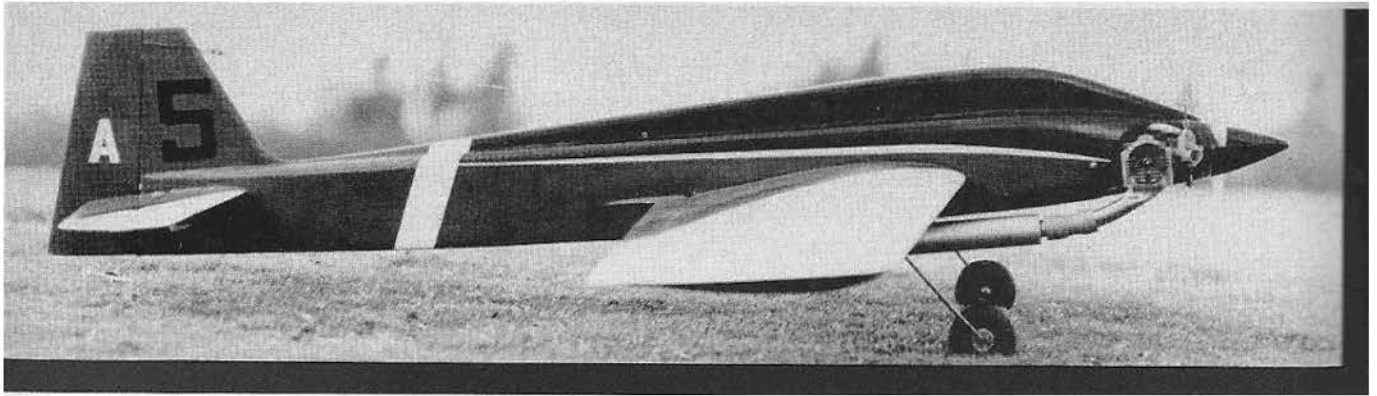


by Ricardo Saprissa R.



The idea for Agujon started out as a result of a rather spectacular crash while flying a Top Flite Nobler at a control line exhibition a few years back.

Luck came into the act as I noticed that the wing, stabilizer, and elevators of the ex-Nobler were whole and almost intact between a pile of splinters and pieces from the fuselage. Of course, the entire incident was blamed on the gusty wind prevailing

at the time of the exhibition, making it especially difficult to exhibit the flying of control line models. The fact that there was little wind apparent was not commented upon.

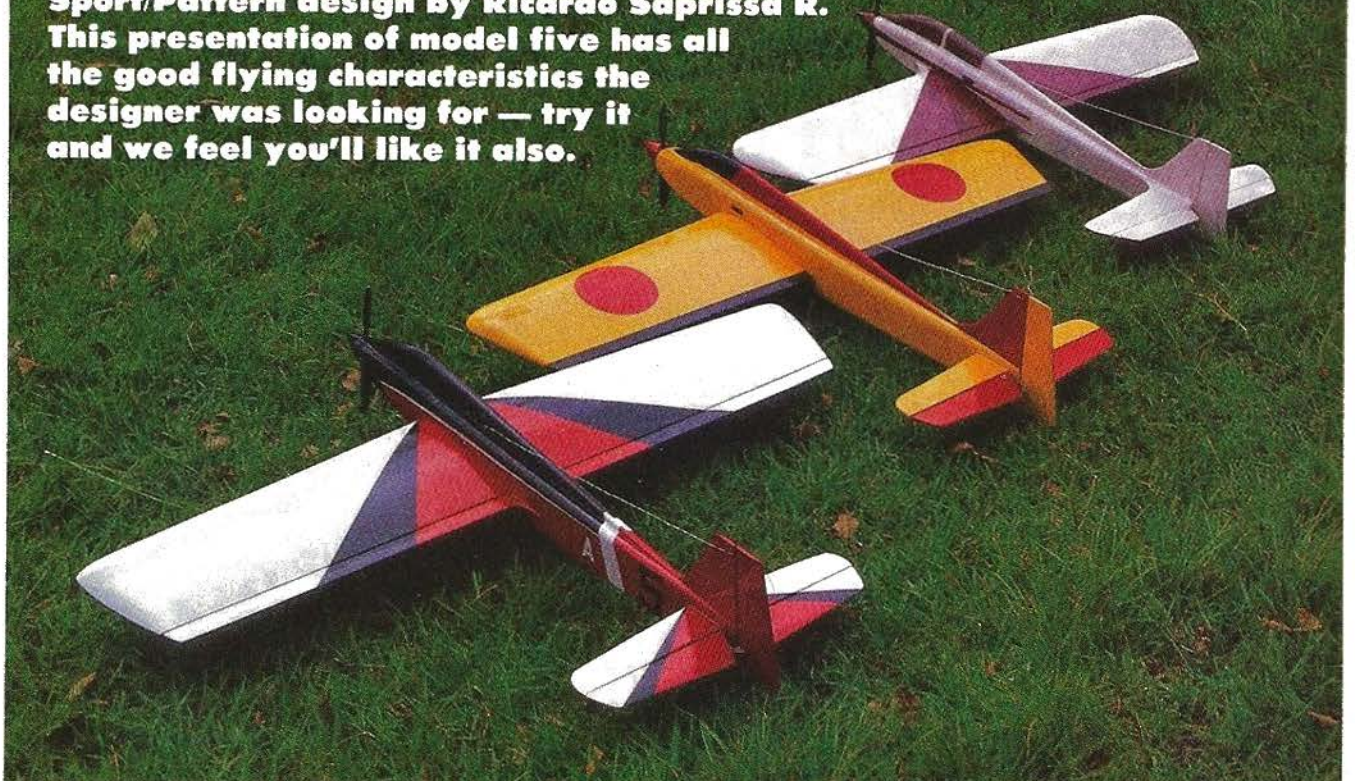
That did it! A more streamlined model was needed for wind penetration in this windy mountain valley of ours. So, to avoid as much frontal area as possible and achieve a penetrating profile, a very slim fuselage had to be designed; hence, the

