This rough-and-ready RC job shines as a sport flier, and it has had excellent results as a Sport Pylon Racer. Built without washout in the wings, its maneuvering capability makes it a fine candidate for Novice or Sportsman Aerobatics. Controls for rudder, elevator, ailerons, and engine—for .25 to .40 sport engines.

THE EVOLUTION of Mr. Spook: During the fall of 1976 I won a deBolt Champ kit as a door prize. Having built two Champs previously, I decided to use the kit material to build a model capable of more speed and with ailerons. Doodling on the Champ plans (pardon me, Hal), I made the fuselage frontal area less (with less height overall) and brought the rear of the fuselage up a bit to improve streamlining. I gave the wing less incidence and set the horizontal stabilizer nearer to 0-0 to improve the speed. I left the thrust as it was. I used the basic Champ wing but changed the airfoil a bit and decreased the dihedral to make the barn-door-type ailerons more effective.

On the first test flight I found that the ailerons were too large in area and (the old story) would cause the plane to turn unexpectedly in the opposite direction at times. Its flight was so SPOOKY

George H. Clapp

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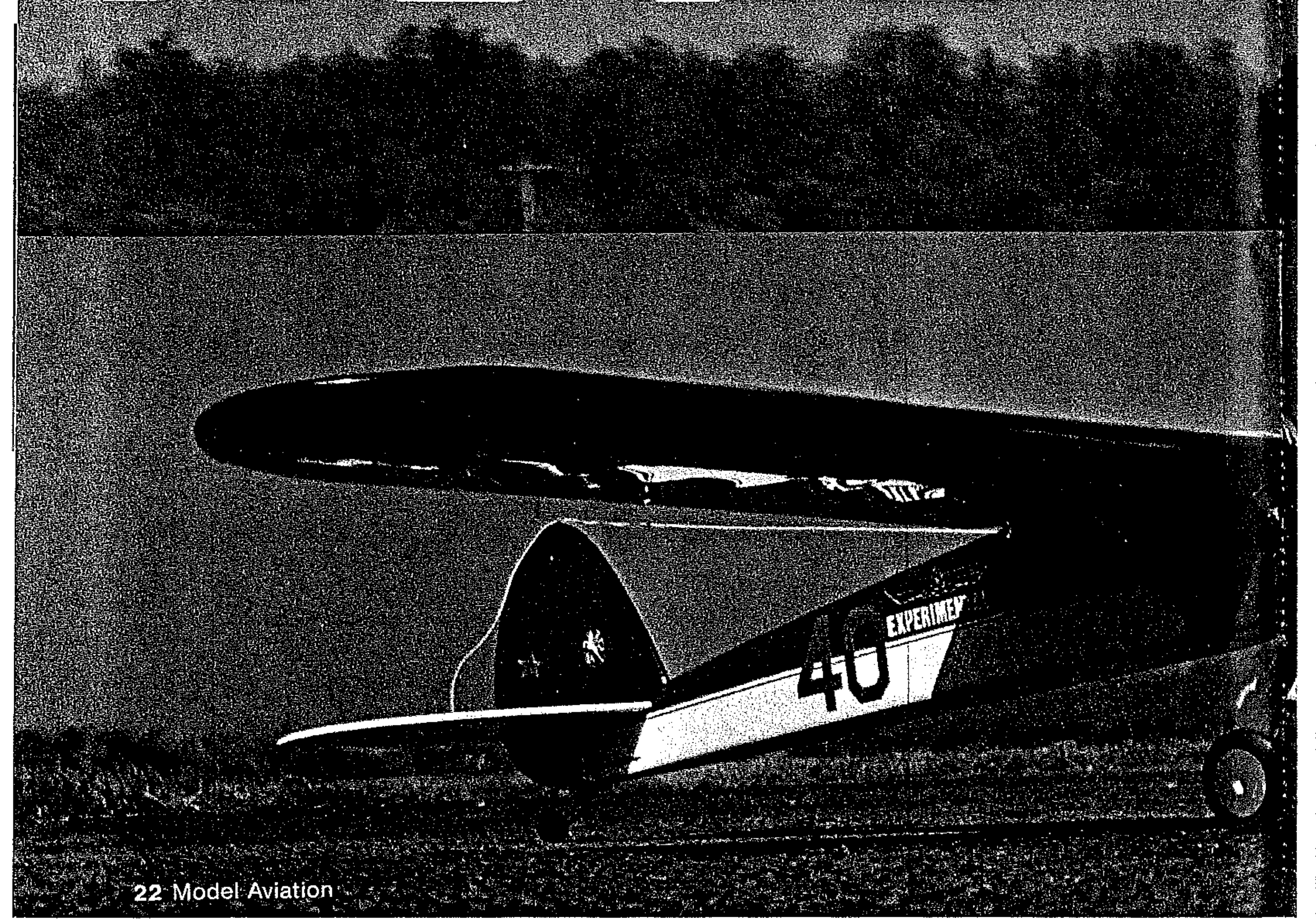
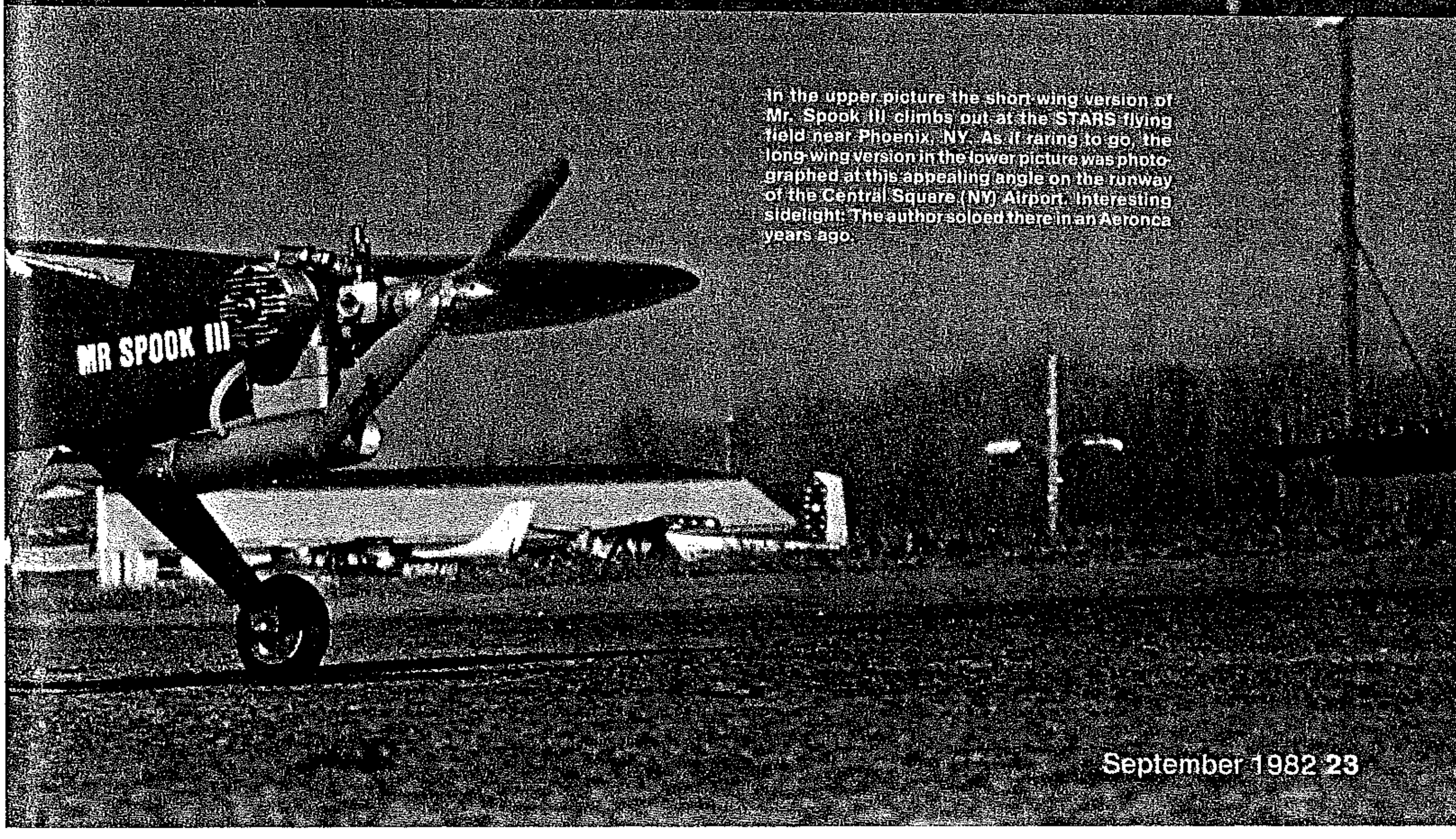
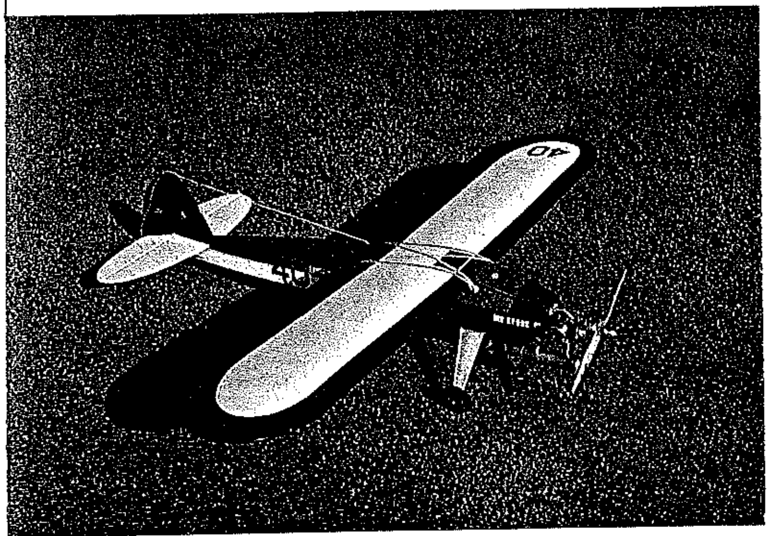
MR.SP

