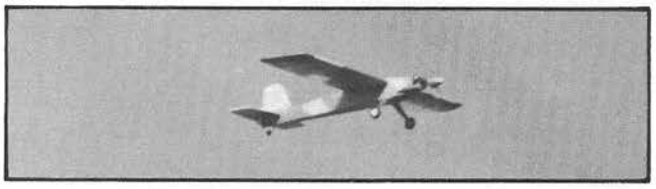
SD-500mkII

Designed as a pylon racer, this model features simple lines, low building costs and builds into a sport-type model with aerobatic abilities. With a hot .40 on the nose, it is a fast racer.

Designed by Val Ure **Article By Arthur York**



Most modelers are basically the same when they pick up their latest magazine — a quick skim through for content and then they zero in on their pet section. By the time they get to read the articles about models, they have assessed all the latest ads, looked at photos, and studied drawings. Occasionally this quick skimming will interrupt your normal habit because a model catches your attention. How did you arrive at this part of the magazine? Was it the simplicity of construction that appealed to you? Simple lines of a .40 powered model with obvious low building cost, or did it meet your need for a simple, everyday, sport-type model with aerobatic abilities? Yes, it has all of those features, but with a hot .40 bolted to the nose, it is a fast pylon racer of the 15-500 class.

The SD-500 series were designed as pylon racers, with easy take-offs, landings that could be dragged in, stability and grooving qualities of a good pattern model. The parent design years ago started as a sport model, progressing into the pylon circuits. The SD-500 started the other way and now is showing up in novice pattern events with success. Do you recognize the family lines — well straighten the wing, place it on the fuselage bottom, lengthen the nose, add down and side thrust. Wallah! an RCM 15-500. That is what the SD-500 MK II is with improvements in handling and flying.

Val Ure, an old buddy of mine for the past three decades is responsible for the SD-500 series design. He is well known in Canadian modeling circles and lately the western states are becoming aware of his many talents.

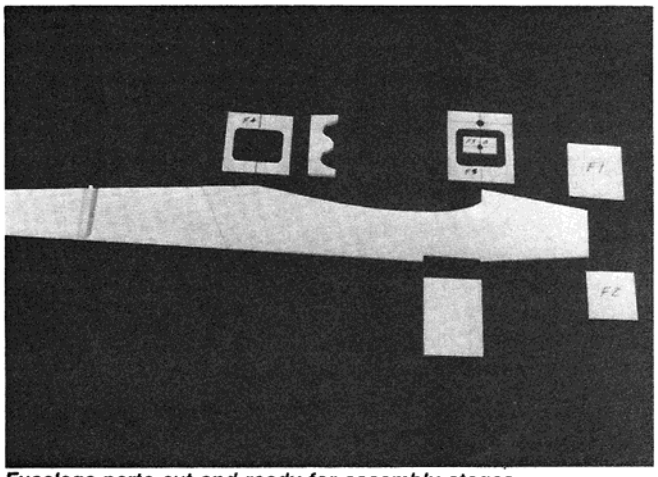
We, in Canada, have AMA's counterpart known as the Model Aeronautical Association of Canada (MAAC). In their pylon rule book is a set of 15-500 rules known as the "Winnipeg Rules," in an attempt to define minimum requirements for cross country competition. Some members in the local club and in the province felt they were too lax, advocating a one model design as the only way to go, stressing the RCM 15-500. An annual zone meeting almost became a disaster over this issue, but a one model design concept was lobbied through for a one year trial. Selection was delegated to the Pylon Committee between the RCM 15-500 and the SD-500. At this meeting, I volunteered (in a moment of weakness or frustration!) to make drawings of the model, if the design was selected, as it and all

