

EEE-Z-FLI PYLONAIR

The latest creation to spring from the author's EEE-Z-FLI drawing board, a racer-like sportster for four channels and .25-.30 power.

BY AL WHEELER

The Pylonair is an easy-to-build, real fun airplane. It looks great (my opinion), is an outstanding flier and has a unique "see through" feature that makes it a useful teaching aid to new and prospective entries into the RC fraternity, as well as interested spectators at mall shows and other public showings.

How often do you hear questions about how the radio works? *What makes the controls move? What are servos? Where is the gas tank? Do you have a battery and a radio receiver, etc.?* The "see through" feature of the Pylonair answers all of these questions literally at a glance. The entire top quarter, from the

firewall back to the canopy, may be covered in clear or tinted plastic, the fuselage diameter being such that a two-liter soda bottle fits like a glove! Turn on the radio, operate the controls, and all those many questions are answered. Seeing is the best teaching medium you can find!

If you prefer the big-engine, long-nose racer look, paint the cover to match or, better yet, make a second cover of soft aluminum for flying and keep the plastic "see through" for show. The Pylonair is fast, quite aerobatic and still retains the "polite" takeoff and landing characteristics common to the EEE-Z-FLI line of aircraft.



Right: Al's 1990 prototype looks more like an Unlimited racer than the current model. Aft end has a slightly different shape than shown on the plans.





Uncovered framework reveals construction typical of Al's other EEE-Z-FLI efforts. Design can be easily modified with an open cockpit, slightly reshaped vertical tail and wingtips, etc., to create your own customized look. Be creative!

GENERAL NOTES

As with any building project, assembly goes faster if all the parts are available as you need them, so spend an evening cut-

structions together; something unclear in one may be defined in the other. The entire construction of the Pylonair is pretty straightforward and should not present any difficult areas.

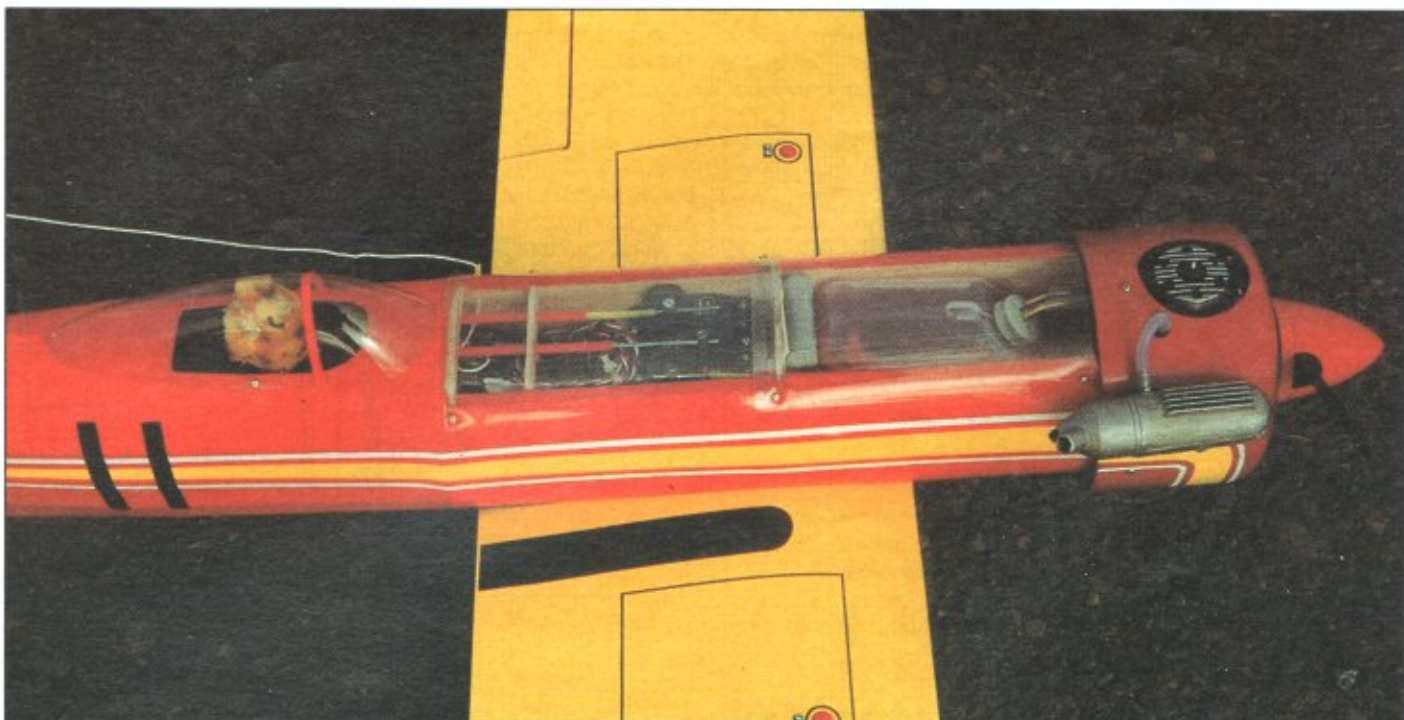
is completed to fit the dorsal. Sand all surfaces and put aside for final fit prior to covering.

