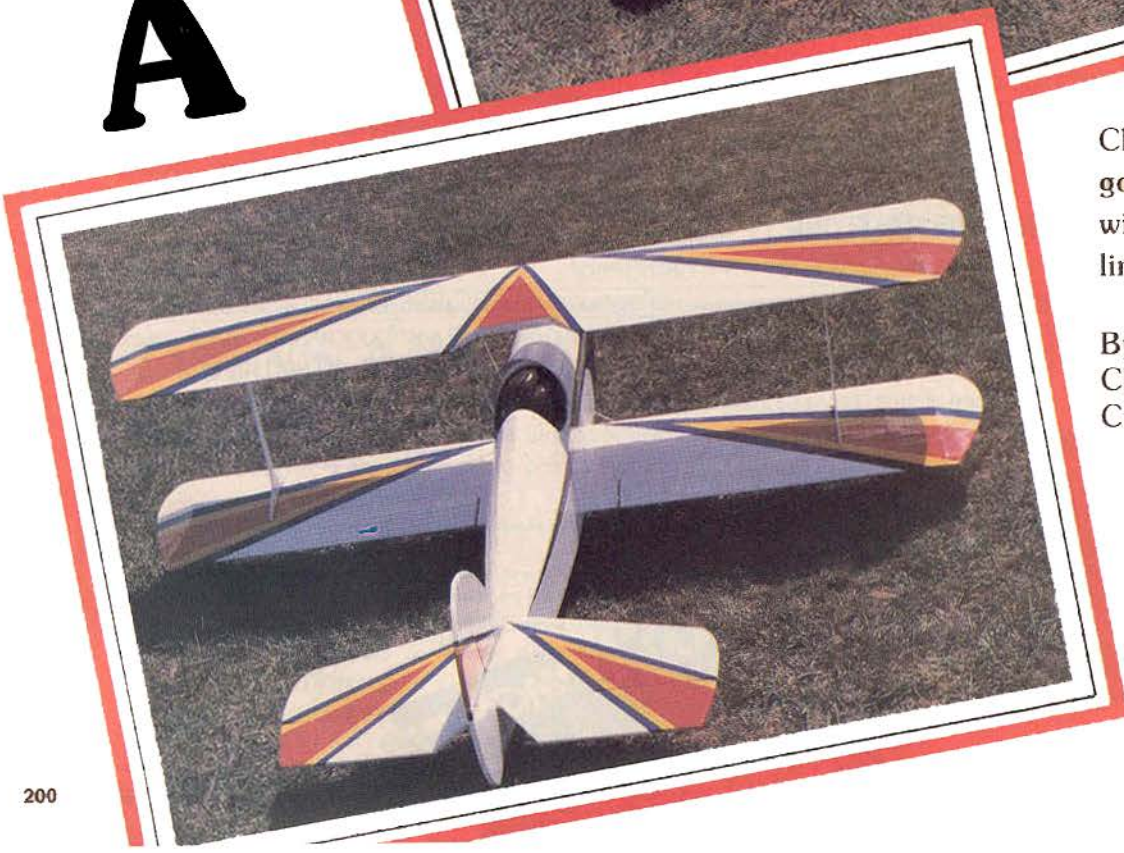
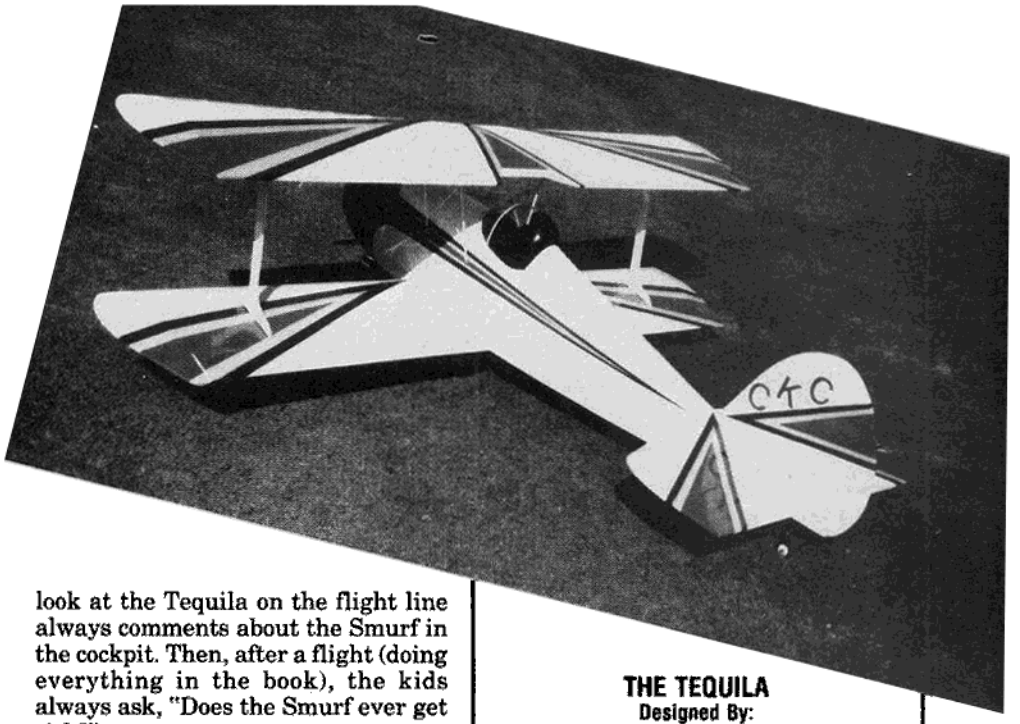
TEQUILA



Chuck's Tequila goes great without either lime or salt.

