CHUCK CUNNINGHAM'S

LI'L SWINGER

40 inches of swingin' machine for .09 to .19. Designed for the Bonner 4RS or Galloping Ghost systems.

THE Li'l Swinger was designed with only one basic thought in the author's mind — to design a ship that would be highly suitable as a trainer for Galloping Ghost type of flying.

And, the Li'l Swinger is that, alright. But I had forgotten, for the moment at least, about our Editor and Fearless Leader! After shipping him the plans, what was to be a GG trainer turned out as a full-house, Class III for the new miniature Bonner 4RS digital system!

So, you can pay your money and take your choice. As a by-product, it is sturdy because it was meant to be. It is cute, 'cause almost any little ship is cute. And, it is a ball to fly, because it is simple with no extra frills.

For best results on Galloping Ghost, use an Enya .099 or Max .10 R/C. My prototype used the former which is a handful of power. I borrowed a little hint from my Enya .60 and opened up the throttle venturi by turning out the needle valve seat one turn. This really added some rpm!

For the Bonner 4RS version, Don used a Max. .19. Although the nose was designed for a two-ounce plastic bottle tank, one of the newer 4-ounce rectangular bottle clunk tanks fitted perfectly with nary a hair to spare!

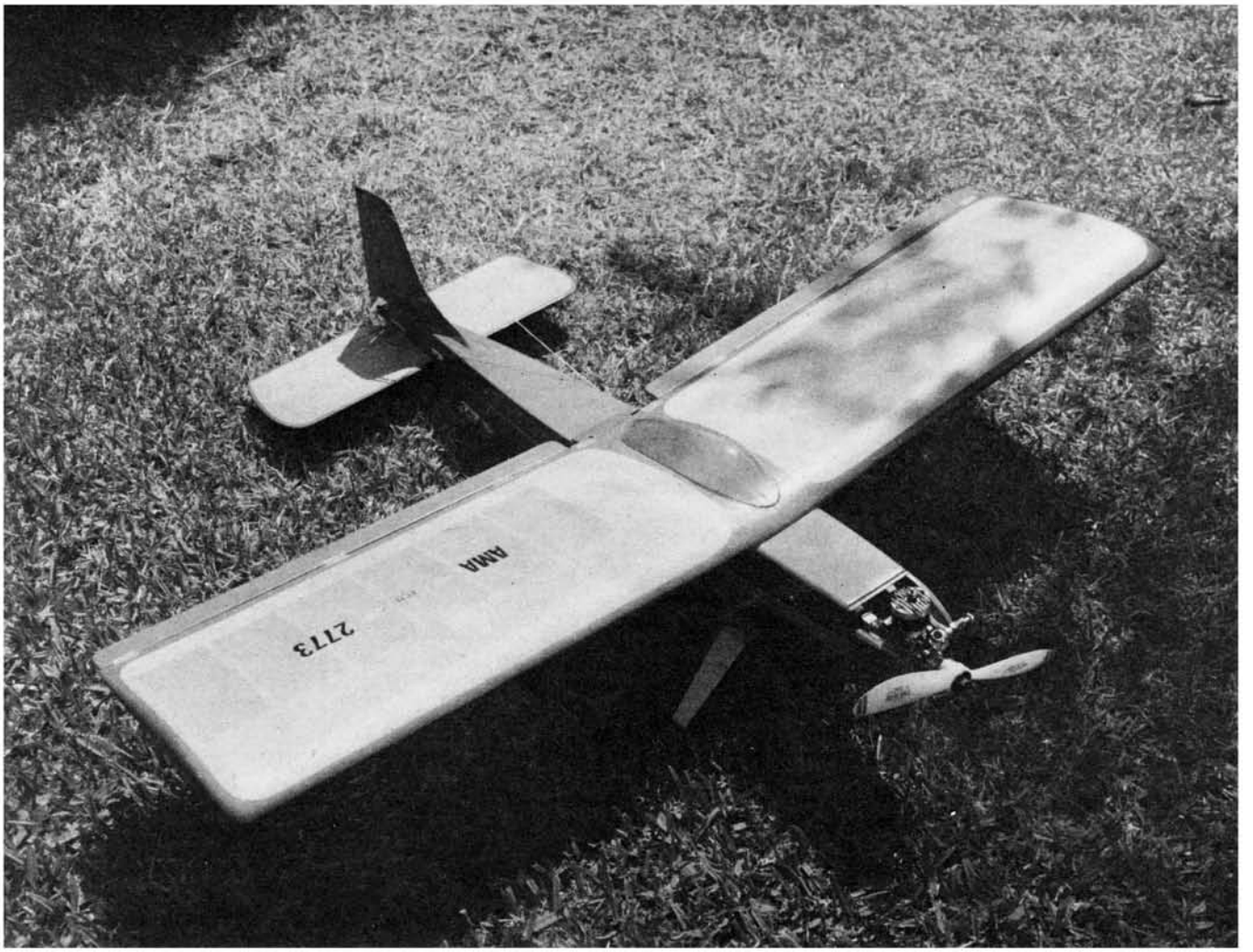
The fuselage is beefed up enough to take the whacks of many, many bad landings, and the rudder is large enough to give good precise control at almost any speed and position.