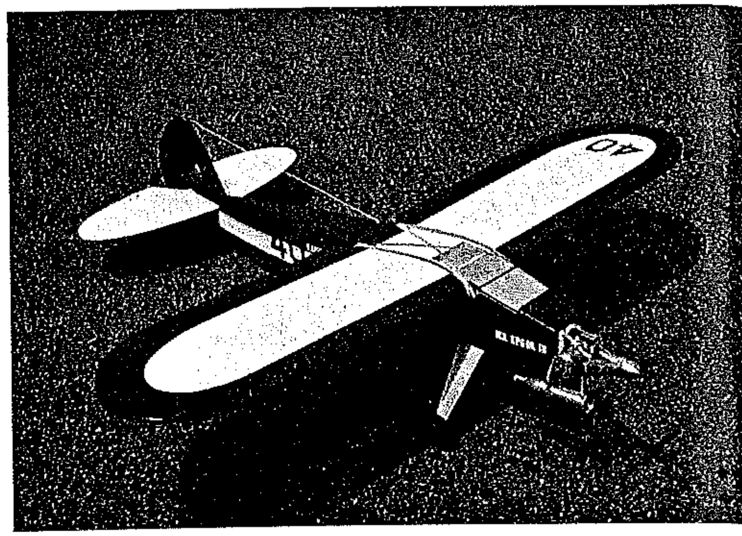


OOK III

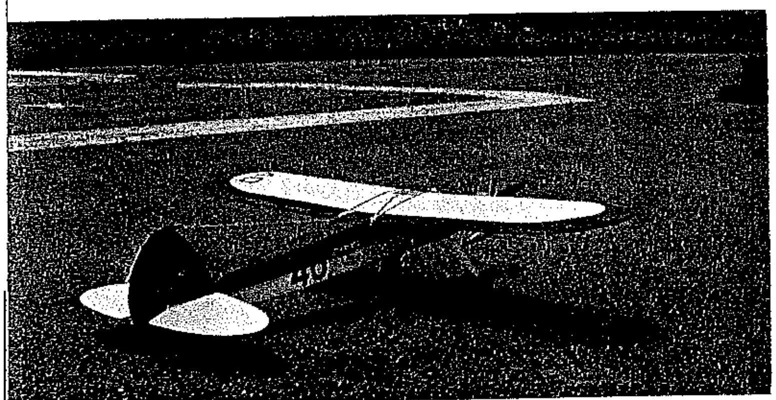


In the upper picture the short-wing version of Mr. Spook III climbs out at the STARS flying field near Phoenix, NY. As if raring to go, the long-wing version in the lower picture was photographed at this appealing angle on the runway of the Central Square (NY) Airport. Interesting sidelight: The author soloed there in an Aeronca years ago.

