



By Hector Tschén

Gitano

With simple, lightweight construction, good looks, and great performance, the Gitano is a real winner.

The Gitano is the result of more than five prototypes, from which we have built and flown more than six of each one over the past eight years. The plane really shows its potential in the Turnaround pattern where space and time between maneuvers seems to be so tight. The inherent speed control of the design makes the maneuvers easy to plan in advance, as well as the low weight which is the key for constant low speed, tremendous vertical performance, and instantaneous response to minimal control input -- all great features for the pattern competitor.

Construction is a lot simpler and faster than most high performance aerobatic planes. Try one, you will love it.

CONSTRUCTION

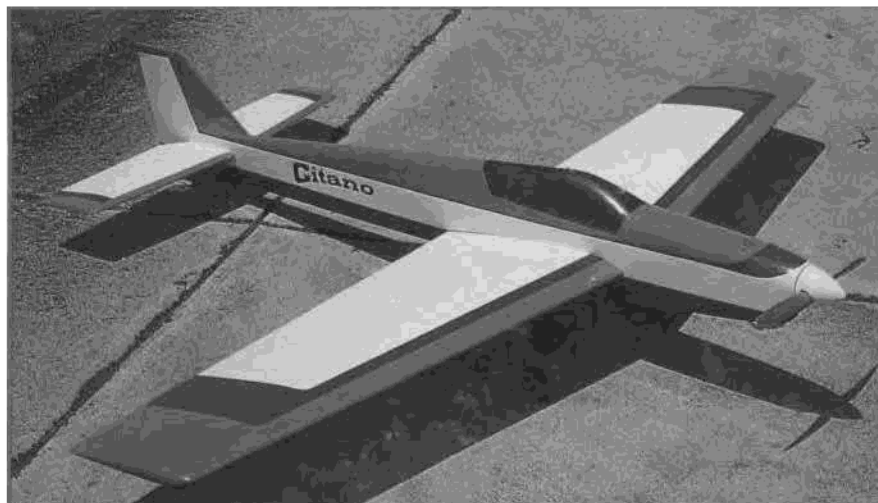
Wing and Stabilizer:

Although this is not a beginner's project, the wing has very easy construction steps and only a few of them have to be done with special attention. First, the wood for the skin should be the lightest possible. Don't worry about strength, most foam-balsa wings are well over-designed. Second, very

special care should be taken to build straight wing panels; from the positioning of the templates in the foam block before cutting, to the slow cure epoxy thinly applied **only** to the balsa skin. Note that the wing has a straight trailing edge -- no taper. Third, both the wing and stab are completely finished, almost ready to cover, before

removing the ailerons and elevators. This assures the best airfoil profile shape and control surfaces matching. The stab building sequence is the same as for the wing. Wing and stab panels are hot wire cut, the old fashion way, from white foam of approximately 1 lb. per cu. ft. density.

The wet epoxied skins are then located on

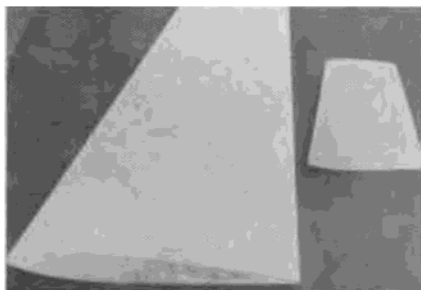


GITANO 60
 Designed By:
 Hector Tschern
TYPE AIRCRAFT
 Pattern
WINGSPAN
 66½ Inches
WING CHORD
 12½ Inches
TOTAL WING AREA
 800 Sq. In.
WING LOCATION
 Low Wing
AIRFOIL
 Symmetrical 14%
WING PLANFORM
 Tapered L.E.
DIHEDRAL, EACH TIP
 3/8 Inch (flat on top)
OVERALL FUSELAGE LENGTH
 62 Inches
RADIO COMPARTMENT SIZE
 (L) 15" x (W) 3" x (H) 3" (Avg.)
STABILIZER SPAN
 27 Inches
STABILIZER CHORD (incl. elev.)
 7¼ Inches (Avg.)
STABILIZER AREA
 190 Sq. In.
STAB AIRFOIL SECTION
 Symmetrical 10%
STABILIZER LOCATION
 Mid-Fuselage
VERTICAL FIN HEIGHT
 7¼ Inches
VERTICAL FIN WIDTH (incl. rad.)
 12 Inches
REC. ENGINE SIZE
 .60 2-stroke, .90 4-stroke
FUEL TANK SIZE
 12 Oz.
LANDING GEAR
 Conventional, Retractable
REC. NO. OF CHANNELS
 5 (6 servos)
CONTROL FUNCTIONS
 Rudder, Elevator, Throttle,
 Ailerons (2 servos), Retracts