You will note on the plans that the hinges are shown made from tape, and used in a figure eight manner. I was working on this idea when "Big Daddy" Ken Willard mentioned the same thought in his write up of the Top Dawg. I have used them on several ships and have experienced no trouble at all. Use 3M decorator tape in the small width. Cut pieces about one-and-one-quarter inch long. Match sticky side to sticky side and lap about one fourth of an inch. Place them on the surface to be hinged in the same manner as figure eight type cloth hinges, press firmly into position, and you're done. It's cheap, simple, and has the advantage of giving you a very free hinge movement, a must for galloping ghost.

The name for the Li'l Swinger is kinda obvious, it's a swinging ship, and it gets its control from all of that stuff on the back end swinging back and forth. Back in the old days, before the modern GG gear such as the Rand GG Pak used in this ship, we had to hang a mass of wire on the tail surfaces to get the job done. If this ship had come along then, keeping the naming idea in mind, it could have been called the Plumber's Friend!

The real test of any aircraft is in the flying, and since that is really the ultimate goal here, let's get into flying not only the Li'l Swinger, but in flying galloping ghost in general.

On any GG ship the important thing to watch for is that both of the control surfaces are pulsing around neutral, and that when you give an up, you get up, and when you give a right you get a right. If you don't, then go no farther, but dig into the controls and see what is wrong. Set up the control movement so that you have a maximum of ¾" deflection of the rudder on either side of neutral and about ⅛" maxi-



mum of down elevator. Let the up elevator take care of itself. With the control pulsing merrily away check the throttle control (if you are using one) to see if low engine is really low engine. If everything looks good, then check very carefully to see that the trim levers are set in the middle position and that the surfaces are pulsing about neutral. If not, turn off all switches and adjust the Kwik-Links until everything is just right. Move away about ten steps with the transmitter and check again. For best results with any GG ship, full down should be a rapid flutter in down elevator with not too much deflection. You're not going to do outside loops, but you do want to penetrate the wind, and also to feed in a little down elevator in a roll. So resist the urge, save that movement for the other side of neutral, up.

Be sure and check the balance point. Do not balance the Li'l Swinger any farther forward of the point shown on the plans. You may balance it as much as ½" further aft if you desire, but the cg as shown has proven just about right.

For test flying go out and find a nice field with lots of nice tall soft weeds, the kind that will give you lots of comfort if something happens on the first few flights. Don't weaken to that old urge to test glide the ship. It won't do it. I don't care how many free flights you may have checked out, or how much your flying buddy insist that you test glide it, don't! Any GG ship with the actuator at rest will be in down elevator position, and if you dash off to heave it into the wild blue for a test glide your bird will promptly gobble up a beak full of dirt. And, don't turn on the actuator to check it out as this ship isn't a floater. Just resist the urge, please!

Make sure that everything works with the engine running, that your transmitter is functioning properly, that the battery is in good shape, and that the receiver battery is charged. With all systems go, grab the Li'l Swinger just behind the landing gear, be sure that the switches are turned on in both the transmitter and receiver, lean the engine out until it just breaks into a two cycle, put your heart back in your chest, and check everything one more time. If you're fully satisfied (remember, your tank is good for at least 10 minutes, so don't hurry), then let's get airborne. Check the wind direction, and with the transmitter held in your left hand and the aircraft in the right, at shoulder height, run into the wind. Keep running until the ship begins to feel light, then push it straight ahead. Don't wind up and throw it, and don't toss it either up or down, just straight ahead.

