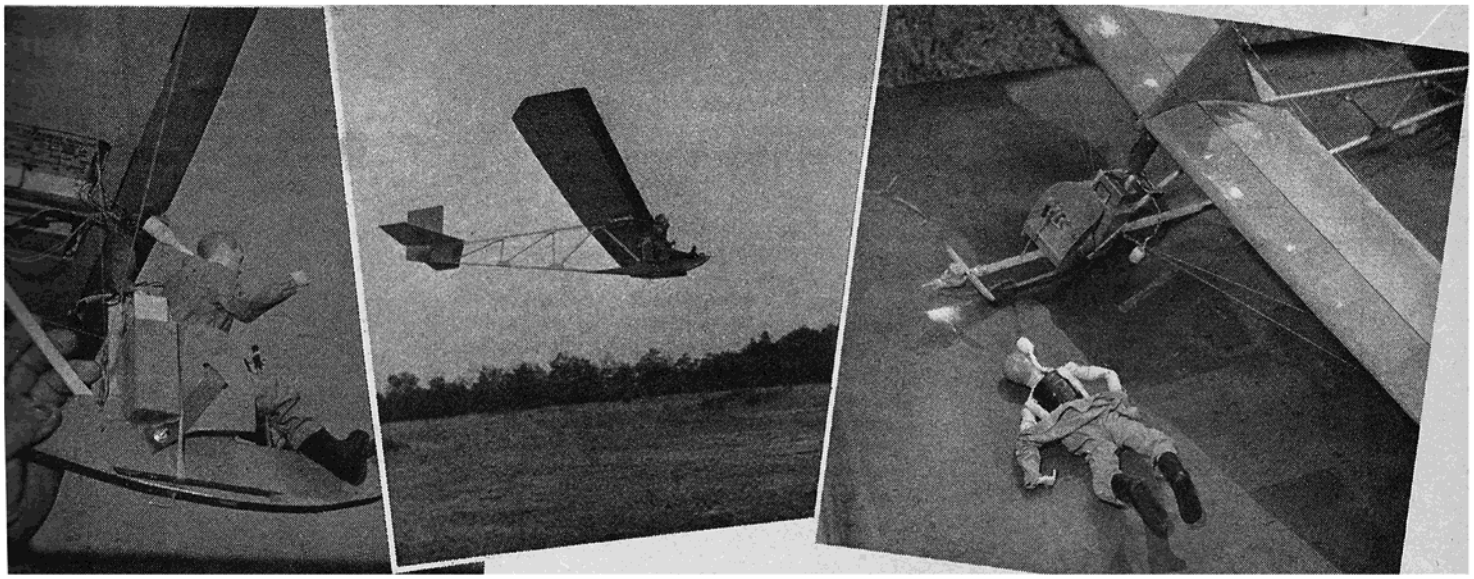


Floating in . . . trim it a it a little steep in glide.

He fainted dead away. Note battery/back/pack. You'd feel sick too if you had nicads in back.

Walter Kessler's

1931 Northrop 'Primary Glider"

FULL SIZE PLANS AVAILABLE THROUGH "MODEL PLAN SERVICE"

A GI. Joe pilot doll gets a well ventilated ride . . . Try this spirited scale throwback of a soarer for your idle radio gear.

actually gives it its flight strength.

span, ample in area, light wing loading.

will detract of course from flight it's ability, so think in terms of getting it good soaring altitude. An old, odd bird.

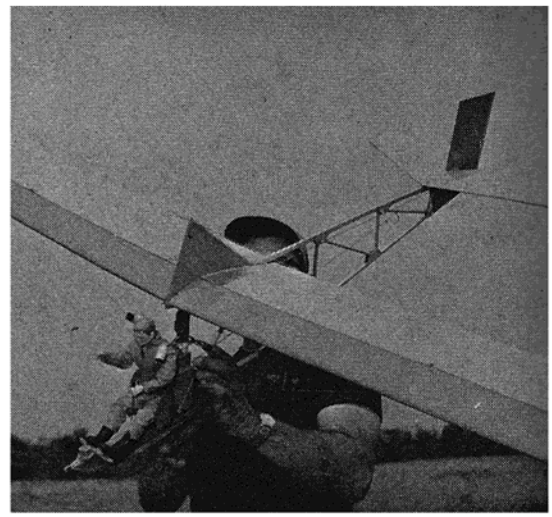
It builds up fast and easy, ideal on a slope or towline. Strangely appealing, a real conversation stopper. An aerial tow maybe?