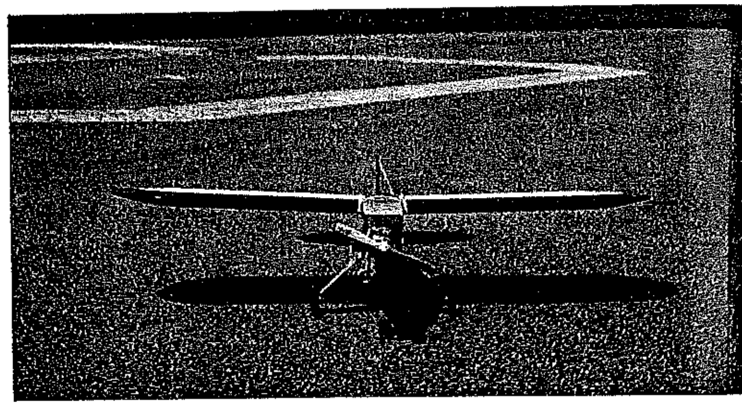




Can you tell which is the short wing and which is the long wing in these views? The short wing (right) has a slightly lower aspect ratio—and it has a .25 engine vs. the .40 in the long-wing version. The main difference in flight is that the long wing rolls more slowly. Note rubberbands for holding on wing. Author says this can prevent much damage in a mishap as compared with the rigid nylon bolt hold-down method.



The ailerons appear to be up a bit at the wing root while even with the airfoil at the tips—caused by washout, recommended for racing.



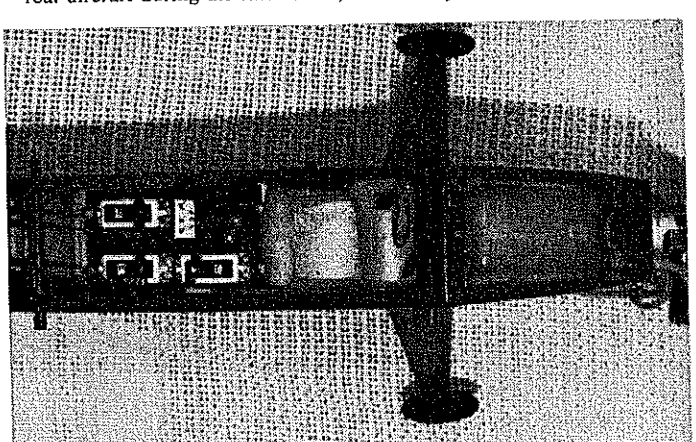
Rounded wing tips are aerodynamically clean. Wheels are angled inward slightly for improved ground handling. All photos by the author.

that I shelved it until sometime later.

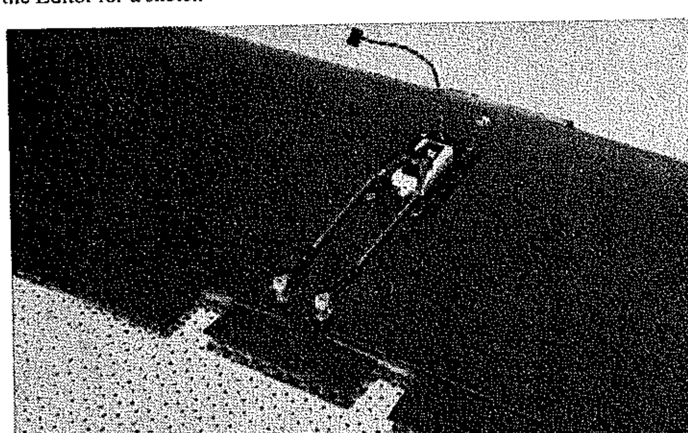
In 1979 the club I am in, Syracuse Thunderbird Aero Radio Society, began a season of Sport Pylon Racing, and I used my 1936 Old-Timer design, Torc, which was published as a trainer in *Model Builder* in 1978. I entered it in Novice to get some experience in rounding the pylons. When the third race came up Torc was under repair, and the only airplane I had in one piece was the outgrowth of the Champ kit. I knew what was wrong with it and reasoned that if Frieze-type ailerons had solved the same problem on real aircraft during the late 1920s, I would try something like it. (The leading edge of a Frieze-type aileron projects below the wing when in the up position to produce the needed drag to offset the other down aileron.) There wasn't time to rebuild the wing with the Frieze-type ailerons, so I decided that I would modify the existing ailerons to equalize the lateral drag. I did this by installing small inverted airfoils below each aileron with a gap to allow the airflow to go between. When the aileron went up, the leading edge of this small airfoil came down farther in the slipstream to equalize the aileron drag. (See the July 1980 *MA* Letters to the Editor for a sketch of this system.)

I had time to test Mr. Spook before the next race. These added airfoils (I call them collectors) worked very well. The roll rate was fairly fast, and with the decreased incidence in the wing the plane was much faster than a regular Champ. I finished out the '79 racing season with this bird, while everyone who saw it asked "What are those gizmos below the ailerons?"