If everything is working right the aircraft should start flying right off the portable launching pad (that's you) with a slight climb. Do not make any corrections, or attempt any turns, until about 50 feet of altitude has been gained. Of course, if it has a violent turn, then correct for this with the transmitter, but the safest course is to let the Li'l Swinger fly itself. When you have reached a safe altitude make a wide, slight turn to the right or left. Don't rack the stick all the way over to turn, just move it gently in the direction that you want to go. Watch the aircraft, and fly it, not the joy stick on the transmitter.

Make turns in both directions. Note if the nose is down or up. If it is down, trim in a little up trim, not a lot, just a little at a time. Your best flying attitude is with the nose just about level, then you can hold in a little up elevator to keep it up in a turn. To make a tighter turn feed in a little left rudder, when the ship yaws to the left pull in a little up elevator and she will come right around. With experience you will be able to make this type of turn very tight and right on the deck. But don't rush it, learn what the ship will do up high where you have time to make a correction if something goes wrong.

Julie Embree, RCM's "girl next door," poses with the Bonner version of the Li'l Swinger. She's also flown it.

When the engine quits on the Li'l Swinger, roll in all of the up trim and then let the ship settle down to the ground. The way that this ship is trimmed and balanced, when the engine cuts it will start a shallow dive toward the ground, but with up trim you can change this dive to a nice, non-floating glide that, with practice, you can terminate right on the spot of your choosing. The trim has purposely been set up on this ship to keep it out of the floater class as this type of flying is not needed with galloping ghost. I'd much rather have a ship that will penetrate a good breeze, loop at will, and make straight true turns, than a floater that makes for a constant battle with ballooning into the wind.

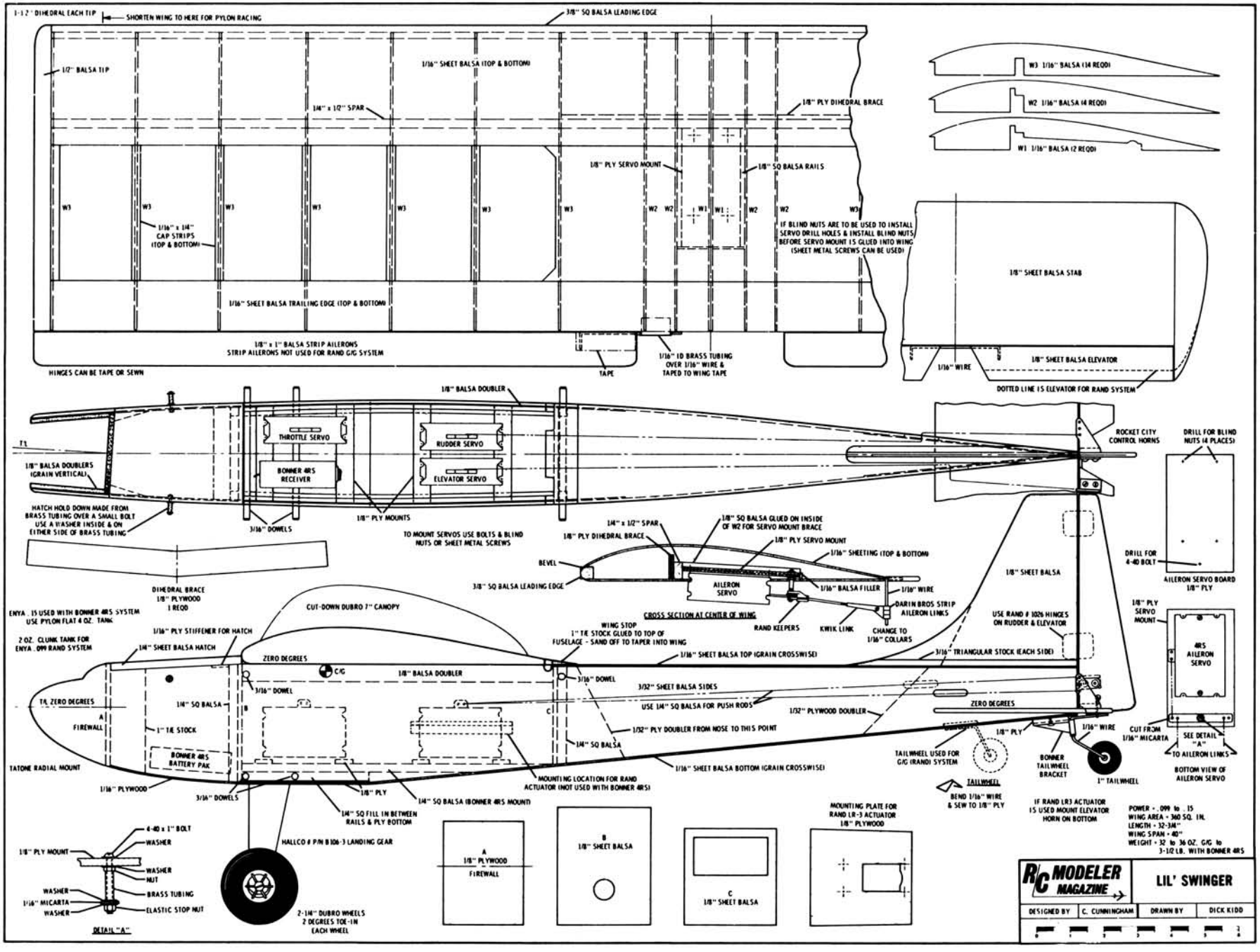
One word of caution, don't let the adeptness of handling of this ship go to your head, I did, and I should know better. On the second flight, after making a series of low passes for my wife who was taking pictures, I was gliding in for a dead stick landing and decided that it was so responsive at low glide speed that I'd put it right in my lap and catch the ship just as it got to me. I did, and you guessed it, it glides fast, and I very neatly removed the horizontal stab with my catch. Go on and say it, you're right!