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa & Ply
Wing	Foam, Balsa & Ply
Empennage	Foam & Balsa
Wt. Ready To Fly	112 Ozs. (7 Lbs.)
Wing Loading	20-21 Oz./Sq. Ft.

the foam cores, and the entire assembly is placed into the foam casings with a heavy weight on top and left overnight to cure. Next, trim and sand L.E., T.E., and tip to accept balsa L.E., T.E., and tip block. Sand wing and stab panels to final shape.



Wing and stab panels just after covering with 1/16" light balsa. Note grain on wings.



Wing and stab finished. Aileron and elevator are carefully marked before removing from the main surfaces.



Aileron is cut out from finished wing. Note central part that will be replaced with 1/4" caps. Stab has identical procedure.

You can now cut the ailerons and elevators 1/4" wider and 1/4" longer than the finished size. Then, remove 1/2" width and 1/4" length from each control surface. Add the 1/4" and 1/16" caps to wing, stab, ailerons, and elevators. Please note the slant angle on aileron's and elevator's leading edge caps to allow control surface movement.

You can now join the wing and stab halves, reinforcing the wing center with 3" wide 6 oz. fiberglass, and the stab with 3/4 oz. 3/4" wide fiberglass. Epoxy the landing gear blocks in place using anchors made from 1/4" dowel, 1/4" long at the same time. Assemble your retract mechanism, installing wheels and collars,



Wing and stab tip trim lines, before gluing L.E. and T.E.



Aileron servo cavity is opened here with hot wire. 1/8" ply servo mounting base is epoxied in place later.

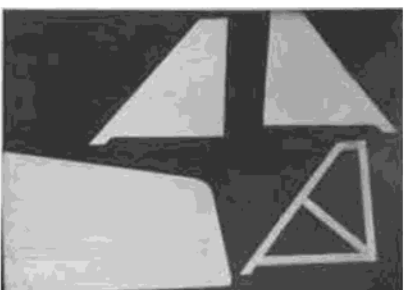
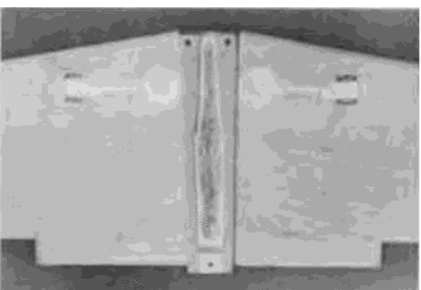
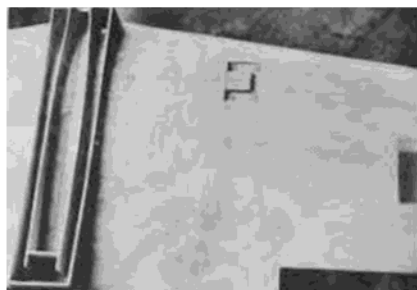


Landing gear mount is 1/4" birch ply, and 1/4" dowel anchors are epoxied in at the same time. Wheel well is opened first with a cutting compass.

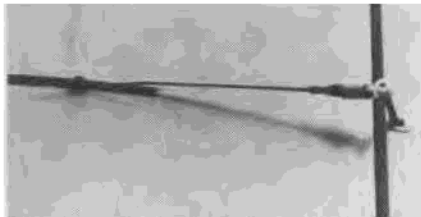
then temporarily install in the wing — gear down. Now manually close the gear to mark where the wheel wells are to be opened, leaving enough room to operate even after some hard landings. For a better finish, add some scrap 3/32" balsa as caps to the L.G. blocks, leaving uncapped just where the gear brackets fit. Sand caps to wing contour.

Now you can open the retract servo bay and retract pushrod channel according to your retract manufacturer's instructions.

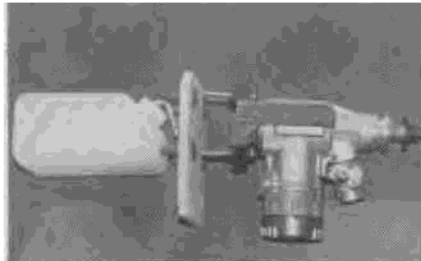
Open aileron servo cut-outs to suit. All the originals used horizontal mounted servos on a plywood platform. Finally, cut the channel where the servo wires are going to be routed from servos to center of wing.