During the next winter I rebuilt it to try for more speed. I added 4 in. to the rear of the fuselage for better ground control, and I designed a new wing with symmetrical airfoil and rounded

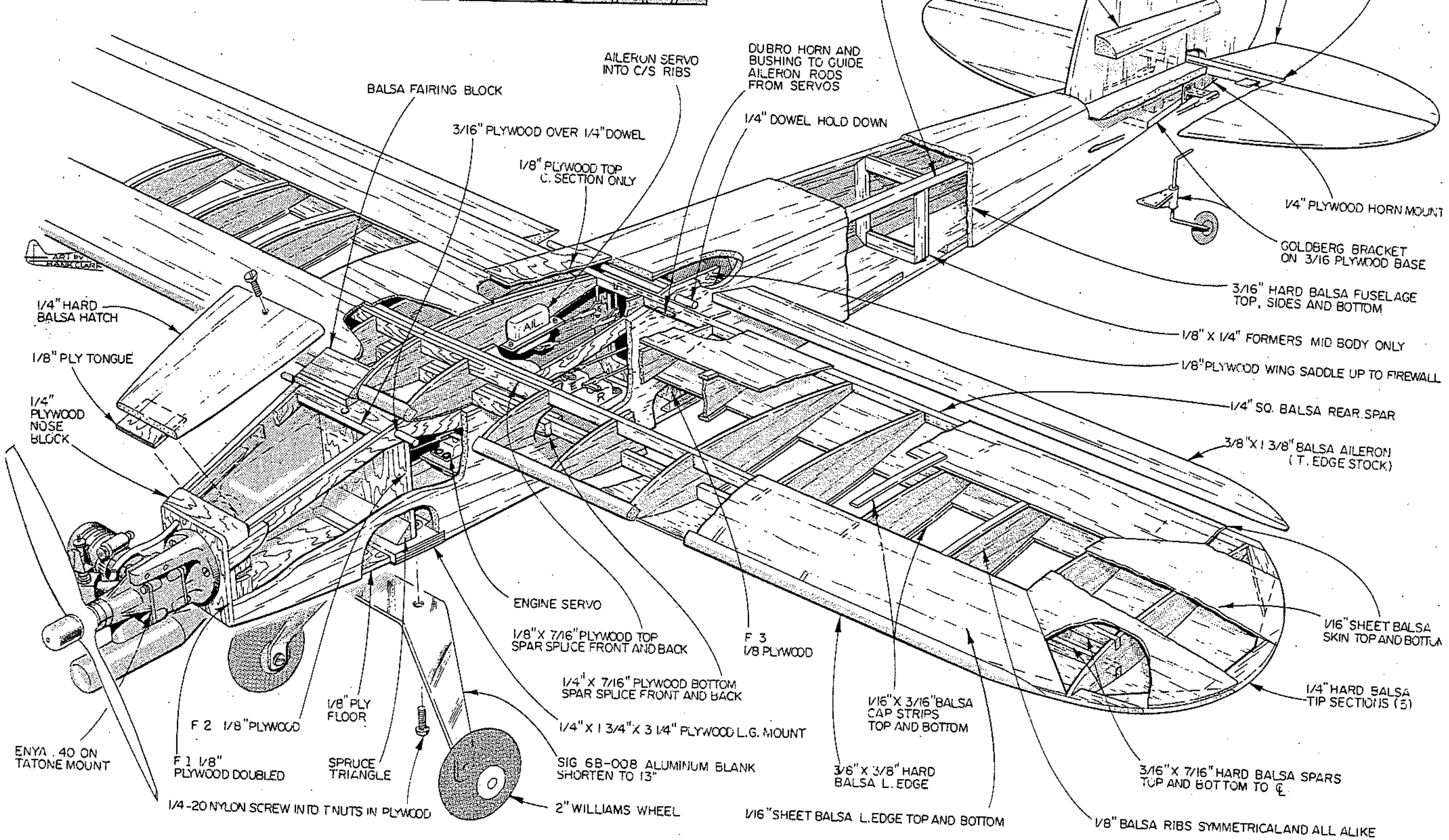


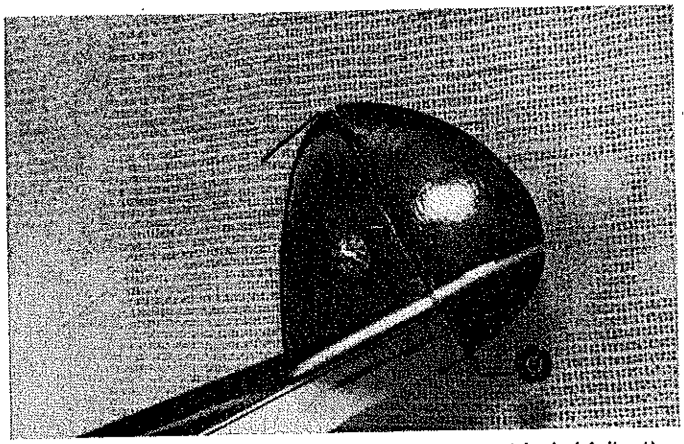
Fuselage is shallow, but there's room for everything. Behind tank is the foam-covered battery pack, receiver, foam packing, and servos on 1/8 ply tray. Note cable-in-Nyrod to the control surfaces.



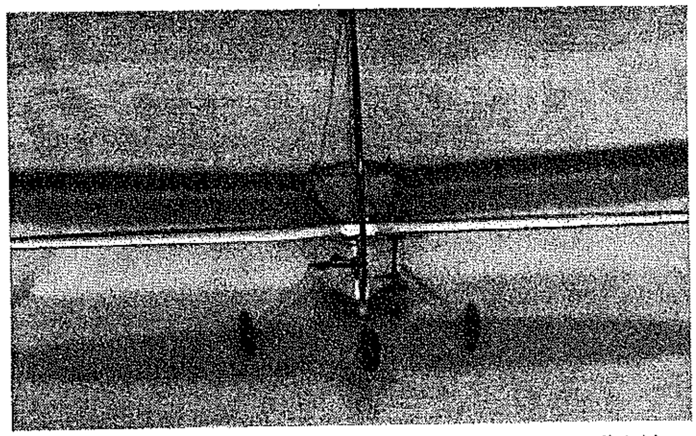
Aileron servo is fastened to underside of 1/8 ply mount, allowing most of the servo to be within the wing. Note Du-Bro linkage and top rear plywood center cover with hard balsa web.