I think that you'll have fun with the Li'l Swinger. It has proven to be just what the name implies, a real Swinger! When you paint it up, how about trimming it in WWI **Allied** colors for a change, with British Concordes instead of Maltese Crosses, then you can go out and do battle with all of the Wolfmeisters tearing up the sky!

Construction

Building the Li'l Swinger is easy, and if you have built a R/C ship before you should have no trouble with this one. If this is your first ship, then get someone to help you over the tough spots.

The wing is easy and strong. Cut out the eighteen ribs required from medium balsa and stack together in a bundle, pin the bundle into one piece and then sand the ribs to insure that they all have the same airfoil. Set this stack aside. Pin down the trailing edge sheeting, the leading edge sheeting, and the lower cap strips, and glue in place. I like to build both wing halves at the same time, then glue together at the proper dihedral angle to finish them off. Glue the ⅜" square leading edge on top of the leading edge sheeting. Before gluing it in place, sand the bevel on it as shown. This won't take long and it is easier to sand it now than later. Glue the spar to the sheet and before this has dried, glue the ribs in place. After the ribs are in place make sure that the dihedral brace will fit in both wing


1-1/2° DIHEDRAL EACH TIP
SHORTEN WING TO HERE FOR PYLON RACING
3/8" SQ BALSA LEADING EDGE
1/2" BALSA TIP
1/16" SHEET BALSA (TOP & BOTTOM)
1/4" x 1/2" SPAR
1/8" PLY DIHEDRAL BRACE
1/8" PLY SERVO MOUNT
1/8" SQ BALSA RAILS
W3 1/16" BALSA (14 REQD)
W2 1/16" BALSA (4 REQD)
W1 1/16" BALSA (2 REQD)
W3
W2
W1
1/16" x 1/4" CAP STRIPS (TOP & BOTTOM)
IF BLIND NUTS ARE TO BE USED TO INSTALL SERVO DRILL HOLES & INSTALL BLIND NUTS BEFORE SERVO MOUNT IS GLUED INTO WING (SHEET METAL SCREWS CAN BE USED)
1/8" SHEET BALSA STAB
1/16" SHEET BALSA TRAILING EDGE (TOP & BOTTOM)
1/8" x 1" BALSA STRIP AILERONS
STRIP AILERONS NOT USED FOR RAND G/G SYSTEM
HINGES CAN BE TAPE OR SEWN
TAPE
1/16" ID BRASS TUBING OVER 1/16" WIRE & TAPED TO WING TAPE
1/16" WIRE
1/8" SHEET BALSA ELEVATOR
DOTTED LINE IS ELEVATOR FOR RAND SYSTEM
1/8" BALSA DOUBLER
THROTTLE SERVO
RUDDER SERVO
BONNER 4RS RECEIVER
ELEVATOR SERVO
1/8" BALSA DOUBLERS (GRAIN VERTICAL)
HATCH HOLD DOWN MADE FROM BRASS TUBING OVER A SMALL BOLT USE A WASHER INSIDE & ON EITHER SIDE OF BRASS TUBING