♦ Did you ever see a real "Primary" glider being launched? Quite a thrill, especially if you are part of the proceedings. Unfortunately however, the famed old "Primary Gliders" are as dead as the dinosaurs, and the only time you are likely to see one is in an old movie or the like.

I thought I should do something about it, a model replica for radio, sort of a tribute to a passing age of aviation. I located a three view of the full scale ship, and enlarged it to a suitable size for an old reed set that was gathering dust.

One slight problem immediately arose: who would believe such an aircraft, without a pilot up front. I looked about and found a very realistic toy doll, "G.I. Joe", made by the Hasbrook Corp. I examined the various outfits that were available for it, and right

Walt and Northrop "Zogling." 2" to foot scale.



1931 pilots were sort of expendable. Drafty! The flying wires add the strength, so use em.

"Primary Glider"

... continued ...

then he was elected to fly the boney bird. These dolls are to a scale of 2" equals 1 foot, which set the scale for the model. This came off the drawing board at a nice big, practical soaring size, 6 foot 2" span.

For reasons of transportation, I worked out an easy way to break the model down, which in practice worked out very nicely. All the wires that were a part of the real prototype, would be "working" on the model also, but they had to be able to be knocked down for transporting without a lot of trouble. After much thought, the system of rigging presented here was worked out, and it seems to do the job.

Don McGovern saw the ship at the field, and seemed impressed with its novel appearance and potential for radio slope and towline flying. The pilot up front on his precarious perch makes you really root for him somehow, and he lends the ship a "human" touch to say the least.

I always try to design a model for ease of construction and I believe this model can be completed in about 20 hours work. (I'd be inclined to doubt it, except Walt seems to build a new ship every week, so it must be so . . . the Editor) That's the amount of time I spent on this original, once I had the design set in my mind. For a trip back in time and the fun to be had, here is how we will start:

The Elevators: Start with the elevator surfaces. The majority of this is constructed of ¼" square balsa and ⅛" x ¼" balsa. A couple of pieces of spruce (or pine) are employed for the main spar. I believe in strength here, but at the same time, try to keep the tail assembly as light as possible. Sand the leading edge and tips round and put a sort of taper on the trailing edge. The rest of the elevator is flat. When the elevator is dry, remove it from the board. Sand it smooth and give it a couple of coats of dope. Install the wire brace eyes that are made from a pair of soldering lugs, soldered together on the larger ends.

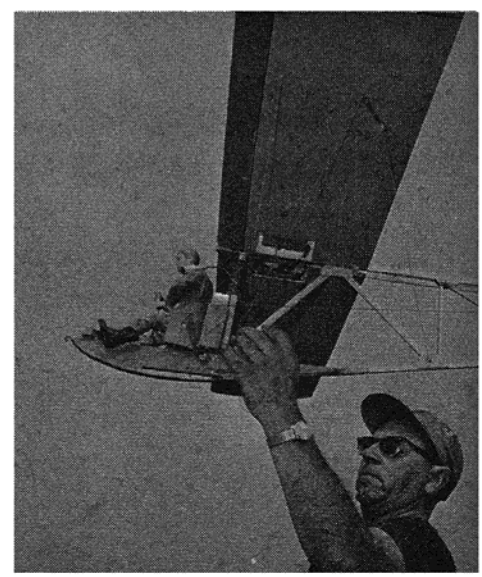
Rudder: Simple in construction, and here again, a spruce spar is employed. Balsa just won't stand up to the windy blows the weatherman dishes out here on Long Island. Rounding off the leading edge, top and bottom of the rudder, and taper the trailing edge. Dope the structure at least twice and set aside to cure. I didn't use a fitting on the rudder strong enough to break the two outrigger brace wires, (36 lb. test braided nylon) but it survived a crash with only minor damages.

The Fuselage: The top stringer of the fuselage is ¼" x ½" spruce or pine, while the lower stringer is ¼" x ½" tapered to ¼" sq. I may as well mention the fact right now that as long as you are building this model you may as well get an X-Acto saw or a Zona saw. They are ideal when it comes to working with hardwoods as on this airframe.