SD-500 MK II
Designed By: Arthur E. York

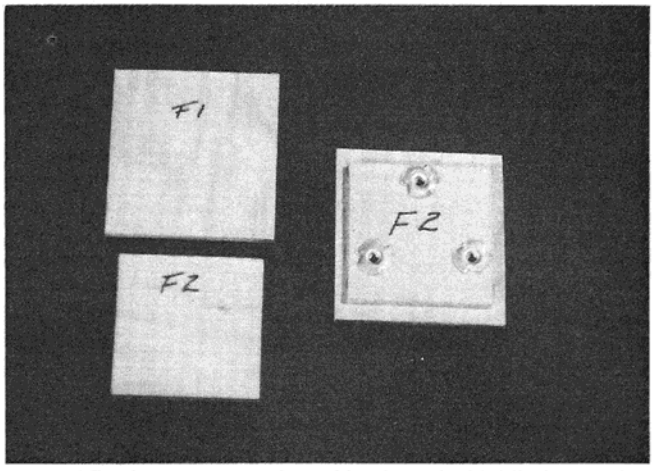
TYPE AIRCRAFT
Sport/Pylon
WINGSPAN
52 Inches
WING CHORD
10⅛ Inches
TOTAL WING AREA
519 Sq. In.
WING LOCATION
Shoulder
AIRFOIL
15½% Symmetrical
WING PLANFORM
Constant Chord (2" Sweep Back)

DIHEDRAL EACH TIP
1¼ Inch
O.A. FUSELAGE LENGTH
36½" (Less Engine)
RADIO COMPARTMENT AREA
(L)10 3/16" x (W)3" x (H)2¼"
STABILIZER SPAN
18¼ Inches
STABILIZER CHORD (incl. elev.)
6" Average
STABILIZER AREA
109½ Sq. In.
STAB. AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
5¾ Inches

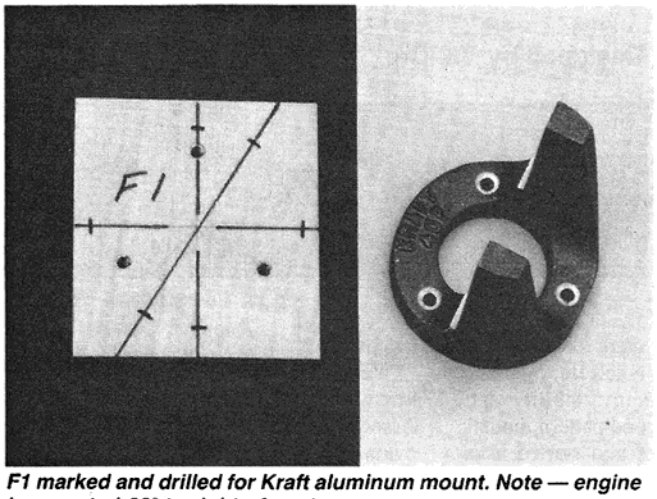
VERTICAL FIN WIDTH (incl. rud.)
5⅝"
REC. ENGINE SIZE
.29-.40 Cu. In.
FUEL TANK SIZE
6 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa and Ply
Wing ..... Balsa and Ply
Empennage ..... Balsa
Wt. Ready To Fly ..... 56 Oz.
Wing Loading ..... 15.5 Oz./Sq. Ft.



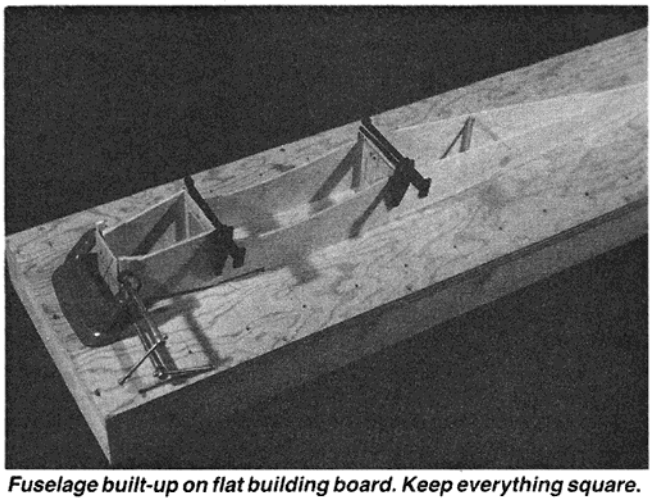
Fuselage parts cut and ready for assembly stages.