FUSELAGE

Make the FS-1 fuselage sides.

ment as this is where bananas are born!

Starting at B1 (firewall), attach all the F series formers. Note that F2 and F4 mount back-to-back with the stringer



The author's first plans-built Pylonair has a clear see-through plastic upper deck—useful for showing the internal layout and workings of the RC system to interested non-modelers. The area could also be covered with thin sheet aluminum or plywood, secured with thin screws so as to be removable and painted to match the rest of the fuselage.

ting out parts. As for equipment, the plans and building instructions denote the products used by the writer. Building methods may be varied at the builder's discretion, but radical departure from the plans and accompanying instructions is not recommended. The type of wing construction shown is very rigid and resists corrective warping, so *build it flat*.

Work the plans and the in-

TAIL SURFACES

All tail surfaces are constructed of medium balsa. The elevators are joined with a hardwood dowel. Align the elevators with the stabilizer and mark and cut the hinge slots. Cement the hinges into the stabilizer only. Do the same with the fin and rudder. The fin rests on the top of the stabilizer, so it is best to wait until the fuselage

Install doublers D1 and D2, leaving a space for the firewall (B1) and former B2. Be sure to make a right and left side! Now cement B2 in the slot between triangular strips in the corners.

When the cement is dry, pull the fuselage aft ends together, assure they are square, secure them with clothespins and cement the joint. Former B4 can be installed at this time also. Exercise care with the align-

notches cut in F4. After the stringers are installed, make and install support shims between the stringers and the fuselage sides at station F7. The fore and aft wing supports (of 3/16-inch plywood) can now be epoxied in place, along with their triangular supports.

Notch the top of F6 and F7 for the 3/16 square stringer, glue it in place and cover the top from F6 to F7 with 1/16-inch

sheet, with the bottom edges cemented to the top edge of FS-1 on each side. Do the same from B1 back to B3. Install the cockpit floor and sheet the area from the front of F6 to the forward edge of the rear F1. The cockpit opening will be cut out when the canopy is fitted; that way you will be sure the opening isn't too big.

Add the three stringers on each side; taper the rear edge to blend with the fuselage sides. Mark, drill and install the blind nuts for your engine mount. Trial fit your engine and mark and drill all necessary holes in the firewall. Make the balsa cowl mounting ring that goes on the firewall face and cement it in place.

Now that the engine mount blind nuts are installed, the bottom 1/16 skin in front of the wing can be installed. Trim it to blend with the bottom of the side skins at the bottom of FS-1.

Install the hardwood tail wheel support block between the fuselage sides and sand it flush at the bottom. The aft fuselage bottom may now be finished, using a 3/16-inch square stringer and 1/16 balsa sheet as was done on the top.