LEFT: Belly pan sides, pipe channel sides, and screw seating blocks are installed over the center fiberglass section. Cover the area around the pipe channel with 1/8" sheet. Note the channel rear wall. CENTER: Finished wing. Note L.G. mount blocks capped, and belly pan covered, only three screw access holes are kept opened. RIGHT: Tail surfaces. Fin is built up from 1/4" x 1/2" balsa stock and covered with 1/16" balsa planking. Note fin L.E. extension inserts into the top of fuselage.



Close-up of aileron linkage. Note that a 1 1/2" long 4-40 screw was epoxied through the aileron to serve as a horn.



Fire wall is prepared to accept particular engine, soft mount, and fuel tank before it is epoxied in fuselage.

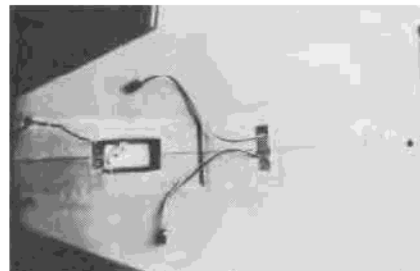
This is made 1/8" wide and 3/8" deep in the bottom side of each wing; ending the channel just before reaching the belly pan, where a 1/2" hole is made toward the top center of wing. Again, this hole can be made with the hot wire angled at approximately 30°.

Now set wing aside to build fuselage. Wing hold-down holes, belly pan, pipe channel, and front screws' seating blocks are installed with the fuselage to ensure proper mating.

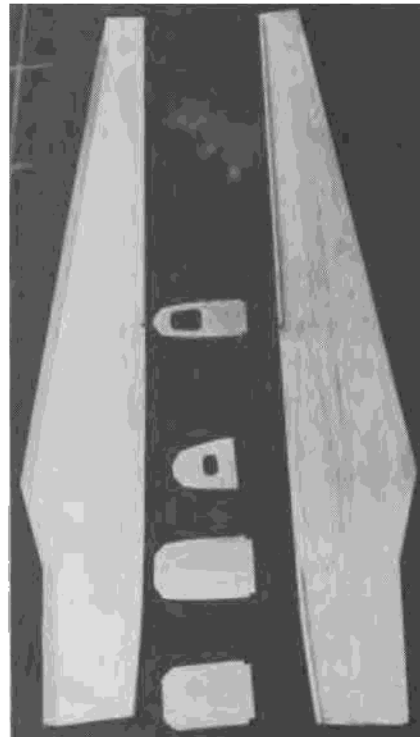
Fuselage:

Since the fuselage joins all flying surfaces and power, it's the most important alignment piece of the system. Check alignment during each step of construction. The following notes will help.

First, draw a center reference line on both sides which is located 2" above the bottom edge of the sheet stock and mark the former positions. (Both the centerline and former positions are copied from plan.) If you are using 48" long, 1/8" stock, you will need a



Top center section of wing, ready to fly. Note retract servo and separate aileron connectors from bottom of wing.



Fuselage 1/8" balsa sides with fire wall and formers. Top triangulars and 1/4" bottom stringers are already glued in place.

splice at the rear; just glue face to face, since a doubler here doesn't seem necessary because the top triangulars, bottom longerons, and stab are very near each other