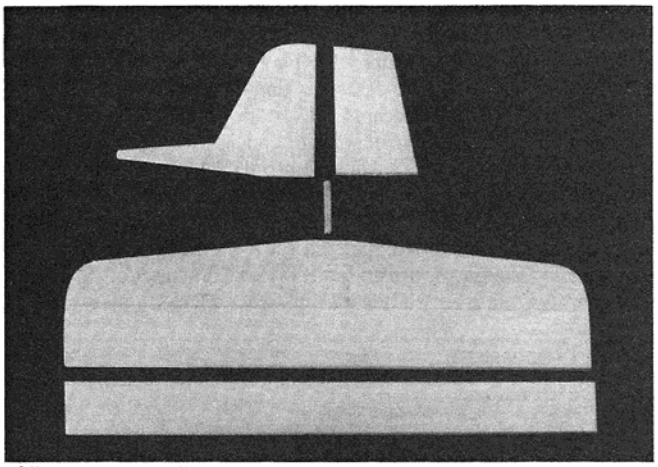
F1 and F2 shown separately and laminated with blind mounting nuts in place for motor mount.



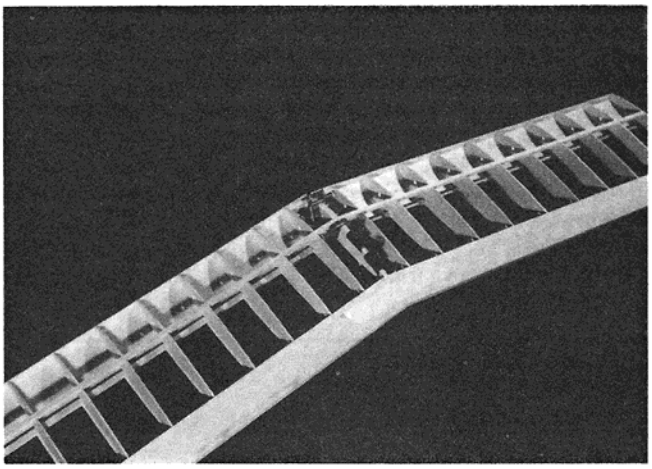
F1 marked and drilled for Kraft aluminum mount. Note — engine is mounted 60° to right of center.



Fuselage built-up on flat building board. Keep everything square.



All necessary tail components cut. Note 1/4" dowel drilled for tailwheel wire.



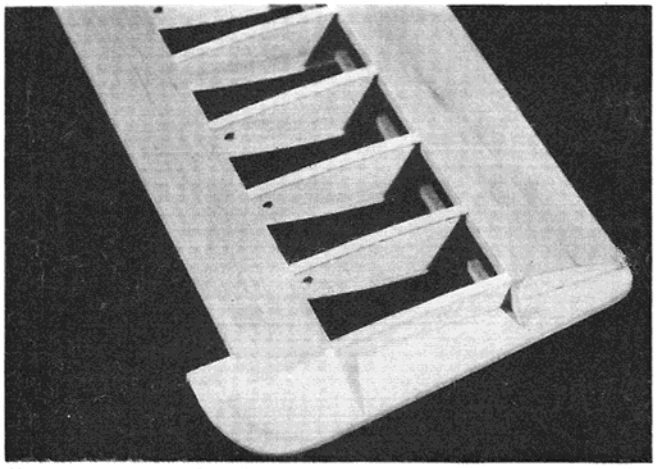
Wing panels being joined and held together with clamps while epoxy sets.

sketches were non-existent.

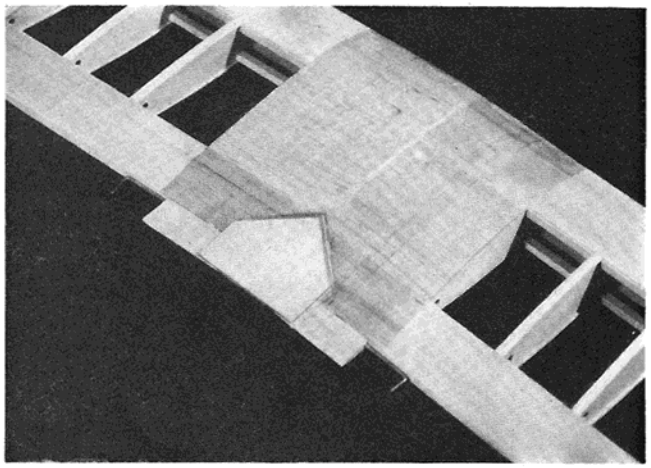
Weeks later, just before Christmas, I received some written information, a piece of folded cardboard and a set of RCM 15-500 plans, along with the decision of the Pylon Committee in favor of the SD-500 design. Up to this time the design had been nameless, references to the model being unprintable profanity; no one wanted to be associated with it and so would not suggest a name. As a joke, I selected the first letters of the most common profane references, applied a 500 after them to designate wing area followed by Mk I. Blueprints were made available four days later to the joy of locals, enabling them to go on a building spree during the holiday season.