name Agujon, meaning "big needle" (from "aguja"; Eng. — needle), to be fitted to the Nobler's leftovers.

This time, however, the new model was not to be limited to the flying space of 60 foot lines but instead was to carry a four function radio in its belly. This way the basic outline of the model was laid down and the construction was designed around the spinner, engine, radio and gas tank so that these components would fit with

AGUJON

From Costa Rica, comes this .35 to .50 cu. in. Sport/Pattern design by Ricardo Saprissa R. This presentation of model five has all the good flying characteristics the designer was looking for — try it and we feel you'll like it also.





LEFT: Three versions of Agujon.
ABOVE: Reina del Caribe, Miss Georgina Garcia at Los Reyes flying field with Agujon.

absolutely no space wasted around them; a snug fit!

Thus, the cross section of the fuselage was kept at an absolute minimum, the thrust line as near as possible to the wing chord centerline, and all settings at zero degrees. Directly to the firewall would be bolted a modified Veco .50 with a Kavan carburetor, swinging a Tornado three bladed 10 x 6 prop on a Veco needle nose spinner, and drawing fuel from a Sullivan SS-8 tank. The landing gear was of the conventional type anchored to the wing, plus wheel covers. The canopy was homemade from 1/16" acrylic and located on the fuselage as far forward as practical. This was Agujon I. Just so as not to deviate from the racy looks of the c/l designs of the time, the vertical fin and rudder design was borrowed from Yuri Sirotkin's "Spacehound" c/l stunter, FAI World Champion of 1964.

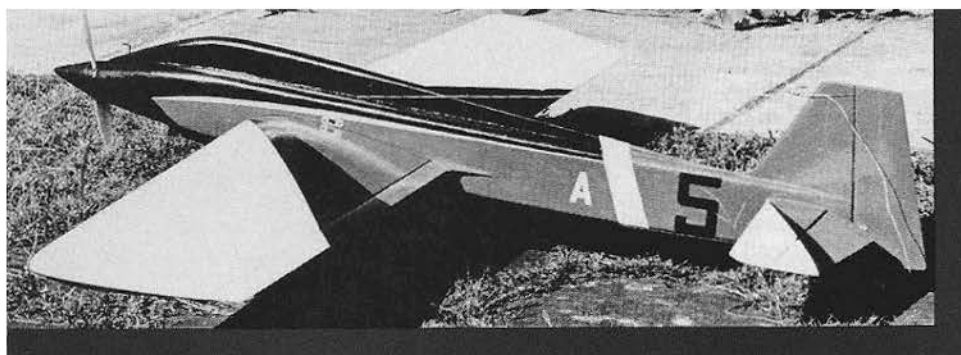
Flying the Agujon was sheer delight from the very start. It had characteristics of its own that nobody

here had seen before. For instance, flared for landing on high idle would touch down tail wheel first and gradually lower the mains for a straight landing run before taxiing to the pit. This was called a "one point landing!"

Naturally, all things change with time and the Agujon was no exception.

CONSTRUCTION

Construction of the Agujon should not be difficult as it is designed for conventional and fast building methods. Strange as it may seem, the design was executed expressly behind the 2" diameter needle nose spinner for looks, as this is what represents the needle principle of the design. If you



However, now in its fifth modification, main changes are mostly structural excepting the cabin and the vertical fin and rudder, and of course, the wing. Now, Agujon V with a strong wing (although thinner) with a hot Schnuerle ported .40 with a tuned pipe, and an all-up weight of not more than 5 pounds, will perform incredibly even to the experienced flier. Try it.

are not able to procure a needle nose spinner right away, any other spinner will do as it will only alter the looks but not the flying.

As with most construction projects of this type, it is most practical to start by studying the plans thoroughly, continuing by listing the materials required and acquiring them. Carefully select all the accessories

such as control horns, clevises or links, strip aileron linkage, fuel tank, proper engine mount, wheels, screws, etc. Next, cut all the pieces required as precisely as possible including landing gear wire, accurately formed, and foam panels also. Now you have a complete kit and are ready to start construction.

Wing:

Foam cores should be cut from the lightest type of foam available. The 2½" or 3" thick expanded bead polystyrene foam type 1 lb./csf would be correct.

Cut foam wing blanks to the plan outline. Follow by using the root and tip templates for cutting the airfoil with a hot wire cutter. If you are not familiar with cutting foam with a hot wire, do not hesitate to consult someone who has had this experience and/or the foam cutting guide book listed in the Anthology section of this magazine.

sand edges with a long sanding block so they will be smooth and straight.