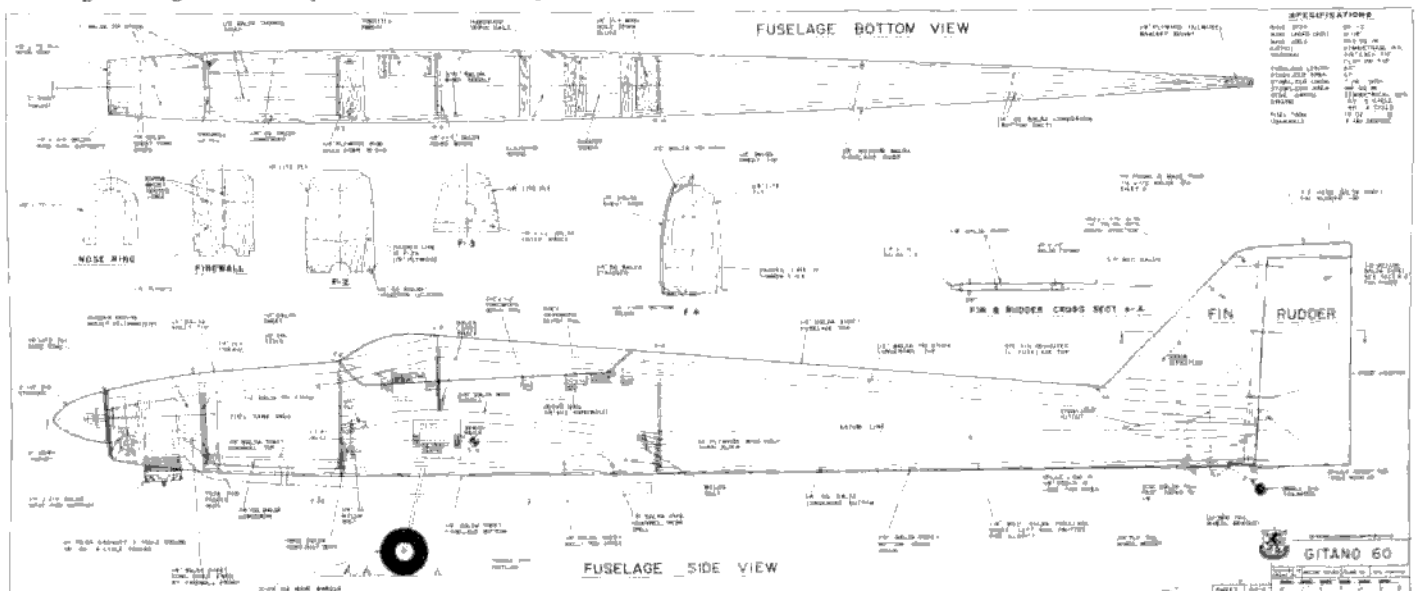


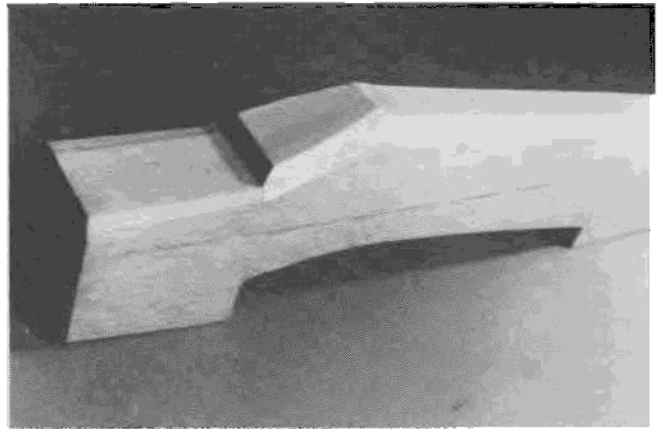
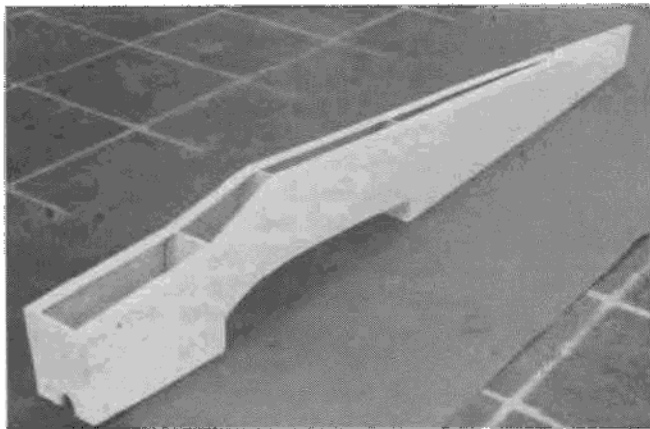
Formers F-2 and F-4 are glued first in their straight segment to one side, then to the other. Curved segment is glued after rear ends and fire wall.

in this area. Then, glue top 1/2" balsa tri-stock and bottom 1/4" sq. longerons to the left and right sides. You can now cut out the wing saddle area, keeping this material for the belly pan sides in the bottom of the wing. First, glue the **straight segment** of former F-2 and F-4 to both sides; then, glue the rear end of both sides, installing the 3/4" rear spacer (see plans), working the sides fore and aft to get a perfectly straight fuselage. Refer to fuselage bottom view. After this step, it is very difficult to bend the assembly.