I built two, each different from the other in minor aspects. A few days before the local pylon meet I covered an SD-500 Mk I, installed the radio and bolted on a hot engine. My first encounter with flying an SD-500 Mk I was the night before the meet. Like flying other tail draggers I applied right rudder as the take-off started; the result was a violent ground loop.

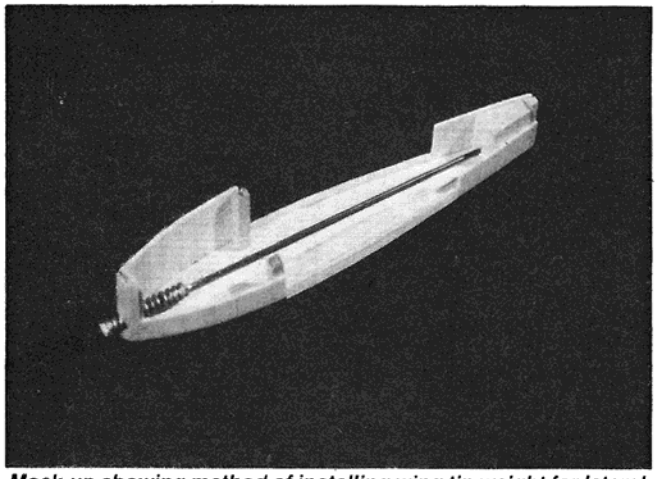
The second attempt at take-off was without using rudder — a classic take-off resulted, straight, and a gradual climb-out. A little aileron trim was all that was required; it flew just great. It was found in doing turns and loops that the elevator was very effective. With a 1/4" up and down



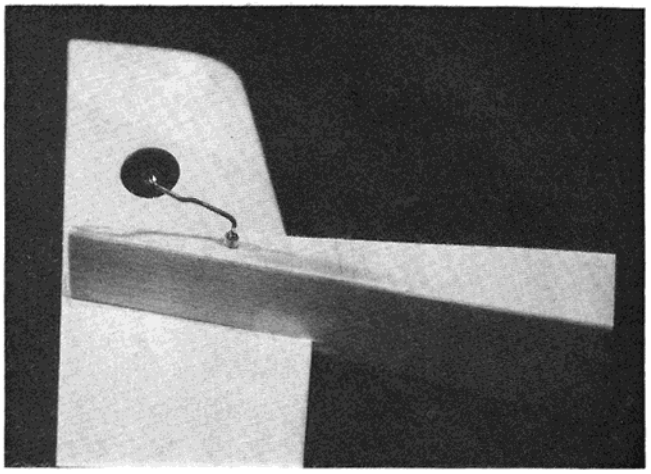
Wing tip detail. 3/8" trailing edge block is faired into tip.



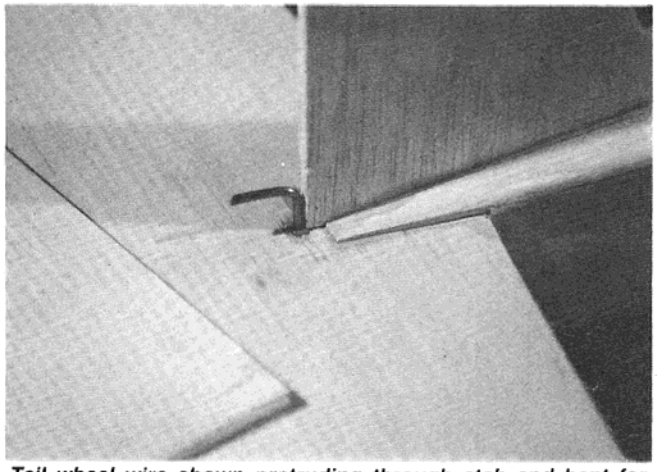
Center section of wing with aileron torque rods installed. Fiberglass has been applied along with ply plate for wing hold-down screws.