Balsa leading and trailing edges are now glued in place. Assemble and glue wing tip blocks as indicated on plans. Once dry, cut blocks to tip and airfoil outline, and glue in place.

system for two wheels. This would have the added facility of having the retract servo (same as the aileron servo) on the outside of the wing, making it very easy to adjust and for general maintenance by simply removing the lower fuselage cover.



Once your cores are cut, sand lightly with a long sanding block to remove high spots and minor ridges. Do not discard scrap pieces of foam as they will be used in the skin application step. Foam cores are available from Wing Mfg. Co.

Wing skins of 1/16" sheet balsa are prepared by gluing sheet seams together to best fit the wing shape. To facilitate skin application, line up entire skin side with trailing edge of foam panel, since it is straight and will not mislead you in placing the skin correctly on the panel. Sand the skins smooth and glue to the panels, using any of the excellent adhesives specially formulated for this. Be sure to follow the directions for its application so that you will be insured of a good bond. Apply the skins to the cores and sandwich them in the scrap foam pieces that they were cut from. Place a flat board over the sandwiched cores and weight down. Be sure all edges are firmly in contact, balsa sheeting to foam core. Allow to dry.

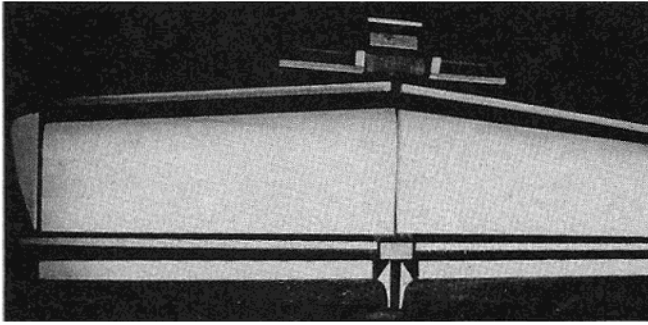
Trim the excess skin sheeting and

Place both completed wing panels upside down on a flat surface and sand the center section for a proper fit. This will insure a flat upper surface with a slight dihedral angle in the underside of the wing. Nothing more is required. Now glue the two wing halves together with epoxy glue, making sure that the wing is "true" with no warps or twists built in.

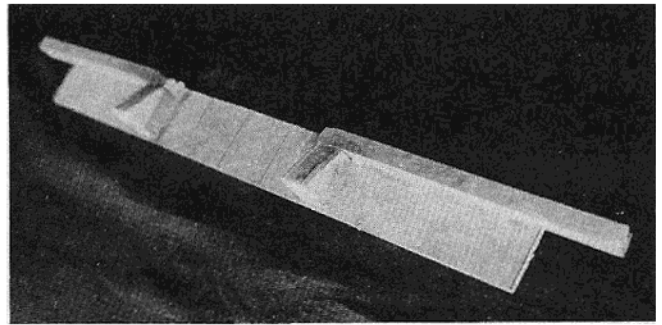
Assemble main landing gear support brace by gluing landing gear blocks and all hardwood braces to the main plywood brace as indicated on plans. I recommend cyanoacrylate glue for this assembly, because an extremely durable bond is needed here.

Spring compensation was designed in the strange looking main gear legs made of 5/32" music wire. As you can see, this landing gear set-up will take an incredible amount of use and abuse even in the roughest of fields. However, if you are lucky and operate your model from a wide and long strip with a hard surface on it, I would no doubt recommend a C.G. retract

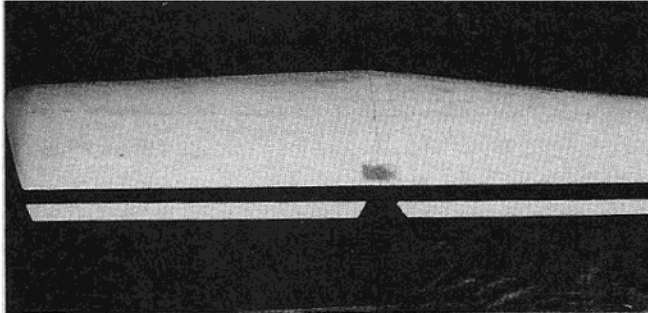
- AGUJON V**
Designed By:
 Ricardo Sapriisa R.
TYPE AIRCRAFT
 Sport Pattern
WINGSPAN
 55½ Inches
WING CHORD
 11¼ Inches
 10¼ Inches (Avg.)
TOTAL WING AREA
 540 Sq. In.
WING LOCATION
 Mid-Wing
AIRFOIL
 Symmetrical
WING PLANFORM
 Tapered
DIHEDRAL EACH TIP
 1/4 Inch
O.A. FUSELAGE LENGTH
 45½ Inches
RADIO COMPARTMENT SIZE
 (L) 12½" x (W) 2¾" x (H) 1½"
STABILIZER SPAN
 20½ Inches
STABILIZER CHORD (incl. elev.)
 5 Inches (Avg.)
STABILIZER AREA
 92 Sq. In.
STAB. AIRFOIL SECTION
 Flat
STABILIZER LOCATION
 Top of Fuselage
VERTICAL FIN HEIGHT
 5½ Inches
VERTICAL FIN WIDTH
 6 Inches (Avg.)
REC. ENGINE SIZE
 .35-.50 Cu. In.
FUEL TANK SIZE
 8-10 Oz.
LANDING GEAR
 Conventional
REC. NO. OF CHANNELS
 4
CONTROL FUNCTIONS
 Rud., Elev., Throt., Ail.
BASIC MATERIALS USED IN CONSTRUCTION
 Fuselage Balsa, Ply
 Wing Balsa, Ply, Foam
 Empennage Balsa
Wt. Ready To Fly 88 Oz. Max. (5.5 Lbs.)
Wing Loading 23 Oz./Sq. Ft. Max.