3/16" DOWELS
1/8" PLY MOUNTS
TO MOUNT SERVOS USE BOLTS & BLIND NUTS OR SHEET METAL SCREWS
DIHEDRAL BRACE 1/8" PLYWOOD 1 REQD
ROCKET CITY CONTROL HORNS
DRILL FOR BLIND NUTS (4 PLACES)
1/4" x 1/2" SPAR
1/8" SQ BALSA GLUED ON INSIDE OF W2 FOR SERVO MOUNT BRACE
1/8" PLY DIHEDRAL BRACE
1/8" PLY SERVO MOUNT
1/16" SHEETING (TOP & BOTTOM)
BEVEL
3/8" SQ BALSA LEADING EDGE
AILERON SERVO
1/16" BALSA FILLER
1/16" WIRE
DARIN BROS STRIP AILERON LINKS
CROSS SECTION AT CENTER OF WING
RAND KEEPERS
KWIK LINK
CHANGE TO 1/16" COLLARS
1/8" SHEET BALSA
DRILL FOR 4-40 BOLT
AILERON SERVO BOARD 1/8" PLY
1/8" PLY SERVO MOUNT
4RS AILERON SERVO
USE RAND # 1026 HINGES ON RUDDER & ELEVATOR
ENYA .15 USED WITH BONNER 4RS SYSTEM USE PYLON FLAT 4 OZ. TANK
2 OZ. CLUNK TANK FOR ENYA .099 RAND SYSTEM
1/16" PLY STIFFENER FOR HATCH
1/4" SHEET BALSA HATCH
CUT-DOWN DUBRO 7" CANOPY
ZERO DEGREES
C/G
1/8" BALSA DOUBLER
WING STOP 1" TE STOCK GLUED TO TOP OF FUSELAGE - SAND OFF TO TAPER INTO WING
1/16" SHEET BALSA TOP (GRAIN CROSSWISE)
3/16" TRIANGULAR STOCK (EACH SIDE)
3/16" DOWEL
3/32" SHEET BALSA SIDES
USE 1/4" SQ BALSA FOR PUSH RODS
1/32" PLYWOOD DOUBLER
1/32" PLY DOUBLER FROM NOSE TO THIS POINT
1/4" SQ BALSA
1/16" SHEET BALSA BOTTOM (GRAIN CROSSWISE)
1/8" PLY
1/16" WIRE
CUT FROM 1/16" MICARTA
SEE DETAIL "A"
TO AILERON LINKS
BOTTOM VIEW OF AILERON SERVO
TAILWHEEL USED FOR G/G (RAND) SYSTEM
BONNER TAILWHEEL BRACKET
1" TAILWHEEL
TAILWHEEL
BEND 1/16" WIRE & SEW TO 1/8" PLY
IF RAND LR3 ACTUATOR IS USED MOUNT ELEVATOR HORN ON BOTTOM
TA ZERO DEGREES
A FIREWALL
1/4" SQ BALSA
1" TE STOCK
BONNER 4RS BATTERY PAK
TATONE RADIAL MOUNT
1/16" PLYWOOD
3/16" DOWELS
1/8" PLY
1/4" SQ FILL IN BETWEEN RAILS & PLY BOTTOM
1/4" SQ BALSA (BONNER 4RS MOUNT)
MOUNTING LOCATION FOR RAND ACTUATOR (NOT USED WITH BONNER 4RS)
4-40 x 1" BOLT
WASHER
1/8" PLY MOUNT
WASHER
NUT
WASHER
BRASS TUBING
1/16" MICARTA
WASHER
ELASTIC STOP NUT
DETAIL "A"
HALLCO # PIN B 106-3 LANDING GEAR
2-1/4" DUBRO WHEELS 2 DEGREES TOE-IN EACH WHEEL
A 1/8" PLYWOOD FIREWALL
B 1/8" SHEET BALSA
C 1/8" SHEET BALSA
MOUNTING PLATE FOR RAND LR-3 ACTUATOR 1/8" PLYWOOD
POWER = .099 to .15
WING AREA = 360 SQ. IN.
LENGTH = 32-3/4"
WING SPAN = 40"
WEIGHT = 32 to 36 OZ. G/G to 3-1/2 LB. WITH BONNER 4RS
R/C MODELER MAGAZINE
LIL' SWINGER
DESIGNED BY
C. CUNNINGHAM
DRAWN BY
DICK KIDD