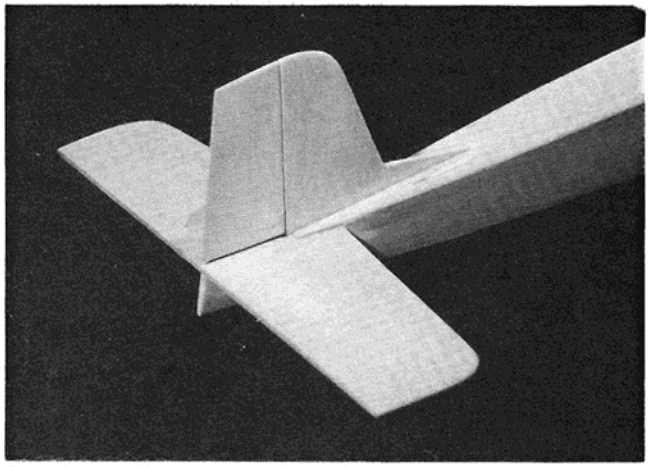
Mock-up showing method of installing wing tip weight for lateral balancing. Works well after model is completely covered.



Bottom view of tail wheel assembly. Wire runs through 1/4" drilled dowel in fuselage.



Tail wheel wire shown protruding through stab and bent for rudder.

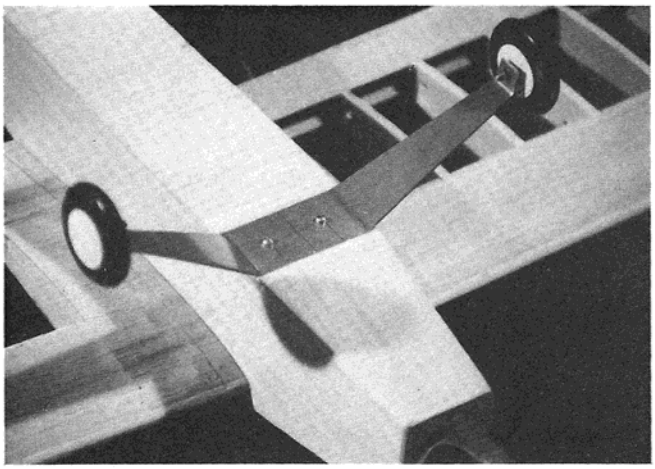


Completed tail assembly minus elevator.

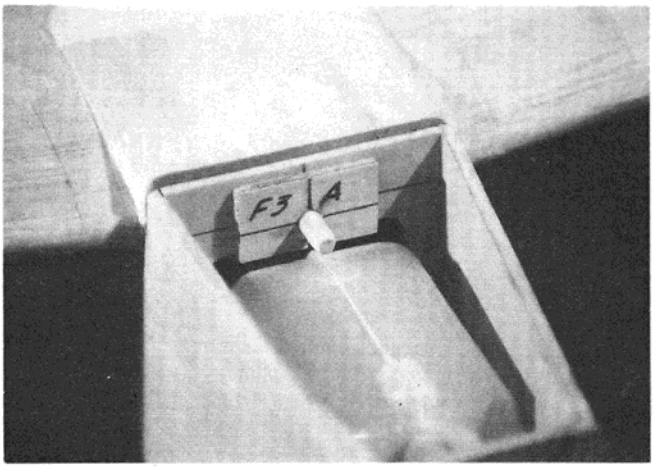
elevator movement, about half the stick movement was needed for large smooth loops. The exact C.G. to now was not known; everyone balances his model on the spar, at the fuselage. Mine was where I thought it should be — 3/4" further back. This was checked out by trying a flat entry into a spin; results were satisfactory with snappy, precise entry and recovery. I felt pleased with this first flight. A low pass was made across the field, followed by a roll to the left. The roll required no control movements other than aileron, beautiful but slow. It was so slow it used up the air space needed to perform four rolls. There was no time to figure this out before the meet; besides pylon flying makes no demands on rolls — just turns and they were fine.

While racing the next day, I encountered turning trouble around the Number 1 pylon. Half the turns resulted in a ballooning climb. I fly Mode 1 and thought possibly a little top rudder might be unknowingly applied. This was not the case, as later I found out that in my hurry I had forgotten to balance the model laterally. Three-quarters of an ounce of lead was installed in the left wing to counteract the weight of the canted engine.