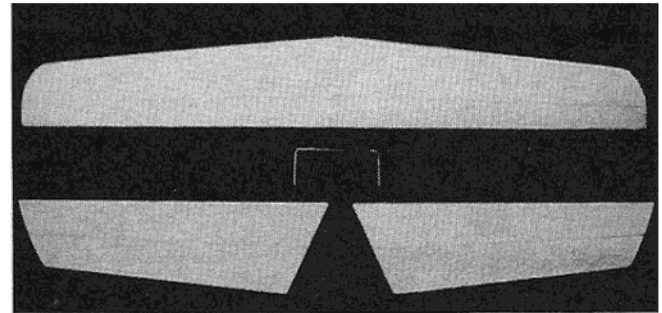
Sheeted wing panels ready for assembly.



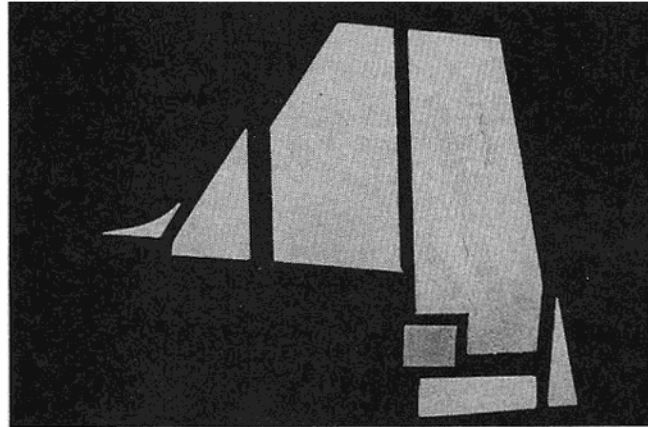
Assembled landing gear brace.



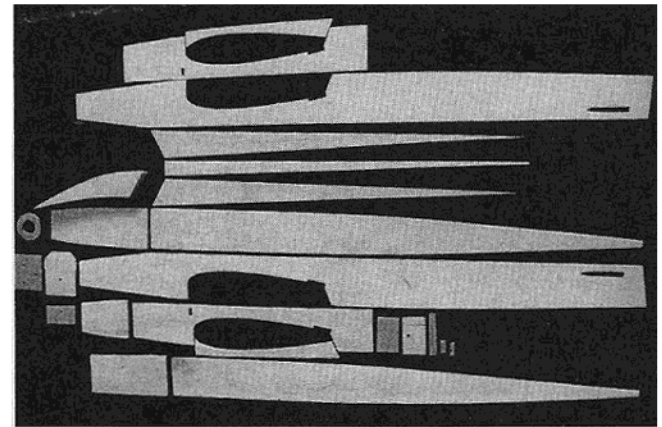
Assembled wing ready for ailerons, l.g. brace and servo mechanics.



Horizontal stabilizer, elevators and connector wire ready for assembly.



Fin and rudder ready for assembly.



Fuselage parts.

The only added recommendation here would be to keep the wheel contact point to the ground as far forward as possible so the ground handling qualities of the model will not deteriorate noticeably.

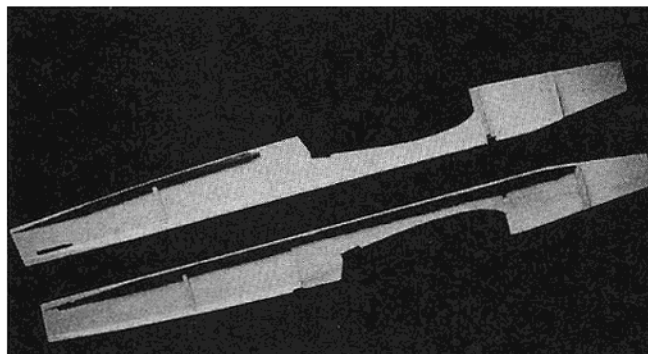
Next, accurately locate on the underside of the wing, the position for the l.g. brace. Mark visibly the outline of the entire brace and cut out all

material (balsa covering and foam) within the outline, leaving the topside of the wing planking intact. Carefully inset the entire l.g. brace in the slot you have just cut and trim so a perfect fit is assured, then glue in place. When dry, fill slot with a strip of 1/16" balsa so the entire brace is hidden and the l.g. blocks show flush with the balsa skin. Sand for a smooth finish.