panels, and then glue it to one half of the wing. Install the top sheeting and cap strips and let all of it dry overnight. The next morning lift both halves from the building board, check that everything is ok and then glue the two wing halves together. Let this dry until the evening.

When the wing is dry sand it lightly with fine sand paper and glue on the tip blocks. Sand them to shape and then give the wing a coat of clear dope. Take a piece of old sheet (the kind that you sleep on) and cut a strip about four inches wide and long enough to wrap around the center section of the wing. Lightly coat this with white glue and then wrap it around the center section. When it is dry sand the edges lightly. You will have a wing that is strong and one that will not suffer from the pull of the tie-down rubber bands. Give the wing a coat of clear dope, sand again and you are ready to cover. You can cover with either silk, silkspan or MonoKote. On a ship of this size a double covering of silkspan will do a good job. I used MonoKote on the wing of the original. It's quick and easy.

The fuselage is very simple to construct, but you must remember that not only in this ship, but in all models, it is very important to have a straight alignment. To do this on the Swinger, draw a line with a pencil down the middle of your building board. We'll assemble the ship around this line. Cut the sides from hard 3/32" sheet and the doublers from 1/32" plywood. You may think that this is a bunch of extra weight for a little ship to carry. It is, maybe two ounces more weight, but the results are a terrifically strong fuselage, able to take lots of punishment and to come back for more. Glue the ply doublers to the balsa sides with contact cement. Cut out the formers and the plywood for the nose and the landing gear mount. Before joining the fuselage sides glue on the 1/4" square braces at former B and C and also glue on the 1" trailing edge stock to act as braces at the fire wall. Remember to offset them as shown on the plans to allow for side thrust. Also glue on the 1/4" square brace for the actuator support. It's easier now than later. Mark the locations of formers B and C and glue the two sides together only at these formers. Check that everything is square and set this aside to dry. While you were cutting out the firewall and the formers draw a line down the center of the formers to use in making a true fuselage. Now, with the main structure dry invert it over the line that you have drawn on your building board and glue in the firewall and bring the tail together and glue. Make sure that all centerlines are right over the line on the building board and that the tail falls right across this line. Set everything aside to dry again and while waiting, go on to the tail assembly. Cut the rudder and stab from medium hard balsa and just lightly sand. Don't worry about a knife edge on the leading and trailing edges, just round them. Dope on a coat of clear dope and set aside to dry.

The fuselage should be dry enough now for you to put on the top and bottom sheeting — be sure and cross grain it. When this has all dried sand the fuselage lightly and give it a coat of clear dope.

On small ships I like to cover the fuselage and tail group with silkspan. This gives it added strength and also makes for a smooth paint base. You can leave it uncovered if you so desire. When covering the sheet surfaces of the tail, with silkspan, do not wet the silkspan, just dope it on dry. This will help to prevent warps.

After covering glue the vertical and horizontal stabs in place and reinforce this joint with strips of "Celastic." This will go a long way toward making the aft section as strong as the nose. Paint the ship in whatever colors you wish, but remember, don't pile on the dope! This only adds weight, so stick with just a couple of coats.