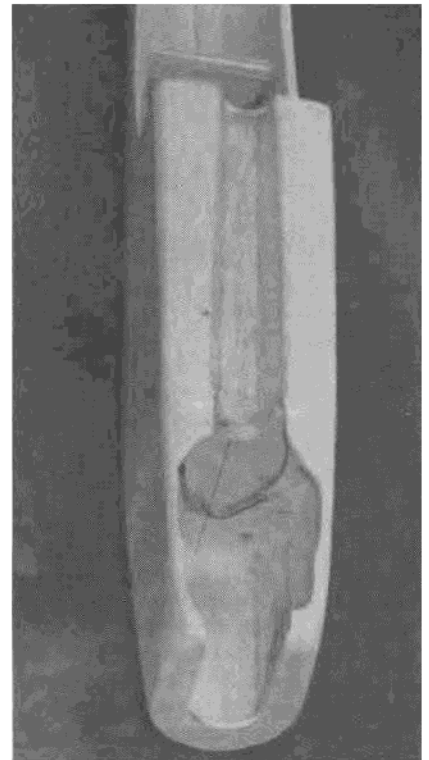
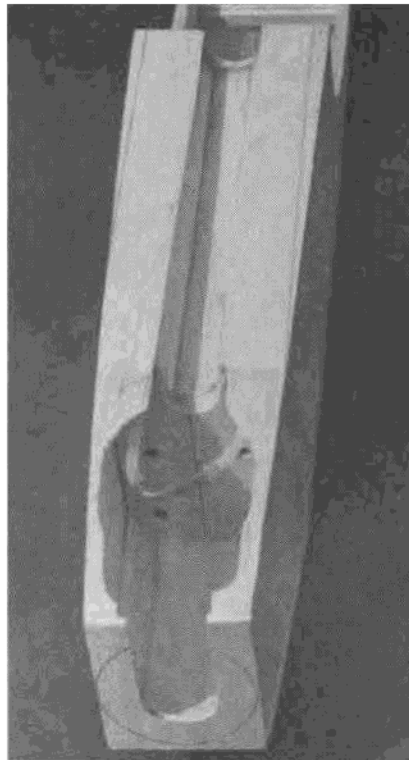
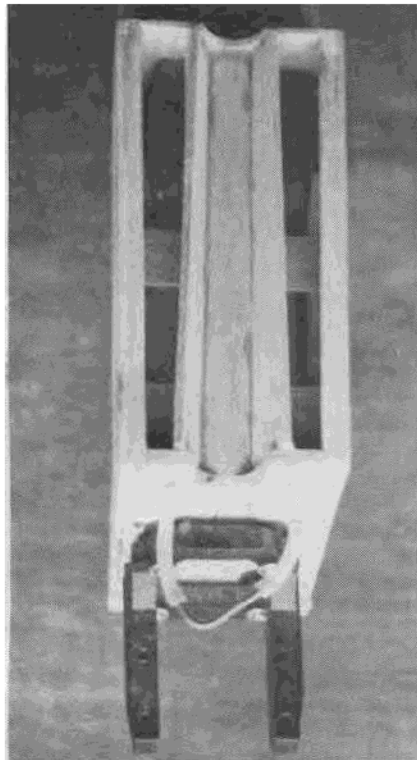
Second, glue the upper or curved segment of F-2 in place, both sides, and then F-4. Install former F-3.

Third, epoxy the fire wall in place, checking the correct down and right thrust. At this point you will have a rather weak fuselage; don't worry, it is in this step that the strength is introduced. Glue in the wing saddles, then before adding the 1/2" sheet top pieces, sand the angled portions of the horizontal 1/2" triangular stock top longerons flat; then add the top deck, canopy blocks, and tank top block. All are 1/2" sheet soft balsa. Continue, installing the servo rails, rear bottom 1/16" balsa cross sheeting, and permanently install the fuel tank. Glue the front bottom 1/8" balsa sheeting or 1/8" "box" sheet channel if header and pipe are to be used. Now it is stiff, eh? Temporarily install engine to form the cowling, and voila! Please note that the L.E. of wing is raised 1.4° positive incidence and stab is parallel to centerline (0° incidence) when cutting wing and stab