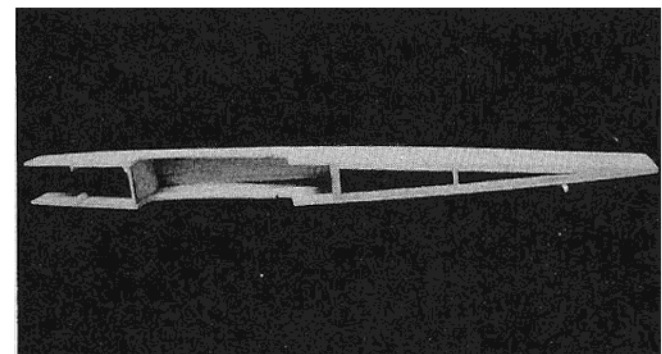
Prepare strip ailerons as indicated on plans; fit linkage, hinges, cut out servo well on the underside of wing and line with 1/16" sheet balsa. Install hardwood servo mounting rails. Fine sand entire wing and the ailerons and set aside for now.

Tail Surfaces:

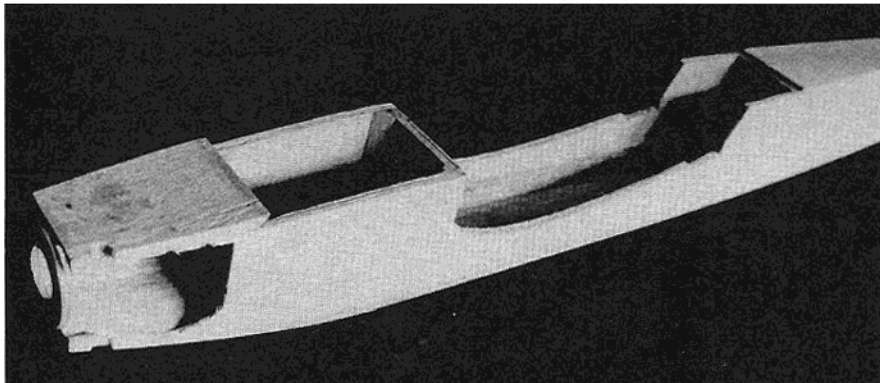
Stabilizer and elevators are cut from 3/8" soft balsa and shaped as



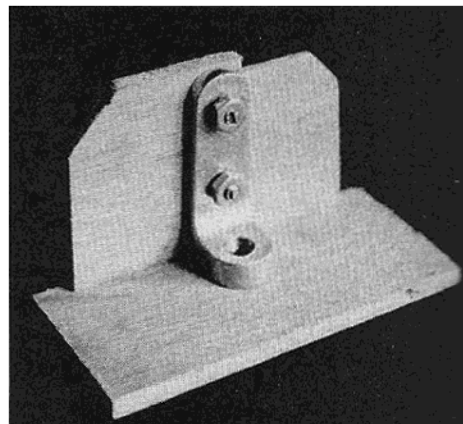
Assembled fuselage sides ready to be glued to top sheet.



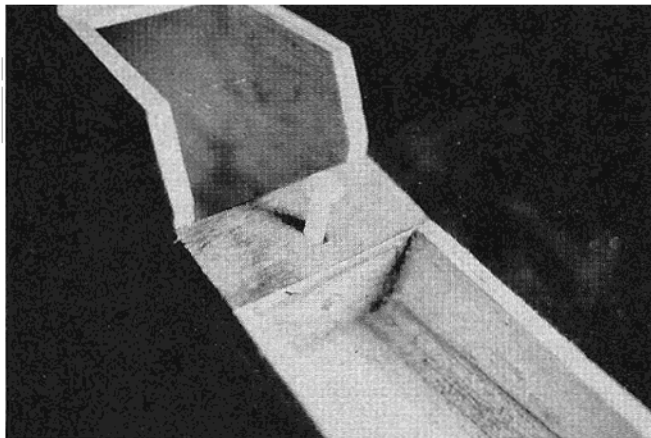
Basic fuselage ready for nose blocks and belly cover.



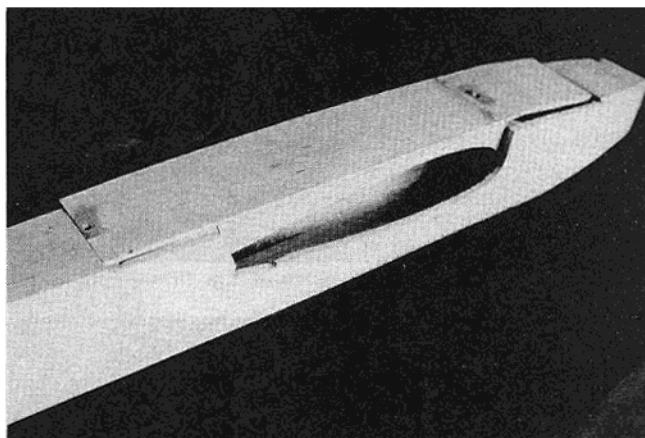
Fuselage with nose blocks, 2" plywood ring and belly cover.



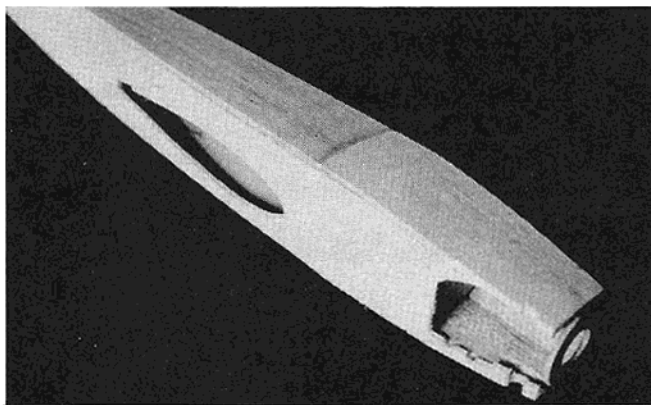
Assembled wing hold-down plywood brace, with single screw leg.