HEY CHUCK-HOW COME THIS GUY TALKS?
HE'S TAPED! AND HE TURNS WITH THE TAIL!
WILCO I HAVE A BOGIE AT 12
HE ALSO WORKS THE STICK AND THROTTLE TOO!
FEET ON RUDDER PEDALS- FAR OUT!
DON'T THAT JUST SLAY YOU?
WHEN DO YOU GET TIME TO DO THIS? I THO'T YOU HAD TO GIRDLE THE GLOBE!
DON'T BE DENSE! THE CITATION GOES ON AUTO-I GO ON R/C DESIGN-OVER TO ISTANBUL AND BACK
-US R/C TYPES DON'T SLEEP LIKE YOU LAZY
ARTISTS HANK!
RAJAH! I READ A UFO!
CHEEZ


BALSA FAIRING BLOCK
1/4" BALSA SHEET FO
ALL TAIL SURFACES
SANDED TO STREAMLI
1/4" X 1/4" SPRUCE TRIANGLE ALONG FUSELAGE CORNERS
1/4" PLYWOOD ELEVATOR TIE UF
AILERON SERVO INTO C/S RIBS
DUBRO HORN AND BUSHING TO GUIDE AILERON RODS FROM SERVOS
BALSA FAIRING BLOCK
1/4" DOWEL HOLD DOWN
3/16" PLYWOOD OVER 1/4" DOWEL
1/8" PLYWOOD TOP C. SECTION ONLY
1/4" PLYWOOD HORN MOUNT
GOLDBERG BRACKET ON 3/16 PLYWOOD BASE
ART BY HANK CLARK
1/4" HARD BALSA HATCH
3/16" HARD BALSA FUSELAGE TOP, SIDES AND BOTTOM
1/8" X 1/4" FORMERS MID BODY ONLY
1/8" PLY TONGUE
1/8" PLYWOOD WING SADDLE UP TO FIREWALL
1/4" PLYWOOD NOSE BLOCK
1/4" SQ. BALSA REAR SPAR
3/8" X 1 3/8" BALSA AILERON (T. EDGE STOCK)
ENGINE SERVO
1/8" X 7/16" PLYWOOD TOP SPAR SPLICE FRONT AND BACK
F 3 1/8 PLYWOOD
1/16" SHEET BALSA SKIN TOP AND BOTTCM
1/4" X 7/16" PLYWOOD BOTTOM SPAR SPLICE FRONT AND BACK
1/4" HARD BALSA TIP SECTIONS (5)
1/16" X 3/16" BALSA CAP STRIPS TOP AND BOTTOM
1/8" PLY FLOOR
F 2 1/8" PLYWOOD
1/4" X 1 3/4" X 3 1/4" PLYWOOD L.G. MOUNT
ENYA .40 ON TATONE MOUNT
F 1 1/8" PLYWOOD DOUBLED
SPRUCE TRIANGLE
SIG 6B-008 ALUMINUM BLANK SHORTEN TO 13"
3/8" X 3/8" HARD BALSA L. EDGE
3/16" X 7/16" HARD BALSA SPARS TOP AND BOTTOM TO ℄
1/4-20 NYLON SCREW INTO T NUTS IN PLYWOOD
2" WILLIAMS WHEEL
1/16" SHEET BALSA L. EDGE TOP AND BOTTOM
1/8" BALSA RIBS SYMMETRICAL AND ALL ALIKE



Tail surfaces should be carved/sanded to a symmetrical airfoil rather than leaving them blunt. For those who know the author's interest in early Fairchild aircraft, that's not the source of the rudder shape!



The more perfect the alignment of the surfaces, the more predictable the first trial flight will be. The prototype needed only minor trim on the transmitter for its first flight.

tips. Mr. Spook II was in the 15-500 class with an Enya .40 for power. I flew it in the 1980 racing season but never could come close enough to the pylons, while going around them, to get a first. It was a great flier but much too large and heavy for a racer. It had to be trimmed out at too great an angle-of-attack, because of its weight, and this slowed it down.

In the early spring of 1981 I designed an entirely new Mr. Spook III and tried to incorporate the best of the two former aircraft. The first one had been built very strong, and it had a rubberband-mounted wing that could slide forward in the event of a hard landing. I set out to build a tough craft that was also light. The wing mounted with rubberbands may not look as nice as one mounted with nylon bolts, but in a mishap the shock-mounted wing can prevent a lot of damage from occurring.

I had an O.S. .25 Schnuerle engine on hand and decided to build the plane for it—with a shorter wing. In this configuration it meets the AMA Sport Pylon rules (was minimum of 450 sq. in. for a .29—now 450 for a .35). This shorter wing has 453 sq. in. I finished the model in time to take it to Toledo in hopes of helping the Sport Pylon cause. Those of us who raced during these last few years have found that our skill at RC flying had been greatly improved. It's too bad that a lot of fliers feel they aren't good enough pilots to try Sport Pylon Racing. It's an excellent entry point, and it's not as tough as you may think.

Mr. Spook III, as it has evolved, is a great flier whether for flying in Sport Pylon or just for sport. The plans are for the 15-500 version (15% airfoil thickness and 500 sq. in. wing area), but by removing one bay from each wing panel you have the shorter wing suitable for smaller engines. I flew the short-wing version in the 1981 racing season with an O.S. .25 Schnuerle engine.

After the racing season had ended, I built the longer 15-500 wing for it and changed to the Enya .40. There was very little difference in the flight characteristics with the bigger wing except that the rolls were a bit slower. It is competitive with anything in Sport Pylon Racing.

Construction. Study the plans and read these construction pointers. If you plan to change engines, I would suggest that you use a Fox mount for each engine. By drilling both mounts the same (Fox mounts aren't pre-drilled), switching engines is no problem. All plywood is aircraft grade. Select strong balsa where strength is needed and lightweight balsa where strength isn't needed.

Wing. Build the wing first, as it will be needed to fit the wing saddle on the fuselage. Cut out the ribs. All are identical with the exception of the two tip ribs. I suggest making an aluminum template as a guide for cutting the ribs.

Cut the 3/16 x 7/16 hard balsa main spars a bit long (excess to be left at the root), and taper the tip ends to fit the 3/16 sq. notch in the smaller tip ribs. Also cut a bit long the ¼ sq. hard balsa rear spars and the ⅜ sq. hard balsa leading edge.