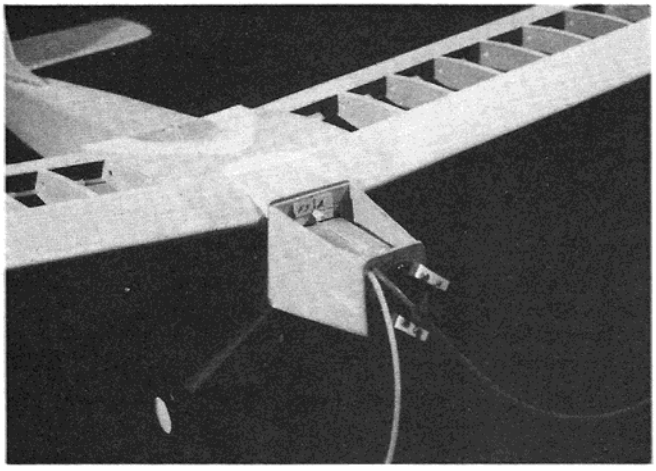
The SD-500 Mk II differs from the Mk I in simpler wing tips and increased aileron area. They both flew great with the following amount of throw — ailerons and



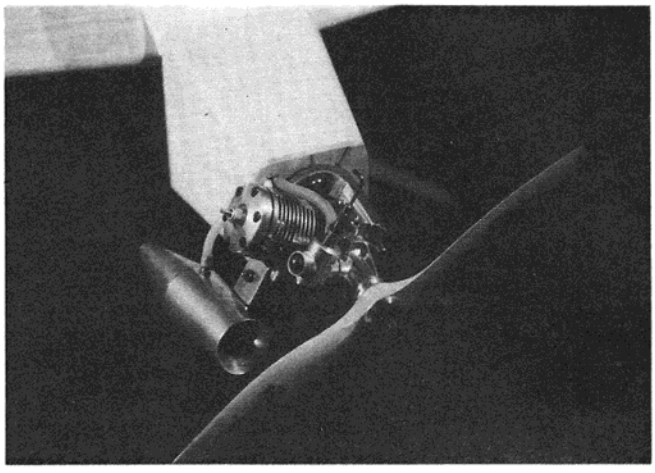
Landing gear bolted in place. This makes a very neat installation.



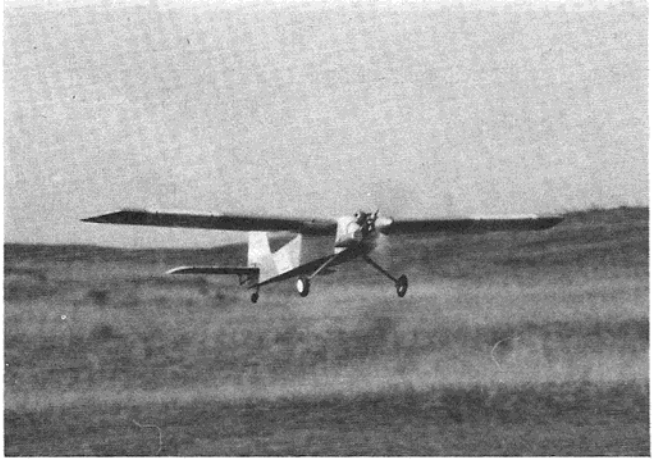
Close-up of F3A and wing dowel. An easy way to get perfect alignment.



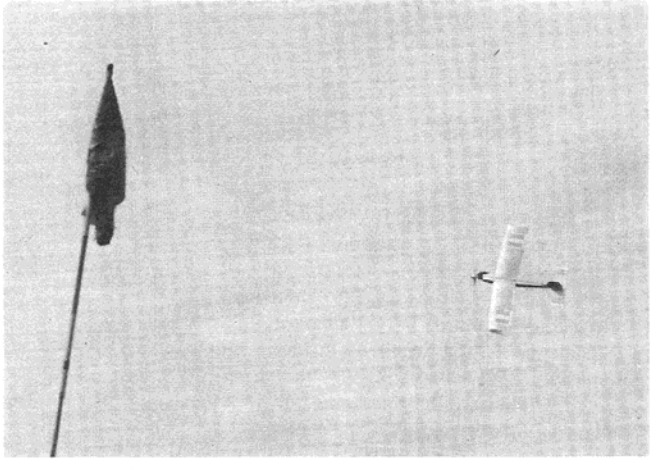
With Sullivan fuel tank and lines in place, we just have to bolt engine to mount.