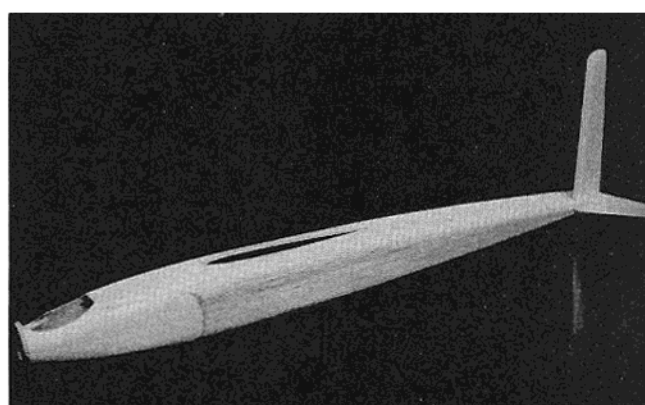
Wing hold-down plywood brace glued to fuselage.



Assembled wing and belly cover. Also tank cover.



Assembled fuselage, without canopy.



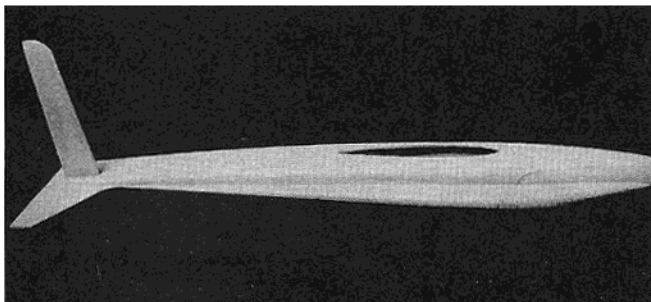
Rounded fuselage with fin and stabilizer in place.

indicated on plans. For coupling the elevators, I find 1/8" coat hanger wire is adequate since it is neither too soft nor so stiff that you cannot make small bending corrections to line up

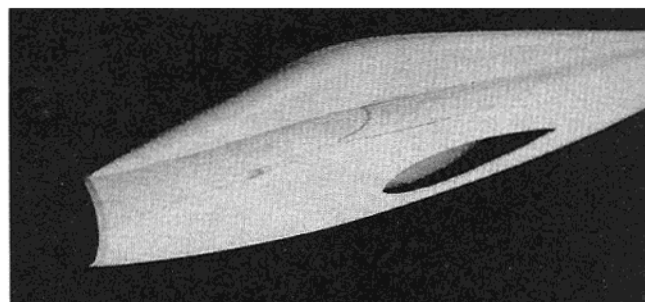
elevators precisely. Do not reduce the size of the elevators! Although they are definitely on the large side, that is just what makes the airplane maneuver the way it does and give it

the beautiful handling it has with very little throw.

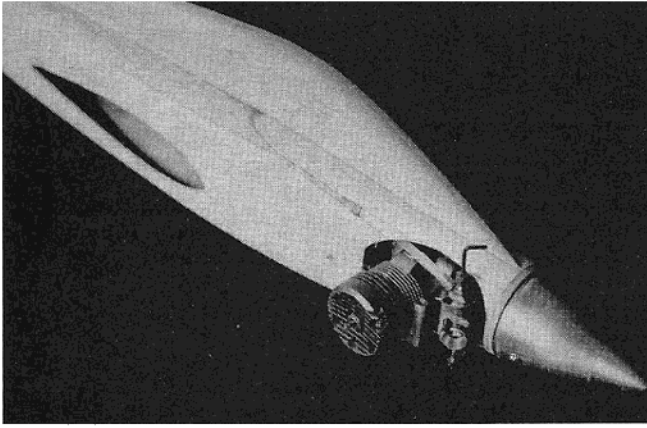
The fin and the rudder are cut from 1/4" balsa. The plywood insert for the tail wheel leg wire is to be drilled 1/16"



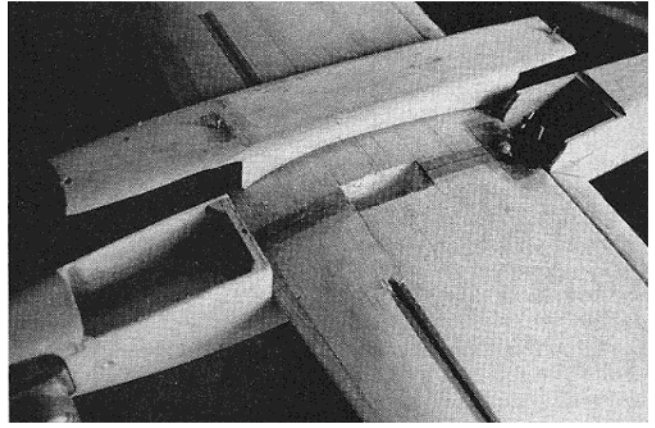
Fuselage with canopy installed.