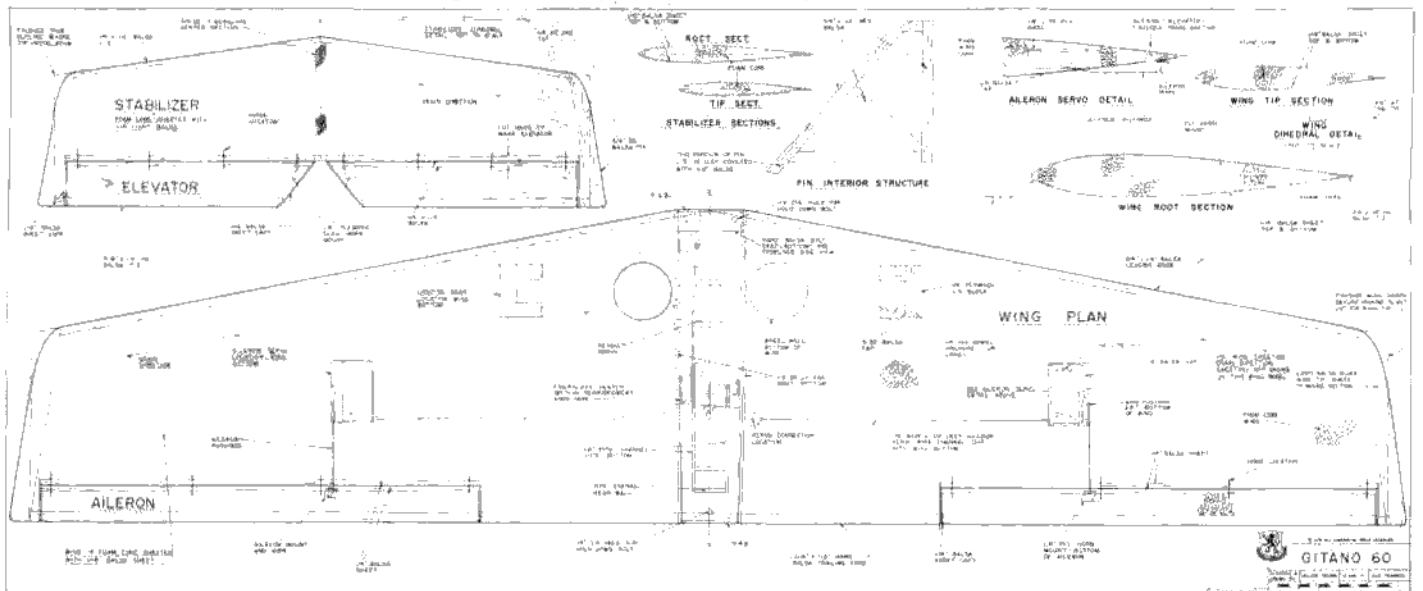




LEFT: All formers, fire wall and rear end completed. Check now for a straight fuselage. **RIGHT:** Top 1/2" deck and 1/2" canopy over deck are now glued in place.

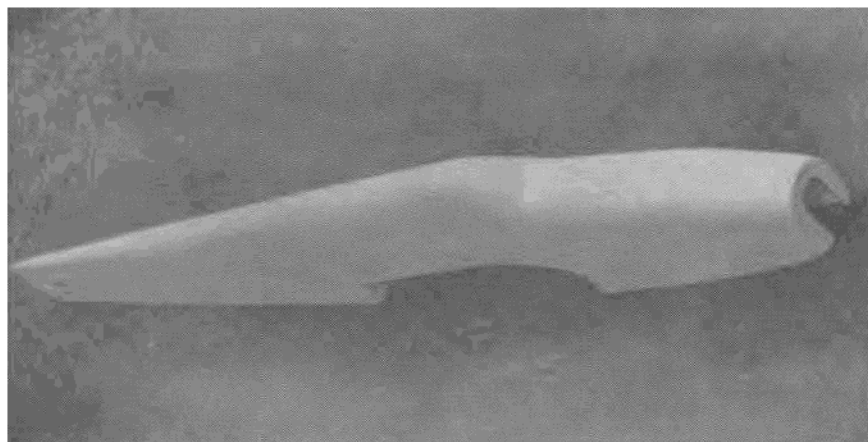


LEFT: Bottom-front header channel is built to suit your particular engine. Sides of channel are covered with 1/8" sheet. Note left shift of mount header channel. **CENTER:** Cowling sides, 1/2" top sheet and nose ring installed. **RIGHT:** Finished view of bottom nose section.