Hinge the tail surfaces by either the tape method that I discussed earlier, by sewing, or by plastic hinges such as the small Rand that have been designed to slip over the 1/8" sheet surface. Remember, the hinges must be free.

The tail wheel is fixed to the plywood bracket by sewing it to the plywood with small wire, or with nylon fishline. The tail wheel does not move, but you can taxi nicely with just the use of the rudder. On the Bonner 4RS version, a steerable tail wheel is used. Notice, also, that the elevator size has been increased. Sheet stock strip ailerons were used with 1/4" movement up

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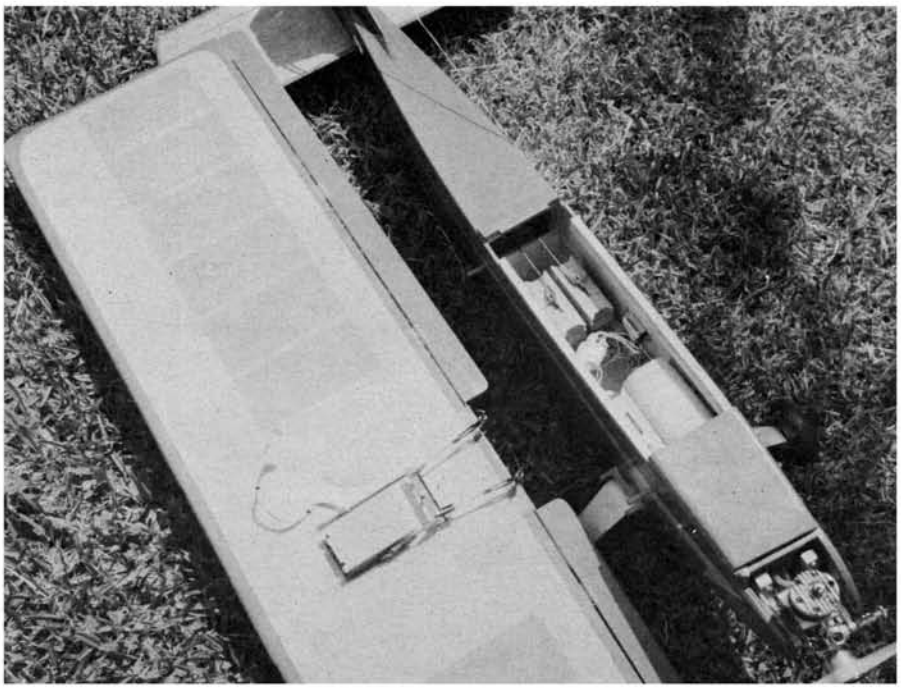

Top: Bonner 4RS system installed in Li'l Swinger. Above: Chuck makes final adjustments prior to test flights from "Dewey's Hill." Dick Ludden looks on while RCM's Editor hunts for rubber bands in the G&K Field Box.

LI'L SWINGER

(Continued from Page 17)

and down. If you desire a canopy, a DuBro 7½" canopy can be trimmed to fit.

After the Lil' Swinger had been test flown numerous times with the Rand GG Pak system we decided to try out some other forms of control to see how they worked. Don Dewey and Bill O'Brien had been testing a prototype of a new single channel system called a Uni-tronics Mustang, so they shipped this off to Texas while Don set about putting the new Bonner full house propo unit in his Swinger.

The Mustang is a single channel proportional setup that utilizes two Rand actuators, one working elevator and the other on rudder and engine. There is no interaction between the surfaces, and a throttle signal causes only the rudder to cycle, not both rudder and elevator, as in GG. This system was tried in the Lil' Swinger and proved to be a very precise and positive control system. The elevator has an especially good "feel" as up elevator is on fast pulse, while the seldom used down elevator is on slow.

I suggest that if you are going to use either this type of system or a full house proportional system that you add ⅜" to the width of the elevator. The elevator on a gg ship should be kept rather narrow to reduce the "brake" effect, but with a non-pulsing system a larger elevator can be used for much cleaner control.

This type of system will lend itself very well to a small ship incorporating ailerons and elevator and a design for it is rolling around in the back of my head, so if this works out will be presenting this in the near future.