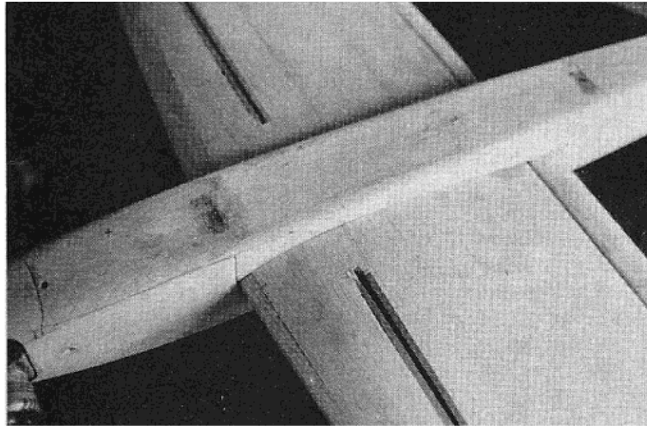
Nose shape shown.



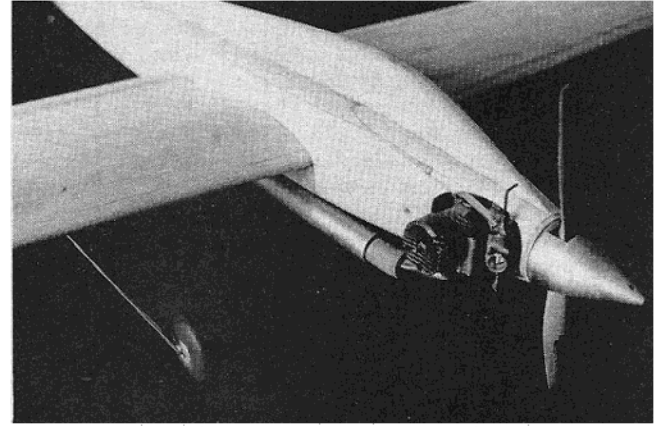
Engine and spinner installation.



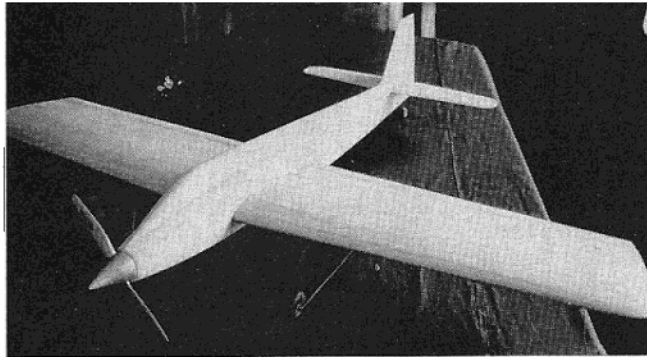
Wing and cover installation.



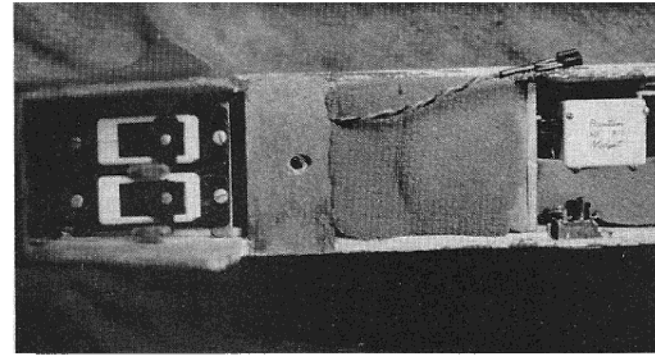
Wing and cover installed.



Completely assembled Agujon showing tuned pipe.



Completed project ready for finishing.



Radio installation.

preferably prior to gluing it to the skag and the rudder, as shown on the plans.

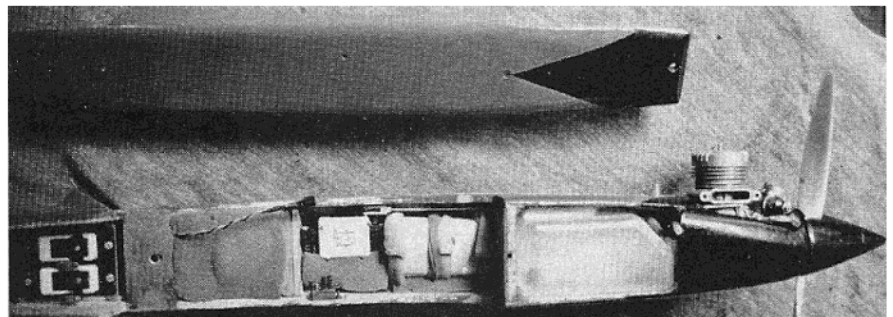
Fuselage:

Since you already have the entire parts kit for the fuselage, let's start with the firewall. Since it is a perfectly rectangular piece of plywood, accurately locate the thrust line as per plans. Using this point as reference, locate the engine mount so the engine crankshaft coincides exactly with the thrust line on the firewall. Drill to take the mount and set blind nuts securely to take the mount screws, but do not secure the engine mount as yet.