The nose skid is made from a piece of ¼" x 1½" spruce or pine. The first upright goes right up to the top of the pylon for the added strength. The top stringer butts against the first upright and should be given a good glue-job. The rest of the work should be self explanatory, it is all flat work, so it is not difficult. Make good glue joints however for greater strength and cut out pieces of 1/32" ply for the necessary reinforcements carefully.

I rounded the edges only slightly, figuring I had better keep all the strength possible in the fuselage. I next sanded it over with fine sandpaper and gave it a couple of coats of dope.

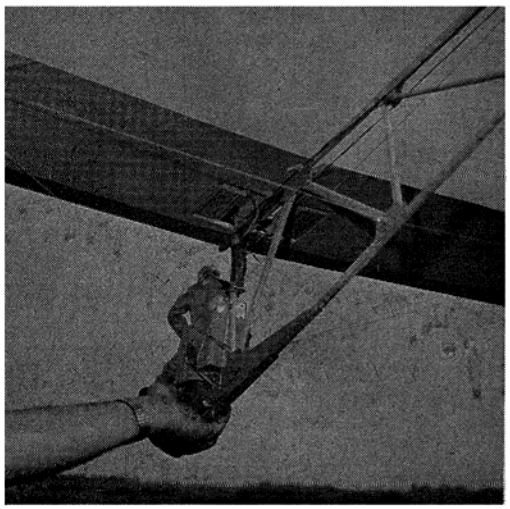
The seat was made from the template and assembled. Put it aside to dry. The radio box is formed of 1/16" ply and the edges of 3/16" spruce again. When dry, I sanded it and covered the box



1931 PRIMARY

(Continued from Page 20)

with silk. Your receiver may be a different size than I have shown, so make a box to fit your receiver. Try to keep the height shown, and fill the bottom with foam rubber to bring the receiver up. Put some sort of retainer over the box to keep the receiver from flying out in case of a malfunction. A rubber band will do, when the fuselage is dry.



Servos stash neatly into wing airfoil. Space is tight on this airy bird. Few people that see it at field can believe there was such a glider.

Don't forget to finish the cabane structure and cover it with balsa. The joystick is a length of bicycle spoke. Drill a hole slightly undersized in the fuselage and screw it in. Then I cut it to size and install a ¾" piece of black fuel tubing for a handle. (It might be a thought here to link the models controls to the joystick in such a way that radio servos in moving the surfaces would also move the pilots arms etc., giving the illusion of the doll actually moving the controls . . . the Editor). The rudder bar is only a piece of ⅛" x ¼" spruce or pine with a hole in the center for a wood screw. Place it so G.I. Joe will be comfortable.

● Install the radio box against the first upright, and using Hobbypoxy, glue it to the spruce. When it is dry, install the seat. The radio box will tilt the seat and it will have to be fitted to the skid. I cut a notch in the bottom of the seat to make it a better joint, and here again I used Hobbypoxy. The time is now here to slyly sneak down to the toy store for your G.I. Joe aviator. Mine is rigged up in the orange coveralls and boots. Don't get too carried away though, you could also get a jet pilot's outfit with helmet and green goggles, but they would be thirty years ahead of time to say the least.

When you get your G.I. Joe home, try him in the seat and see how things fit in general. A few adjustments may be in order, but nothing drastic need be done. The only real problem will be in trying to explain to your kids what you're doing playing with dolls, especially if you told your daughter she is too old to play with one herself.

The seat belt is made from a rubber book strap sold in stationary stores. The strap comes with a buckle, and this is adjusted to clasp at the front of the seat. The strap is cut off, not too short) G.I. Joe placed in position and the belt threaded through the holes in the seat and back towards the skid. Now center the buckle, pull the straps fairly tight, and remember you have to remove the belt to get the G.I. Joe out of the airplane.

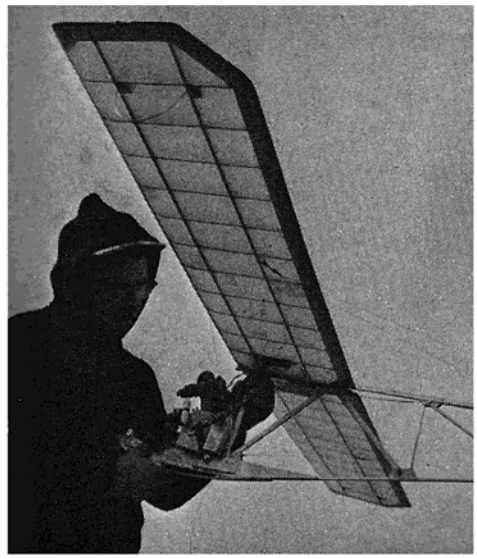
Cut the belt off to the size shown on the drawings. Punch a hole in the belt Mark the hole position in the fuselage and drill it, insert the bolt and adjust Punch and put on the other side of the belt now, slip on a washer and a nut and draw up snugly, then trim the excess.