HP-.40 installed with pressure line to tank.



SD-500 MKII makes a low fly-by for our photographer.



The SD-500 MKII flying around a pylon.

elevators 1/4'' up and down; rudder throw was 30°. With these throws, the model is very responsive and can be a handful on first flight if one lacks experience. As others before me have stated — get your local expert to test fly and trim the model for you. The models have been test flown and in pylon races with the rudder servo disconnected, pinning the rudder in neutral. No one noticed this and once I forgot, until trying to taxi back to the pit area after a race.

CONSTRUCTION

Wing construction is quite simple; do not let the swept back wing upset you. Each panel is built separately directly on the plan, then joined. First cut out the fuselage sides from 1/8'' x 4'' x 36'' balsa sheets and set aside; we need those pieces of 1/8'' scrap for the two center ribs. Make a rib template out of your favorite material, unless you have an old RCM 15-500 template around -- yes, same chord and airfoil. Mark one of the curved edges of the template with a felt pen. Now cut out all 3/32'' and 1/8'' ribs needed and mark each rib the same as the template; this may sound fussy, but I will explain this later.

Take the two 1/8'' ribs, make a cutout for the 1/4'' dowel, laminate on one side of each rib, 1/16'' vertical grain balsa; **important** — one left, the other right. Select two 1/16'' x 4'' x 36'' balsa sheets

for the wing T.E., cut to a length of 25''; the remaining scrap will be used for planking and capstrips later. Strip the two 4'' sheets down the middle using a long straight-edge as a guide; mark the sheets and the edges. In this way, you can use the matching split sheets on the same wing panel.

If you have a table saw, rip two pieces of T.E. fill from a 3/16'' sheet by setting the table saw arbor at 7°. Otherwise, use 3/16'' square sticks and dress to shape later. Glue 3/16'' T.E. fill to the straight edge of one sheet from each matched pair of 1/16'' T.E. sheets. Build your wing panel on the plan in the conventional manner but start by installing 3/32'' ribs from the wing tip to the center with felt pen marks up — **very important.**

Glue the 1/8'' dihedral web in place noting dihedral angle direction, then the 1/8'' center rib; then remaining parts such as the other 1/4'' spar; 3/32'' L.E. strip are glued in place followed by the matching 1/16'' T.E. sheeting. Plank the L.E. and glue capstrips to ribs before removing from the building board. The other wing panel is built directly over the drawing as previously in the same sequence. **Important** — install all ribs with felt pen marks down, and reverse the angle of your dihedral web in relation to the other panel. After completing the panel, carefully align, glue together using clamps, etc., and let dry. Now you will notice all ribs have the felt pen marks on the same surface of the wing and the wing has the proper dihedral. I find this method of rib marking aids in accuracy as any minute irregularities in rib cutting and notching are all positioned on the same surface and line up when joining the wing halves. Complete the wing by adding 3/16'' leading edge, ailerons, aileron torque rods and wing tips; shape and sand lightly. Glue the 1/8'' plywood wing hold-down plate to T.E. of wing as shown on the drawing.

Fuselage construction is so simple it is hardly worth writing about, so I will keep it to the minimum. Glue the 1/32'' plywood doubler to the fuselage sides making a left and a right side. Also cross-laminate the 1/8'' plywood to make all 1/4'' plywood parts, cutting them to shape when dry. Likewise, glue F1 and F2 together; when dry, lay out mounting holes for the radial engine mount using 6/32'' bolts and blind mounting nuts so the engine will be canted. Fuselage sides and bulkheads are assembled with the fuselage bottom on a flat board; alignment and squareness are checked before letting glue joints dry.

Upon removal from the building board, install the 1/4'' landing gear plywood, the rear wing hold-down plate and add the 1/2'' triangle stock as shown. The nose bulkhead gets the 1'' T.E. treatment followed with 1/4'' nose bottom block, finishing with planking the fuselage bottom with 3/32'' sheet balsa. Tack 3/16'' sheet balsa to the rear upper fuselage; trim, sand and remove from fuselage.