FULL SIZE PLANS AVAILABLE — SEE PAGE 192

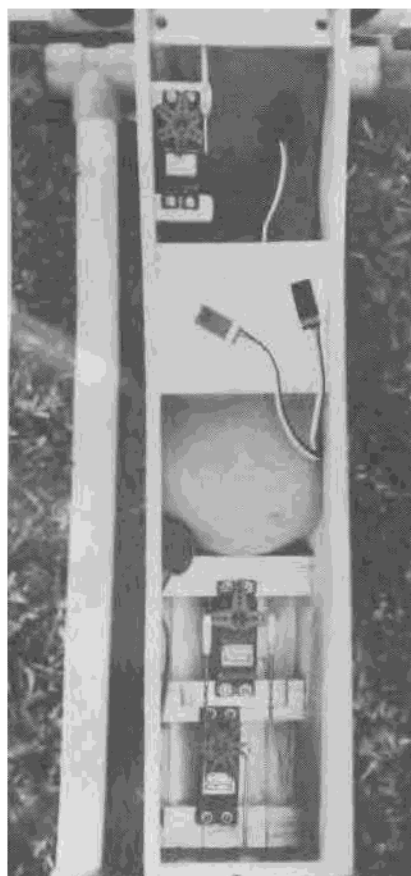
GITANO 60



General view of finished fuselage.

cut-outs.

Wing hold-down plywood blocks can now be epoxied in place. Sand the center L.E. of the wing flat to fit into the fuselage wing saddle, centering the wing to fuselage (measure carefully). Make the $3/16''$ hold-down screw holes through the wing and blocks, keeping the wing firmly attached to the fuselage during the three-hole drilling to finish with a well-aligned wing. Then open the holes in the wing to $1/4''$ and tap the block holes with a $1/4-20$ tap. Install the wing with $1/4-20$ screws and glue on belly pan sides. If a tuned pipe will be used, install channel sides and rear channel wall as well. This can be done in the bottom of the fuselage now to end with the complete channel with the wing bolted to the fuselage. Before gluing



Typical radio installation, very efficient.

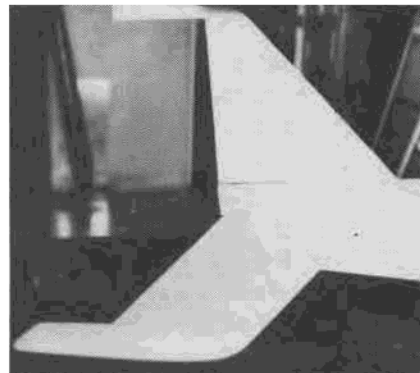
the $1/8''$ sheet bottom to the belly pan, epoxy the hard balsa front screw seats.

Note that the header and pipe channel indicated on the plans are for an O.S. Hanno 61, O.S. header, and a Hatori long pipe; plan your installation for your power plant accordingly.

Vertical Fin and Rudder:

The fin is built up of $1/4''$ balsa, leaving an L.E. extension as an anchor to the fuselage. It is covered with $1/16''$ sheet; then the fin tip is glued in place. Make the rudder from $3/8''$ sheet, shaped as shown on plans.

Epoxy the stab and fin to the fuselage with the wing bolted on, to check alignment of both parts. Note: Be sure to check for perfect alignment of the vertical fin, stabilizer, and wing prior to the epoxy curing. Next, apply fillet material in all joints. This is not only for appearance but



Vertical fin and stab are epoxied to fuselage. Apply a small fillet at the fin and stab and their fuselage joints for smooth contour and added strength.

helps a lot in strength, so do not omit the fillet.

Finishing:

All the Gitanos have been covered with plastic film to keep the weight low. Remember to seal all the engine area and the exposed areas of F-2 and F-4 with thinned epoxy after covering. The landing gear and servos can be permanently installed now. Use your own method, or the L.G. manufacturer's recommendations for installation.

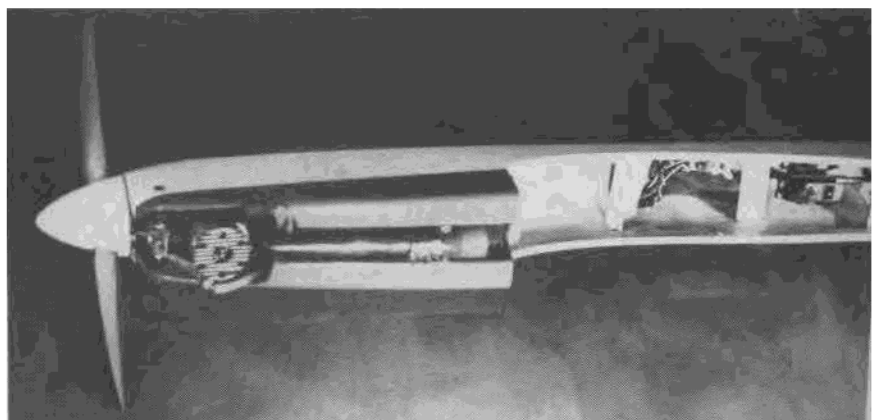
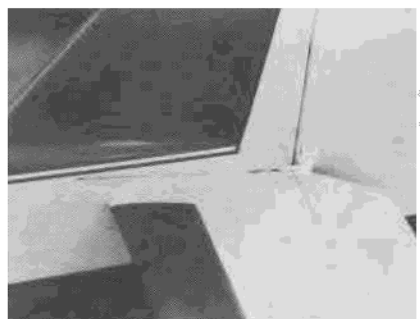
Uncover the aileron servo cavities and servo wire channel, then install servos and rods to aileron horn, and check travels. Install a $3/32''$ cap into both cavities, just leaving the pushrod exit open and apply final cover to these openings and channel.

