stab are exactly parallel.

In the original, the engine was mounted by #2 sheet metal screws, and the receiver block mounted on a pair of spruce cross beams. The batteries mount nicely by using double stick foam tape.

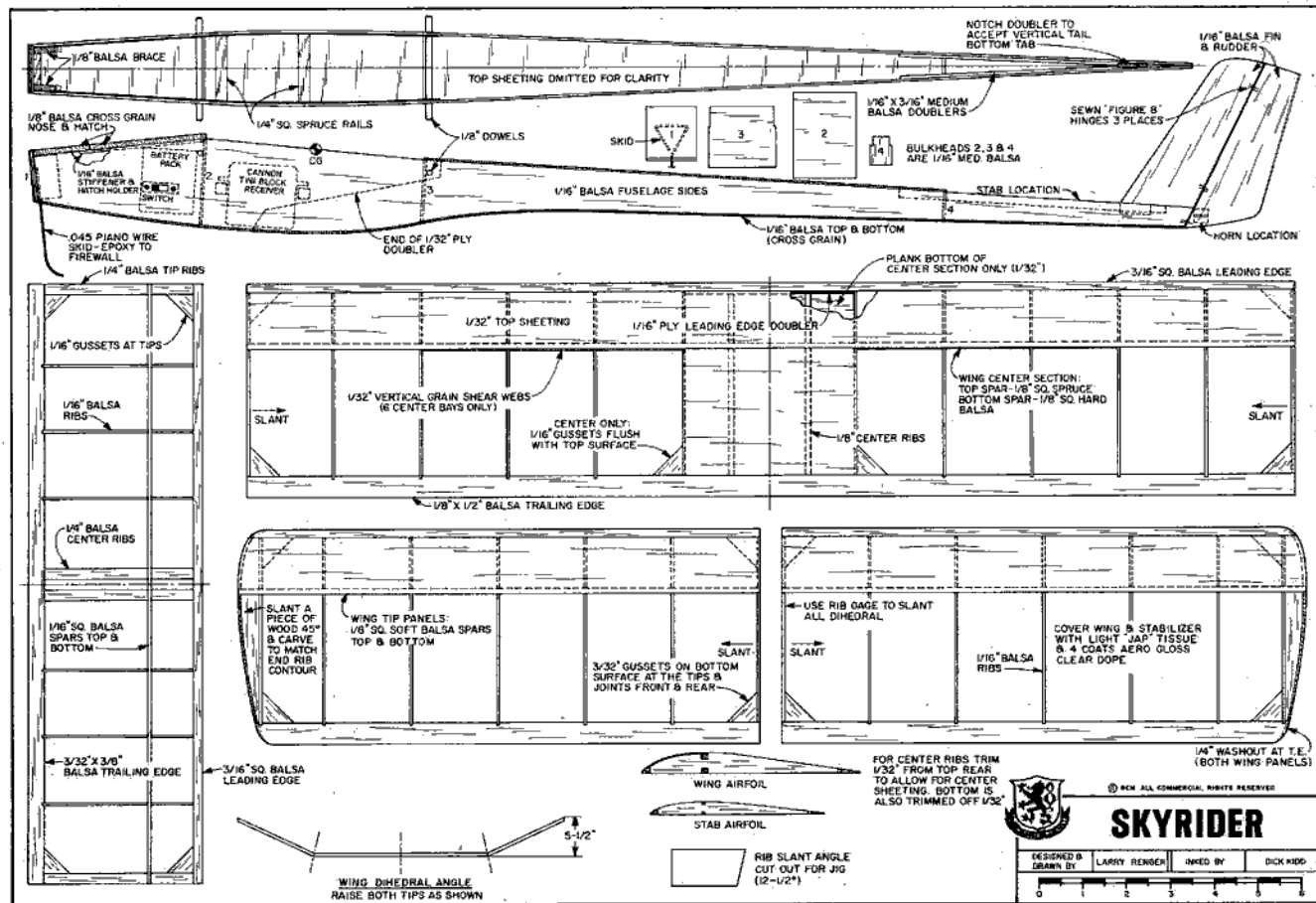
The finish on the fuselage, fin, and rudder was finishing resin with polyurethane plastic paint over it. I will recommend Hobbypoxy, as the urethane dried slowly, covered poorly, ran, and showed brushstrokes. So much for that experiment! The wing and stab were (are you ready for this?) covered with "Jap" tissue and doped. As a MonoKote and Solarfilm freak I had forgotten just how light tissue with clear dope is. Four coats of Aero Gloss sealed it up.

The striping is D.J., the lettering painted on using a "Fascal" mask.

After all the dust settles and the paint dries, it's time to trim it up. The model should balance exactly at the 50% chord point (make that stab do its share of the work). Wash out (trailing edge up) both tip sections 1/4" at the tips, the center section and stabilizers are kept flat.

After all this, what are we waiting for, let's go flying! □

## FULL SIZE PLANS AVAILABLE — SEE PAGE 166



**SKYRIDER**

DESIGNED & DRAWN BY LARRY RENDLER INKED BY DICK HODG

PLAN NO. 611