Next, glue on 1/16" plywood doublers on the fuselage sides and glue all the triangle stock as per plans. This includes the triangle stock to

which the firewall will eventually be attached. On both of the fuselage sides, there is a slot cut into the doubler. This is for the 1/4" ply bulkhead which can be glued in place,

making sure it is at right angles to the side and to the top of the side. Also, glue reinforcing strips at the rear of the sides and let dry thoroughly. Prepare the fuselage 1/4" top by



Radio installation showing tank fitted also.

From RCModeler May 1986

carefully beveling the front end as per plans; here is where the top nose block will be glued later on.

With 1/4" top on a flat surface, glue sides to top, bulkhead to other side, and tail end of sides together, making sure all surfaces are at right angles to each other. At this point, glue firewall, making sure it is absolutely lined true as on plans. Lining up the fuselage with the firewall, or vice versa, can never be overemphasized as this is an extremely important step in building any airplane. Glue plywood and balsa cross strips to rear of fuselage and let dry thoroughly.

Use a sanding block to smooth bottom edges of fuselage rear section and top and bottom edges of nose. Bevel tank side of bottom nose block as per plans and glue in place. Also glue top nose block and sheeting for bottom of fuselage rear. Let dry and glue 2" nose ring, making sure it is flat and perfectly aligned as shown in plans. Now cut out right side of nose so your engine will fit comfortably. Install engine mount to firewall, engine to mount, and smooth out contour of cut-out.

Now take out engine and mount and glue 1/2" triangle stock fillers in compartment and fuelproof it and the tank compartment.

Assemble wing hold-down plywood supports complete with bolted threaded leg and glue firmly in place as shown on plans. Glue plywood dowel support on bulkhead.

Assemble bottom fuselage sheeting as per plans, beveling tank compartment cover end to fit snugly to bevel in bottom nose block, and a close fit to the bottom rear fuselage sheeting. Epoxy nut in place on bulkhead and underneath of rear fuselage plywood cross brace, and fasten cover firmly with flat head screw at each end.

Sand entire fuselage and round all corners to conform to plans. Shape cabin nose profile and glue cabin sides and top to fuselage, and complete gluing cabin nose profile. Make sure the placement of the cabin is exactly on the centerline of the fuselage top.

Round corners and glue vertical fin and horizontal stabilizer in place.

To fit the wing on the fuselage, first insert 1/8" plywood joiner in forward part of center section of wing just behind leading edge, just as shown on plans. Fit 1/4" hardwood round dowel so it has a good grab on the plywood joiner as per plans. Next, insert, on center section near trailing edge, the 3/16" rectangular plywood piece flush with planking as this will support the only wing hold-down screw. When dry, drill for the hold-down screw and fit wing on fuselage and install fillets.

Fit landing gear on wings, and tail wheel to rear end of fuselage, as shown on plans.

Fit hinges to all flying surfaces, and you are ready for finishing and installing your favorite radio equipment.

Finishing:

I will not go into extensive details here because every modeler has a different way to tackle this step. There are many excellent materials that are available today for this purpose. One word of caution: keep it light! Seal all exposed balsa thoroughly and use the brightest colors you can get. Your paint scheme or film covering here will be of help when you fly the plane if you differentiate noticeably the color design on the top from the design on the bottom of the airplane, keeping the darker shades dominant on the bottom and the brighter ones on top. This way you can never misjudge the relative position of the airplane when executing your favorite maneuvers. Just for the record, my plane was finished by the old method of dope, silkspan and enamel because other more durable finishing materials are unavailable here in Costa Rica. Weight of the finished airplane, ready to fly with a Super Tigre S-40 with a homemade header and tuned pipe, was 76 oz.

Flying:

Since all versions of Agujon have shown very comfortable flying habits, the 5th version is by far the best. If you were careful to line it up precisely and not build any warps in the flying

surfaces, wings and tail, Agujon V should fly off the ground without touching the stick with just a little of up trim. Because of the long distance from the main landing gear to the tail wheel, hardly any correction is necessary in the take-off run due to engine torque. It simply runs straight and true. In the air, once fine trimmed, you are in for a very pleasant surprise.

A word about power plants. Agujon V will do very large and wide maneuvers if you wish; with a Schnuerle ported engine and its tuned pipe, it will have an indefinite climb if you let it when wide open. This leads me to think that it might be overpowered. However, Agujon V will behave beautifully when executing the pattern, throttled back to a little less than 50%. The plans show an optional mounting scheme designed to take .50 engines or even a Super Tigre ST .60. These engines are not screamers and since they are not meant to operate with tuned pipes, will not alter the balance any when installed directly on the firewall as is shown on the plans. Although a 10 x 6 prop will do a fine job on any screaming .40, a .50 engine will work better with a 10 x 7 on the Agujon. If you use the ST .60, use a 10 x 8 prop.

Almost any of these power plants will deliver very similar results if handled correctly with lots of power to spare; so if all you have at hand is a .35, don't hesitate to bolt it on. Agujon will handle beautifully on it.

Slow flying the Agujon is sheer delight. Stalls will be gentle and forgiving with no tendencies to drop either wing and spin. But if you want it to spin, it will spin flawlessly either upright or inverted, and recover solidly and without any glitches.

So, if you live high on a mountain where there is a good deal of wind, your Agujon will be right at home.

By the way, all tests for Agujon were flown on a field 3,400 ft. above sea level with an atmosphere more humid and far hotter and standard, if that means anything. (A pressure altitude of almost 6,000 ft.)

□