Cut out parts 1, 2, 3, 4, and 5 of the wing tips, and glue them together over the plan, using waxed paper to protect the plan. Let dry thoroughly.

Make one wing panel at a time over the plan on a *flat* building board. Both the right and left panels are the same at first because of the symmetrical airfoil.

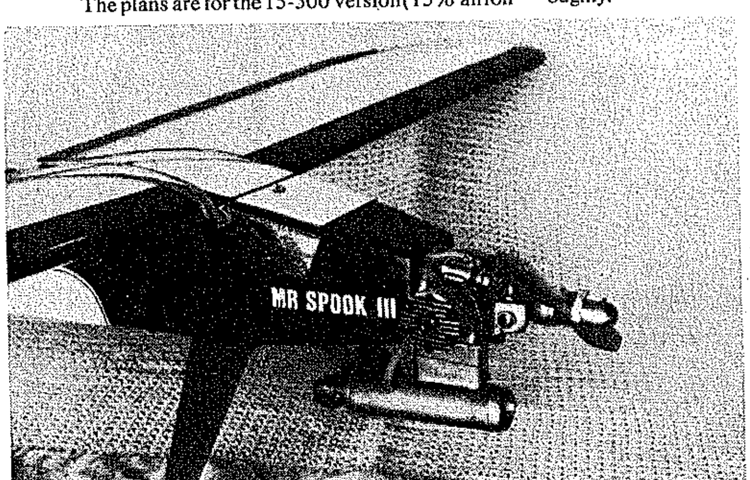
Pin the bottom main spar down securely. Take the ¼ sq. rear spar and block it up (see drawing) with 9/16 scrap pieces. Pin everything securely to the building board. Try out all the ribs to make sure they fit okay, then glue in place. Leave pinned down, and install the top main spar. Now, fit and glue on the ⅜ sq. leading edge, making sure it runs out past the small tip rib. I used Super Jet cyanoacrylate glue (Ca) for most of the model. It makes a good joint, and it saves a lot of time.

At this point you will notice that the shorter tip rib has a gap between it and the leading edge. This is filled in with the wing tip. Take the assembled tip and cut or file a V in it to fit the leading edge. Fit the rear where it joins the rear spar, block it up with 9/16 scrap pieces, and glue to the wing. Let the glue dry thoroughly before removing the panel from the board. Glue in the ⅛ balsa fillers at the leading edge of the tips, both top and bottom. These are needed to prevent sanding through the final skin.

Repeat this process for the other panel. At this point, remember, there is no right or left.

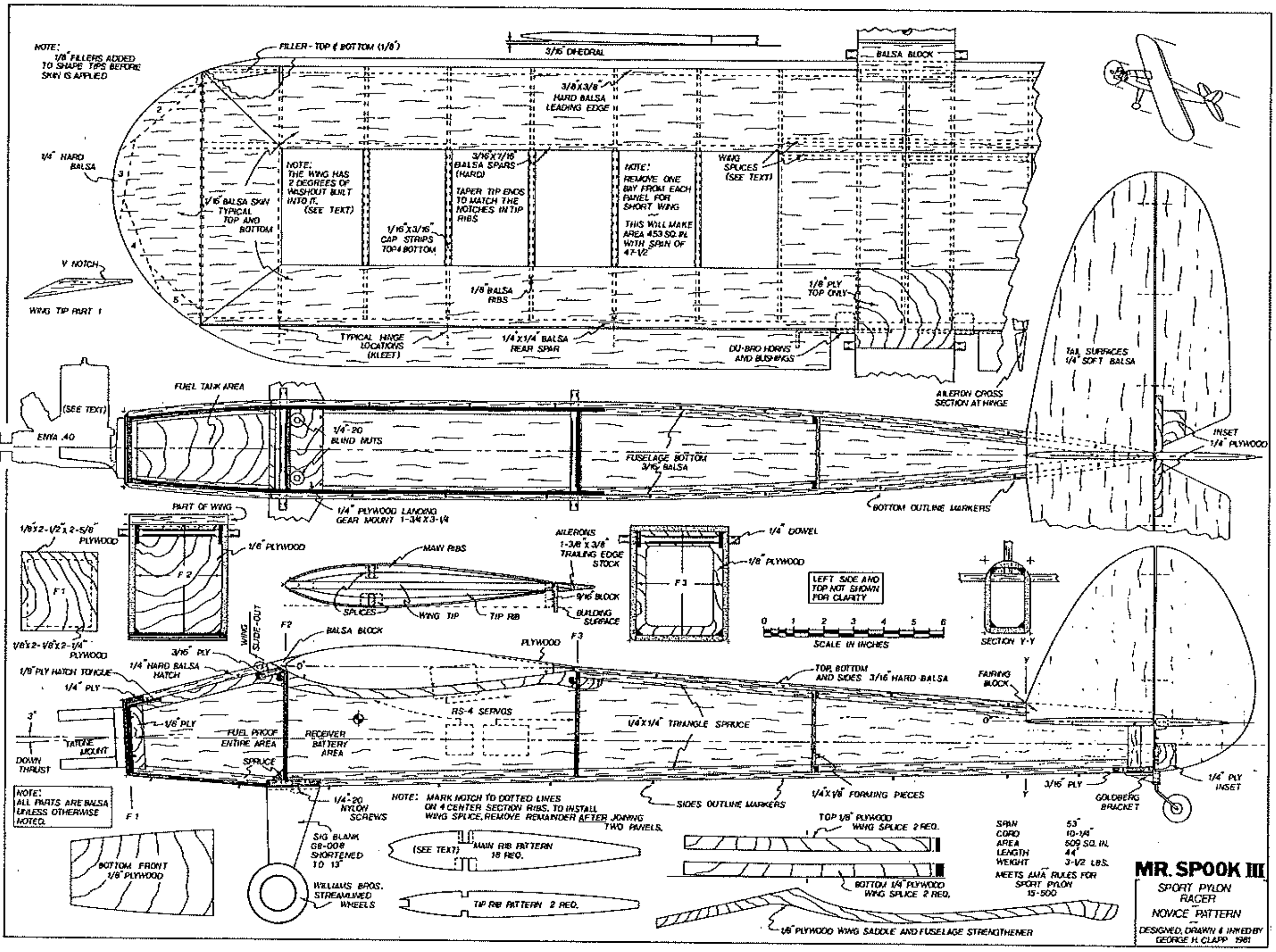
When both wing panels are finished, mark and cut out the notches on the center section ribs to accept the plywood wing splices. This will make the panels right and left (see main rib on the plan).