Put on the fittings needed for the rest of the spider webbing and then make a template of the rib you are using for the wing from 1/8" plywood or equivilant. The two ribs shown are very important as you will see later.

The Wing: As simple as the surfaces can be. Cut out the ribs, using the plywood template. Make three or more plywood ribs, tack the whole thing together and get down to see a friend around any airfield will reveal older aircraft in a variety of home applied color schemes, due to the need to recover every few years.

The Assembly: Now that everything has been built, covered and doped, it is time to start assembling the parts. The hinges are up to you. I have seen some of the new hinges made by Rand, and they look fine for the job. Many other types may also be used, from the sewn-on type to the flat acetate strips. With the reduced stresses on a glider, the strength factor is not as critical as on a fast multi.

The elevator is held to the fuselage with three #0 x ½" round head wood screws, sold by Perfect Parts, to facilitate repair and storage. The rudder is held on only by the hinges, so make them secure. After the tail assembly is secured on the fuselage, string your wires, #36 lb. braided nylon) from the lower rear fitting to the lower anchors, getting the elevator square to the fuselage in the process with no sag to the surface. Now do the same to the top, threading the wire through the rudder and down to the other anchor. Tie the line taut and put a drop of glue on all the knots to prevent them from becoming undone when you cut them off short. This completes the assembly of the tail to the fuselage and leaves only the horns to be installed. Do that chore when you are completing the servo installation.



The rigging is done much the same as the real aircraft, without the need of actual bolts to secure it. I cut two pieces of 3/16" dia. brass tubing about 3" long, gave them a slight bend in the middle and used them in the fuselage for the wing support. I did not glue them in, but rather just put them into the drilled holes (be careful drilling) in the top stringer. These holes set the decalage to give you the necessary incidence in the main wing. Slide the wings onto the tubing supporting the tips with the fuselage square to the table. Put the cabane fitting on the top with #4 x ¾" round head wood screw, and install two snap swivels (any fishing tackle store) into the holes in the cabane. Do not get the swivels too small or too big. The ones I settled on are about 2" long, but be sure you get the type with the straight snap, as the crooked kind cannot be used. Also, be certain they are snap swivels and not just snaps or swivels, as neither can be used alone.

When you have everything in position, string the line through the anchor, tie it securely, bring it through the eye of the snap swivel twice and return it to the anchor on the opposite edge of the wing. Use a slip knot on this. Do the same on the other side, and when complete, adjust the other end with the slip knot so you have about 2" dihedral under each wing. Tie the knots securely and put a drop of glue on each knot to make it permanently locked.

At this point, take the model, turn it upside down so that it is resting on the cabane and the tips of the wings. Hang the rudder over the edge of the table. In this position, string up the bottom again in like manner, using swivel snaps where the wires meet the fuselage fittings. When you have completed this, pull each side snug, but not sso tight that you have trouble hooking it up. Put a good secure knot here again, and coat it with glue. Remember

that if a knot should come undone on one of the flying wires, you will have mish-mash.

Turn the model right side up again, and string a line from the lower elevator brace on the fuselage to a snap swivel on the bottom rear anchor on the wing. Put in a double loop and then bring the line back to the fitting on the front holding screw of the elevator, double loop it here again and then take the line to the **rear anchor** of the opp site wing. Put in another double loop around the other snap swivel and then back to the lower elevator brace on the other side. Make sure the wing is snug to the pylon, front and back. Lighten your rear brace wire by pulling each one till it is snug. When all the wires are tight, fasten the end that went to the last elevator brace and secure the knots. I haven't found it necessary to put a brace across the front of the wing, but I think it would be a good idea. It is shown on the plans as a rubber band between the hooks. Secure the knots with glue again, and your rigging chores are complete.