Using the stabilizer or a piece of scrap in the stabilizer mounting position, form the wooden blocks that complete the fuselage top. Cut the forward block to allow the fin to seat on the stabilizer top. Temporarily slip the fin in position and fit the dorsal to the fuselage top, then cement the dorsal to the fin and sand the edges round.

Drill the hole for the tail wheel strut tube and glue it in place. Make the 90-degree bend at the top of the wire, insert it through the tube, slide on the collar and form the bottom bends. The airplane driver's opening may now be cut out, either to fit a canopy or in the shape of an open cockpit. Give the entire fuselage a good sanding and put it aside.

WING

Start by edge joining the bottom sheets, which extend full chord. Laying the bottom skin on the plans, mark the locations of spars, all ribs and reinforcement plates. Now the wing construction can be done on the top of the bottom skins.

Cement the front and rear spars in place, then install all of the No. 1 ribs. Note that those in the center section (five in each half) are marked 1cs. They are 1/16-inch lower than those outboard to accommodate the 1/16-inch top sheeting. Install the skin supports between the 1cs ribs, against the front face of the rear spar and flush with the top of the ribs.

The No. 4 ribs may now be installed—trim and bevel the ends for a good fit. They should be even with the top of the rear spar and 1/16-inch above the top of the front spar. Install the remaining No. 2 and No. 3 ribs. With the wing on a flat surface and the leading edge on the edge of the work surface, use a round file and open up the leading edge ribs to accept the leading edge dowel. Work the file through several ribs at

a time and file the openings so the dowel will bottom on the lower skin. A good contact here is important. When satisfied with the fit, cement the dowel in place, assuring a good bond to the lower bottom skin and each rib.

Use epoxy to install the plywood landing gear support and the hardwood block. Drill a 1/8-inch hole through the block and plywood as shown. The center section is now sheeted with 1/16-inch balsa from the front face of the rear spar to the mid point of the front spar top. Assure a good bond to each rib and the skin supports on the front of the rear spar.

Cut a strip of 1/16-inch balsa to fit from the rear face of the front spar to about 1/4-inch beyond the leading edge. Because the center section sheeting extends to the center of the front spar, you will have to notch the leading edge sheet as indicated. When satisfied with the fit, cement the leading edge sheet in place, assuring a good bond with the spar, all ribs and the leading edge dowel. Use tape to hold it in place until dry. Cut the excess from the leading edge and sand it to fair in with the dowel; do likewise to the lower skin leading edge. The aileron stock can now be fitted on top of the bottom skin aft of the rear spar. When fitted, cement the aileron stock to the bottom skins flush against the rear spar, but *do not cement it to the spar!*

When dry, cut off the entire section from the rear spar aft. Cut off the aileron from what will be the fixed center portion. Bevel the aileron leading edge from the center line (hinge point) to allow for up and down travel. Groove the front edge of the inboard section to accommodate the aileron control rod tube. Cement the tubing in place, and with the wing on a flat surface, cement the center trailing edge back on, assuring that it is flat with the bottom of the wing. Align the aileron with the rear spar and mark and cut the aileron hinge slots, centered on the aileron leading edge. Cement the hinges into the rear spar only.

Drill the control rod hole in the aileron at the inboard end. Bend the inboard (servo) end of the aileron control rod, insert it through the tube from the butt end, and

bend the aileron end. Slide the aileron onto the hinges and the control rod, and check for ease of travel both up and down. You may have to make a notch in the top edge of the rear spar to allow clearance for the control rod in the up position. Also, the aileron leading edge will require a groove from the control rod hole to the inboard end to assure free movement.

The wingtip, top brace and forward filler may be added and sanded to shape.

Now do the other half of the wing. When you are ready to join the halves, block sand the butt ends carefully so that they mate perfectly with both tips raised 3/4-inch off the board. When satisfied with the fit, punch several holes in each butt rib using a compass point or similar tool to allow the epoxy to penetrate. Using five-minute epoxy, join the halves on a flat surface; no need to build in a right or left roll at this point. Round the tips and smooth up the entire wing—it helps to eliminate those unsightly little lumps that detract from an otherwise neat covering job.