Cut out the wing splices from ¼ and ⅛ aircraft plywood. You will note the ⅛-in. splices go on top and the ¼-in. splices on the bottom. (The



Both .25 and .40 engine installations are shown in these pictures. Interchangeable round radial mounts were used. Match the mounting holes of both mounts so that a single set of firewall blind nuts can be used. Screw in front of wing holds tank access hatch in place.

FULL-SIZE PLANS AVAILABLE . . . SEE PAGE 164



bottom splices are heavier to take the high loads when rounding the pylons.) There is very little dihedral, in fact so little that a dihedral template isn't shown on the drawing because the angle would be imperceptible to the eye.

To join the two panels after the ends of the root spars have been trimmed, sand the root ribs a bit at the top, and block up each panel 3/16 in. for the dihedral. Fasten down the panels, and glue in the *top* plywood splices. When these are set, unfasten the wing and fit and install the bottom splices.

With the wing halves together it is about time to build in the washout. This is done by installing the 1/16 balsa skin in the proper manner. First, sand all high spots on the framework.

Apply *all* of the balsa skin to the *bottom* of the whole wing where it is called for on the plan. This will leave both wing panels very flexible. Turn the wing over, top side up. One panel at a time, block up the rear spar with 9/16-in. scrap at the root and 11/16-in. scrap at the junction of the rear spar and tip. Fasten down the blocked-up panel securely, and apply the top balsa skin. When the glue has dried the panel will be very rigid, and the washout will be set. Repeat this on the other panel. (Note: If you plan to use the model for Novice or Sportsman Aerobatics, you may want to omit the washout. Remember that washout becomes washin when flying inverted.)

Cut out the balsa skin at the rear of the top center section. Fit and glue in the ⅛ plywood piece that covers the aileron connection. Install the ailerons as shown on the plan.

Fuselage. Cut out the parts, and fasten the 3/16 hard balsa rear bottom piece to your building board. Glue the ¼ plywood landing gear saddle to the front of this, equalizing the 3/16 in. at each side. Glue on the ¼-in. triangular spruce longerons, keeping them flush with the sides of the bottom piece. Glue in bulkheads F-2 and F-3, making sure that they are truly vertical.

The sides are now glued to the area of the two bulkheads. When this is set, bring in the rear sides using the small tail post shown. Install the ⅛ x ¼ balsa forming pieces at the center of the rear of the fuselage and the top ¼-in. triangular spruce longerons. Make sure that you notch these longerons at the front for the wing saddle which is installed later. Do not apply the top rear turtle deck at this time. The rudder and elevator controls will be installed while this area is open.

I used cable in Nyrod for these controls. On the balsa forming pieces midway back, glue in a crosspiece with holes for the Nyrod to pass through, and provide exit holes for the Nyrod, one on each side of the rear at a suitable height to connect the control horns. Leave the forward Nyrod ends (at bulkhead F-3) unbraced until the servos are installed.

Now, glue on the top rear 3/16-in. turtle deck (this can be soft balsa). Make a mock-up of the stab, vertical fin, and fillets rearward from ¼-in. scrap. Spot-glue these together and to the position of the final tail surfaces, making sure the fin-simulated part is lined up straight. Shape the turtle deck and this mock-up as shown from bulkhead F-3 to section Y-Y and rearward. Remove the mock-up, and save the fairings to be fitted into position later when the tail feathers are installed.

This leaves the front of the fuselage to be assembled. Glue together the two pieces of firewall F-1. Bring together the sides, and with a thick Ca, glue in the bottom and F-1; hold this together for the short time it takes to dry (use waxed paper to protect fingers). Fit and glue in the ¼-in. triangular spruce longerons at the bottom sides. Do the same with the ⅛ ply side pieces at the rear of firewall F-1. Fit and install the wing saddle-fuselage strengthener. This can be held with clamp-type clothespins very nicely while the glue sets. Fit in and fasten the other plywood pieces shown only in the side view.

Cut out the area for the tail wheel plywood mount, and install it. Build the forward hatch and glue the tongue to it. This also is only shown in the side view. Drill for and install the wing hold-down dowels, landing gear, and motor mount blind nuts.

Tail surfaces. These are made entirely of ¼ light-weight balsa. Be sure you don't get the punky kind of balsa that will break cross-grain very easily. I want to point out the need for carefully shaping the tail surfaces to an airfoil as shown on the plans. (Quite often you see the tail feathers of a model with lightly rounded blunt leading and trailing edges. These blunt edges are not nearly as efficient as a good airfoil.) I usually cover these surfaces and install the hinges before finally gluing to the fuselage. After fastening the tail surfaces to the model, glue on the fairings that were a part of the mock-up to each side of the vertical fin.

Covering. A good, smooth covering job always begins with sanding of all places that otherwise would protrude through the covering. Be very careful in sanding the wing tips at the joints, as it is easy to sand through. I rubbed in Ambroid glue to these after sanding for added strength. I used

Continued on page 121

Mr. Spook III/Clapp

Continued from page 27

Super MonoKote covering film.

Balance. The center of balance (let's not call it center of gravity) should be as shown on the plans for racing. For better aerobatics in Novice or Sportsman Pattern, the balance point can be a bit farther aft. Be sure to balance the wing after it is covered. Even if balsa of the same density is used, very seldom are both sides the same weight. On the large wing I built, a #10 common nail was needed to bring it into balance. If your wing needs balancing, drill a small hole in the extreme tip for a nail and glue it with a Ca.

With the model not in perfect balance (nose- or tail-heavy) it may be trimmed in flight and left that way without trying to balance it to perfection. *In this condition the aircraft will only be in trim at the velocity it was flying when it was trimmed.* At a higher or lower velocity the amount of pressure on the trimmed elevator will vary and cause the need for excessive control stick manipulation to counteract it. Of course, the farther out of balance the aircraft is, and the more elevator that is used for trim, the worse this condition becomes.