To disassemble, open and remove the snap swivel from the rear anchors of the wings. Then open the snap on the lower fuselage brace from the flying wires on the bottom of the wing, either side will do, and take the snap out of the brace. Now the snap on the other side can be removed, and then the upper snaps. The wing can be taken off the tubing and laid aside. While you have the wings loose, fit your servos into the pockets in the wings, screwing them to the plywood ribs. #2 rib)

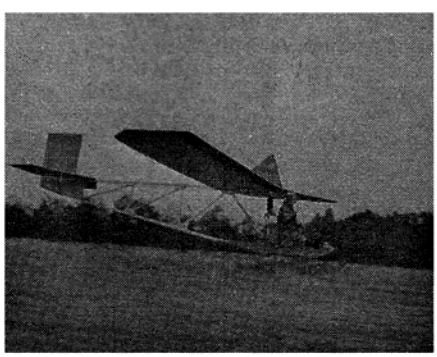
I have had both Annco and Bonner Servos in these pockets and they fit well. Other types of servos may require other methods of mounting. I used5/8" #4 aluminum wood screws with pan heads to hold these servos to the plywood ribs. These screws are available at any hardware store or lumber yard that has a Reynolds Aluminum display. The skid on the bottom of the runner also came from one of these display racks, or can be obtained from a tinsmith or cut from a piece of 1/16" stock. Aluminum or brass is suitable.)

The servos are hooked up to a wire pushrod, using the joiner shown. This makes it possible to remove the rods from the wings. The pushrods are 1/16" dia. piano wire, held on braces alongside of the fuselage. I made four braces and secured them with a common bolt for both pushrods. The rest of the installation is common with adjustable Ny-links or Du-Bro Kwick-Links for fine adjustment. A short piece of wire connects the servo to the joiner and is held in position by a piece of tubing. It extends down and back of the rear of each wing edge to meet with the pushrod at the joiner. This method has been successful, handy, and has survived a major crash (yaw on towline, caused by hook too far aft for high wind . . .) with no failure. The joiner is an idea of Gene Rogers and is used on his "All Wet Canister," Jan. F.M. It is a fine idea, and I tried to show it enlarged for greater clarity.

Now with the servos in the wing, the controls all hooked up, check the surfaces to be sure they are neutral. Slide the receiver into the radio box and secure it with a rubber band. Hook up a harness to connect up the servos to the radio. Your battery plug should be on the harness, so plug in batteries and check everything out. Now everything is in place but the battery and G.I. Joe . . . he comes next.

G.I. Joe: Remove the coveralls from the figure and with your X-Acto knife, cut a section out of the back and shoulders of the figure, large enough to put the batteries inside the body. Loop the elastic that holds the parts of the figure together around the battery with the plug-in section on the top. I used a Deac pack and it worked out very well. Now replace the coveralls over the figure with the battery leads coming out of the collar. Now you have a removable battery pack that can be taken out to be charged. Put the figure in the seat, fasten the seat belt, place his boots on the rudder pedals, one hand on the joystick and the other raised in a signaling attitude. Plug in the battery, check the controls with the radio hooked up. Attach the towline and you're ready to go. That is, if you're not to old to play with dolls.

Flying: This is simple as A,B,C. With all this area, and no engine to get you into trouble, but I hope you suffer better weather than I did with the original. The local Long Island weather was pretty bad, with 20 degree weather and 20 mph winds. Spring is still around the corner as I scribble this, and I dream of better weather to test the aircraft more thoroughly. It has the look of a ship that will be capable of good flight, though as mentioned before, to trim out a new ship in violent gusty weather is hard indeed. Few modelers in the country have to contend with weather as constantly foul as that faced by Long Island flyers, who fly in anything.



"The Northop Primary" should create some wide interest at meets aid airshows. While it will not rank with a Nordic in rate of sink, its nostalgic qualities will bring a tear to the eye. It can be real fun on a slope site, it climbs readily on a towline, but keep the angle of climb in the medium range. For still greater heights, namely 300 to 600 feet, experiment with the Hi-Start shock cord method of launching, in which about 25% of the line length 600 to 900 feet total) is made up of rubber. When this is stretched back, the model will climb rapidly and steadily, with but rudder correction from you. At those altitudes, your G.I. Joe may say, "the heck with this," and go tearing off in a thermal.

Just maybe, you can experiment a little further. Possibly an aerial tow aloft a hairy deal at best ride a trifle above tow craft, correcting with elevator for height, rudder for yaw . . . never aileron in this application) or if you're lazy and care naught for scale, add an engine even. (Shame on you!) Fun is where you find it. ●