WING-TO-FUSELAGE FITTING

The bottom surfaces of the fuselage side skins have to be carefully trimmed to allow the wing to seat at the bottom of the fuselage sides and doublers. Leave a little extra material and finish with a narrow sanding block. When satisfied with the fit, locate the three wing mounting bolt holes on the bottom surface of the wing and drill them out to 5/32-inch. Drill these holes perpendicular to the lower wing surface.

Put the wing in place on the fuselage, square it up and, using the holes already drilled in the wing as pilots, drill the 5/32 holes through the wing attachment pads.

Remove the wing and drill out the holes in the pads with a No. 7 drill, then tap 1/4-20. Open the holes in the wing to 1/4-inch and trial fit the wing. Fiberglass tape can now be applied to the center section of the wing, top and bottom. With the tape smoothed out flat, pour on liberal amounts of CA+ and squeegee it through the cloth. When the glue has dried, open up the mounting bolt holes with an X-acto knife.

COVERING & FINAL ASSEMBLY

The choice of covering material is yours. All of my EEE-Z-FLI efforts are covered and trimmed with Top Flite Super MonoKote. After covering, re-open the hinge slots and trial fit the hinges. Mask around the cockpit area and do the interior in flat black, either brush or spray. Trim should be applied prior to assembly, as the surfaces are easier to handle.

Install the stabilizer, fin and dorsal, and the elevators, in that order, making sure that everything is lined up properly and the elevators move freely, followed by the wood block fairings on each side of the fin, and finally the rudder.

When installing the three fuselage ser-

vos, face the center one aft and the outside ones forward. This gives adequate arm or wheel clearance. Connect the pushrods to control horns on the elevator and rudder. Install the fuel tank, engine mount and engine. Trial fit the cowl and trim it as necessary to clear the muffler. Cut a hole in the top for access to the glow plug.

The aileron servo can now be installed and hooked up to the aileron control rods. Check the operation and adjust as required. Invert the wing and install the landing gear. Align them parallel with the leading edge and secure them to the bottom of the wing with nylon landing gear straps.

Strut fairings are made from soft aluminum as shown; bend each one 90 degrees at the top and secure with two No. 3 screws. If wheel pants are used, the fairings can be shortened to fit. To give the heavy strut look, use fuel tubing slid up the wire and painted silver. Wheels are your choice, secured with standard wheel collars.

Install the wing and you have an airplane standing on its own feet; the light at the end of the tunnel is starting to show! If you have finished the two liters of soda you can make a pattern to fit the top of the fuselage. Allow about 3/16-inch below the top of FS-1 on each side for attachment. Two sections of the soda bottle will be required, joined over the center F1. If you use aluminum, one piece will make the entire length.

The canopy can be fitted and installed, or the windshield and headrest if you are doing the open version. The canopy is held on with a No. 3 screw on each side. Provide a small piece of plywood on the inside of the cockpit edge for it to screw into.

With the aircraft level, 0 degrees at the top of the stabilizer, the wing should be at +1 degree. If needed, shims may be installed at the bottom edge of FS-1. Control travel should be 1/2-inch up and down elevator, 3/4-inch right and left rudder, and 1/4-inch up and down aileron. With the rudder at neutral, the aircraft, when pushed, should roll straight on the ground; adjust if required by bending the wire.

Check the balance; it should be slightly nose down when supported at the point shown. Correction can be made by carefully moving the battery. Do not try to fly a tail heavy airplane!

FLYING

Taxi the aircraft around to check the ground handling. Line up into the wind and apply enough throttle to get it rolling straight, then add the rest of the power. The prototype tracks straight with a little right rudder, the tail comes up with neutral trim and the bird will fly itself off as it gains enough speed.

Make a trim flight around the pattern and check the stall characteristics. The Pylonair glides well and the flare and landing are pretty routine. You will find the rollout to be straight with little correction, and in no time you will be making neat touch-and-gos. Enjoy! **MB**