There are many other forces that can be involved but in an aircraft like Mr. Spook III—with 0-0 incidence and with the amount of downthrust used—knowledge of these out-of-trim characteristics can help you get it in perfect balance longitudinally. Lateral balance is taken care of primarily by balancing the wing.

Flying. This model has given me many pleasurable hours of flying both in Pylon Racing and fun flying, and it doesn't seem to have any bad traits. The ailerons with either wing are super-sensitive. When first test flying the plane, I would advise setting aileron throws at the minimum. Rolls with the small wing are much faster than with the long wing because of less area to rotate. Either way, it shows no tendency to tip stall on takeoff, even when pulled up sharply. This can be credited to the two degrees of washout. It can be brought in for landing in a three-point attitude (all the way) using a little back pressure on the stick; this minimizes the more usual extended glide at flare-out. Anyone with aileron experience will feel at ease flying Mr. Spook III.

Propeller Tests of different props on an O.S. .25FSR with 15% nitro fuel. All props are wood except as noted. Static tests were conducted with the engine mounted in Mr. Spook III.

Prop	rpm	Lb. Thrust
7-6 Top Flite (racing)	16,500	2½
8-4 Zinger	16,500	3½
8-5 Zinger	15,000	3-1/8
8-6 Zinger	14,000	2¾
8-6 Tornado (nylon)	14,000	2¾
8-7 Zinger	13,500	2¾
8-8 Top Flite (racing)	13,000	1¾
9-4 Zinger	13,500	3½
9-5 Zinger	13,500	3¾
9-6 Zinger	12,000	3¼
9-7 Zinger	10,000	2¼
9-7 Zinger	14,000	2½

Taking into account that rpm will increase with the model moving through the air in flight (because of the load on the prop lessening) it would seem wise to select a prop that allows higher pitch to be used to advantage with the increase in rpm. The best combination of pitch, rpm, diameter, and thrust seems to be with the 9-in.-dia. group. With the 8-6 and 9-6 Zinger, note that 2,000 rpm is lost with the 9-6, but the thrust is improved. With

Continued on page 124

lower rpm the 9-6 leaves more room for an increase in rpm in flight.

Conclusion. I would like to give credit to my good friend, Ken Little, who did all of the flying photography. Ken not only is a modeler, going back to the late 20s like myself, but he is also a professional photographer.

If you decide to build the model and do so with both wings and changeable engines, it will give you several possible combinations. With the long wing and a .25 engine, it is quite docile. With the short wing a .40 engine . . .

Have fun.

SAFE FLYING IS NO ACCIDENT!

Radio Technique/Myers

Continued from page 30

properly balanced, and with the control throws set up so the controls are "harmonized." (By the word "harmonized," I mean that the controls should be set up so that they have the ability to provide equal pitch, roll and yaw rates.) It helps to have a dual-rate transmitter, because you can obtain control harmony with its screwdriver adjustments.

The next point to be aware of is that it makes a difference how the Watson is oriented with respect to the airplane. You can't just stuff it into some empty space and then go fly. The unit's long axis must have a particular position with respect to the airplane or Helicopter center line, and likewise, the cover on the Watson box must lie in a particular direction. In my case, I found best results when the Watson's long axis leaned back about 10° from being parallel to the Helicopter rotor shaft and when the cover was aligned in the fore-and-aft direction. This is true because my unit is not totally free from responses to lateral acceleraton, nor are its responses to lateral accelerations equal in all directions. You have to experiment a bit, to get it right. Once you *have* got it right, it works very well. If you don't get it right, you will think that it's defective (as I did, for a while).

Larry Davidson flies an RC Helicopter very well, but his performance in a gusty wind was noticably better *with* the Watson Stabilizer. Does that tell you something?

I like to give a product a boost when it performs well for me. The Radio Shack Metal Detector 63-3001 appears in the lead photo for that reason. Here's the scene: The time is Saturday afternoon of a three-day weekend which is scheduled for testing of the Watson Stabilizer. The time is 6:10 p.m., just 10 minutes after Larry Davidson has closed the hobby shop where all the spare parts are. I've got to mail this column as soon as the Post Office opens on Tuesday. I'm out in the yard, flying the Heliboy from place to place, and making adjustments, when suddenly the engine stops in flight. Fortunately, I'm flying low and fast when it happens, so landing is no problem. I walk over to the Heliboy and discover that the needle valve has fallen out—someplace in the lawn!

I spent the next hour on my hands and knees, looking for a piece of brass an inch long. A neighbor asked, "Do you know anyone with a metal detector?" I said, "No." Tim said, "Radio Shack sells one for about $40." I said, "Here's $40. Get one if you can." When Tim came back with the unit, it was getting dark, and I started learning how to find metal. I found a lot of scraps of aluminum foil (probably gifts of the rotary power mower). Tim is pretty clever. He cut a piece of brass tubing about an inch long and had me look for *that.* When I had the unit adjusted so I could find the tubing easily, we were pretty sure that the needle valve would turn up. It did. Weekend saved. (How much is three days of flying worth? On a deadline?)

Now, do you know anyone who wants to buy a metal detector? Lease? Rent?

George M. Myers, 70 Froehlich Farm Rd., Hicksville, NY 11801.

Distance Record/Hiner

Continued from page 33

noon; no lift was encountered. Before the second launch, Dale Folkening took some pics of the crew and the Sailplane. The second launch was at 12:03 p.m., and light lift was encountered.

It took over two hours for the Pegasus to cover the first 25 miles. This early part of the flight was characterized by small but fairly strong thermals to cloud base. Jack would keep the Pegasus in the thermal and let it drift downwind until the thermal died. Only at this time would Jack fly straight down the road until the Pegasus ran into the next thermal. This kept the average speed down because the ground speed, due to wind drift, was only about 5 mph while thermaling. The Pegasus was much easier to see under a cloud when in a thermal than in clear blue sky. Between thermals the Pegasus was flying at a ground speed of 25 to 30 mph. A more aggressive flying style would result in higher speed but also a greater chance of premature landing.

The last hour and 18 minutes of the flight covered 30 miles. The thermals now were very