Engine:

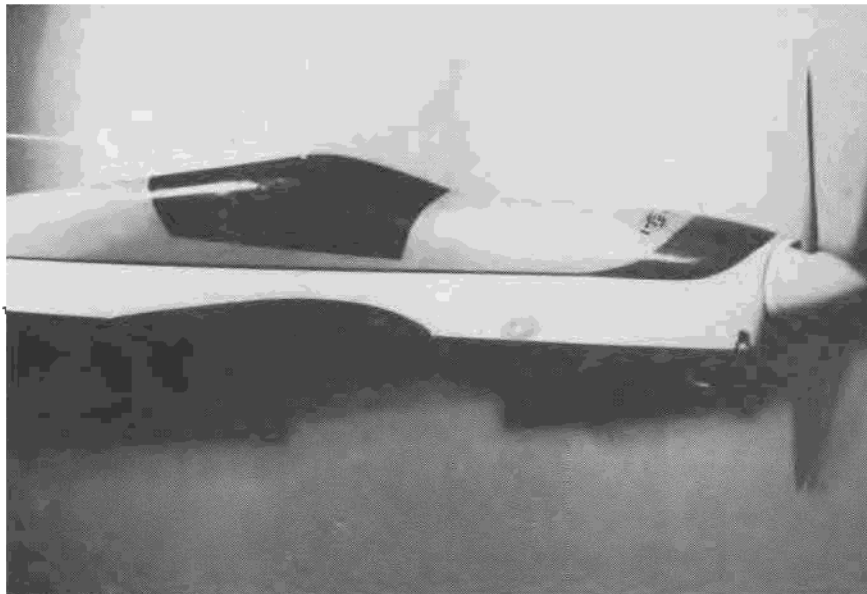
Since this is a high performance pattern plane, it needs a dependable power plant; a



LEFT: Twin elevator pushrods from a single $5/16''$ hard balsa rod. RIGHT: Rudder push-pull cable detail. Note the small fuselage outlet needed.



Finished engine section.



Finished fuselage front section.

long stroke .61 with a 12 x 12 prop at 9500 revs will provide more than enough power for the long vertical rolling maneuvers. There is enough room in the front end for a soft mount, leaving some extra clearance between the nose ring and engine drive washer to allow free movement.

Preparing For Flying:

Before flying, some important things have to be checked.

All the R/C gear should be working free

of binding or play on the surfaces. All of the prototypes use push-pull cables for rudder surface and a 5/16" sq. hard balsa pushrod on elevators, with a "Y", dual 2-56 rods to service both elevators with independent adjustment. Try the left elevator 1/16" lower for better tracking. I personally use VTR on flying controls and 10% exp. on throttle.

Start with the control throws recommended, as well as the Center of

Gravity indicated on the plans.

Recommended surface throws: aileron, 1/4" up and down; elevators, 3/8" up and 1/2" down; rudder, all you can get on high rate.

Flying:

Most pilots who have flown Gitanos for the very first time confess that it is the easiest plane to draw lines with, either straight, in any attitude, or curved; so I will not describe the maiden flight as usual, but let you experience it yourself.

Spend your first flights trimming your plane, usually in the following order:

(1) Pitch: with full power, no climb or descent in upright-level attitude.

(2) Roll: no right or left bank either in upright or inverted attitude. Try to fly hands-off without any pitch or roll input from one control to another!

(3) Yaw: from straight and level flight, full power, pull to a vertical climb and trim the rudder until the model can do this maneuver without drifting to either side for the first five seconds; then right rudder may be needed since the speed-power ratio will decrease rapidly.

Now you can begin to really enjoy and know what a Gitano is.

I would be happy to hear from anyone who has comments about the construction or flying of the Gitano. Please drop a note to: Hector Tschén, 3 Calle 17-03, zone 15, Guatemala City 01015, Guatemala, Central America. Fax (502-2) 690820. □

**From
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