If you are an experienced builder you have already glued the material for the stabilizer, elevator fin and rudder out of proper sheet balsa. Align and glue the stabilizer to the fuselage after cutting to shape and sanding. The 1/4'' dowel that is used for a tail wheel guide is installed through the stabilizer and the fuselage bottom after the dowel has been drilled for the tailwheel wire. This is a good time to install all pushrods for the elevator and rudder, and to check for possible clearance.

Trim the 3/16'' fuselage top for the stabilizer, making cutout for fin; glue in place and sand. Bend the 1/16'' music wire for lower part of tailwheel assembly, slip through the 1/4'' dowel from bottom, bend and cut upper portion of music wire for the rudder. The fin can now be aligned and glued in place.

Any landing gear made of 3/32'' dural which will give minimum clearance of 4'' between fuselage and ground with a wheel tread of 10'' is desirable. Use two 6/32'' bolts and blind mounting nuts to fasten to 1/4'' plywood fuselage bottom. Bend the landing gear to give the wheels tow-in for proper tracking. Trim the L.E. center section of wing to mate with fuselage and fiberglass 1/2'' beyond each fuselage side. Make sure the 1/4'' dowel fits into the wing L.E. snuggly.

Now cut a piece of 9/32'' O.D. brass tubing about 3/8'' long. This slips over the protruding dowel and ''Hot Stuff'' is used to hold it in place. I found this prevented the 1/4'' dowel from getting a groove cut into its surface by bulkhead F3A after many flights.

Take extra care in fitting the wing to the fuselage; that extra large hole in bulkhead F3 allows movement for proper alignment. Slip F3A over the 9/32'' brass tubing on the wing dowel, glue to F3, being sure to keep the dowel free of glue. When dry, drill through both the 1/8'' and 1/4'' plywood wing hold down plates with a #7 drill; tap through everything for 1/4'' 20 nylon bolt, doing all this with the wing in place. Open the hole in the wing later, after removal from the fuselage so that the 1/4'' nylon bolt slips through.

Before gluing the 1/4'' balsa block to top of the fuselage nose, install the throttle cable assembly and drill the nose bulkhead for the fuel lines. Scrap balsa should be added to the top leading edge of the wing and shaped, and a final sanding given to the model.

Cover the model with your favorite plastic iron-on film; trim for visibility.

Check the C.G. after all R/C equipment, fuel tank and engine complete with propeller, spinner, muffler, have been installed.

Since the engine and muffler are canted at 60° to the right, it is very important to balance the model laterally. I balanced mine by using a piece of 3/32'' welding rod sharpened at one end which passed through the left wing L.E. as close to the inside of the tip rib as possible. The sharpened end was imbedded in the scrap already glued into the T.E. planking, removed and cut to length. The model was then placed assembled with prop shaft resting on table and pin driven into the tail as a final pivot on my fingertip. With a welding rod on the wing tip, balance by over-adding a strip of solder, trimming the solder until the model balances. This solder is coiled tightly around the blunt end of the welding rod, soldering each end secure.

Open a hole in the L.E. of the wing to now take the increased diameter, give the sharpened end a coat of epoxy, slip in and tap it firmly in place and epoxy the other end to the wing's L.E.

MATERIALS LIST

Balsa:
6 — 1/16'' x 4'' x 36''
3 — 3/32'' x 4'' x 36''
2 — 1/8'' x 4'' x 36''
1 — 3/16'' x 4'' x 36''
2 — 1/4'' x 4'' x 36''
2 — 3/32'' x 3/8'' x 36''
2 — 3/16'' x 1/2'' x 36''
2 — 3/16'' x 3/16'' x 36''
4 — 1/4'' x 1/4'' x 36''
2 — 3/8'' x 1'' x 24''
1 — 1/2'' x 18'' triangle stock
1 — 1'' x 1/4'' x 6'' T.E. stock

Plywood:
2 — 1/32'' x 4'' x 17''
1 — 1/8'' x 6'' x 18''
6'' of 1/4'' dowel

Hardware:
1 — motor mount
6 — 6/32'' bolts and T-nuts
2 — control horns
1 — set aileron torque rods
1 — 1/4-20 nylon wing bolt
1 — set of wheels 2¼''D.
1 — tail wheel 1'' D.
12'' — 1/16'' music wire
— hinges
1 — dural L.G.
— fiberglass cloth
1 — 6 oz. fuel tank

□

Editing By Hlsat.
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