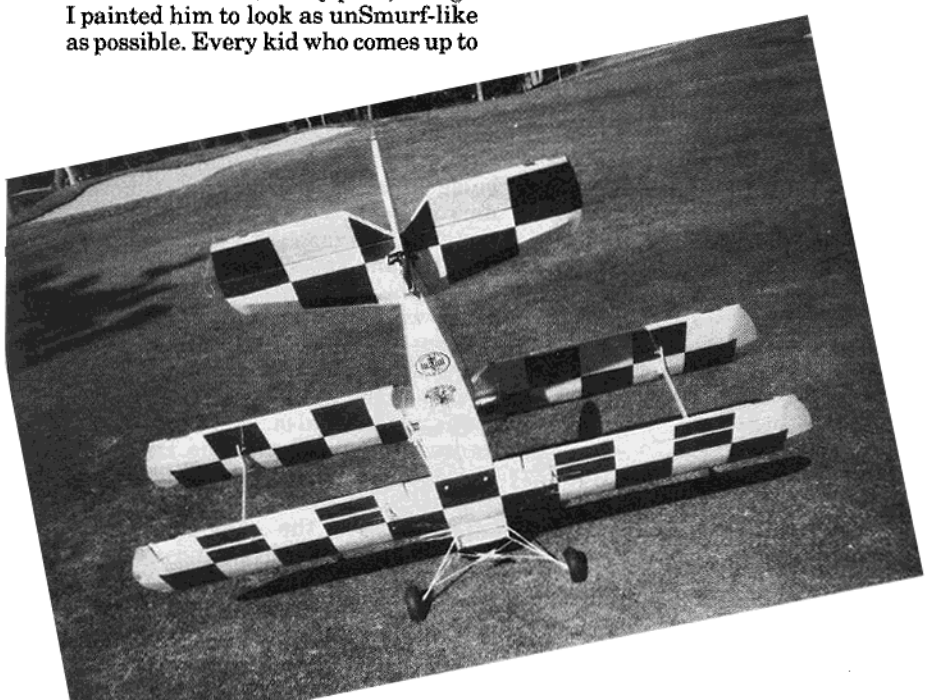
By
Chuck
Cunningham



The Tequila is a bipe lover's biplane. It has the racy good looks of a current state of the art experimental aircraft. It flies to suit any bipe lover in the world and is fully aerobatic. It will do anything that you're good enough to do, and will do it in style. It was designed around the very fine O.S. 1.08 engine, yet will accept the .90 to 1.2 4-stroke engines just as well. The nose is also large enough to accept the big Super Tigre engines from the 2000 to the 3000; in fact, I may try one of these engines in it next. It has plenty of wing area, 1700 square inches, to support a large gas engine, or a Saito 2.70 twin. The structure has been designed strong enough to support any of these larger engines, but, basically, it's at home with the 1.08.

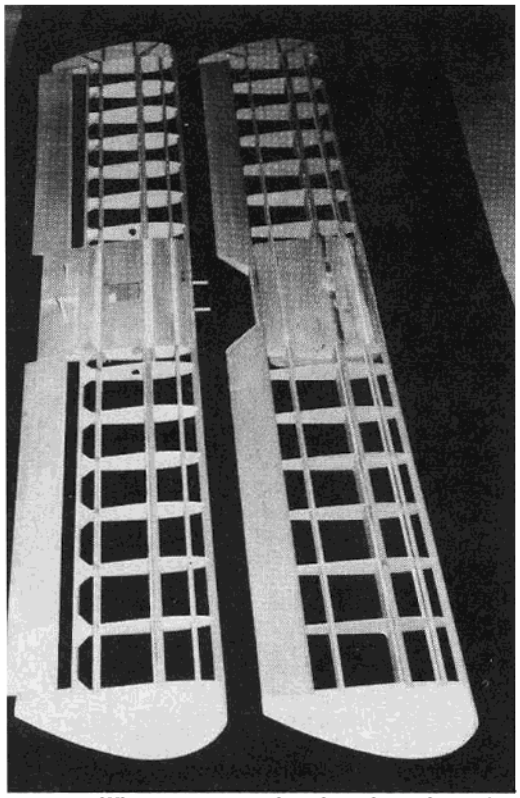
I used a Smurf head (salvaged from a dime store bank) as my pilot, though I painted him to look as unSmurf-like as possible. Every kid who comes up to look at the Tequila on the flight line always comments about the Smurf in the cockpit. Then, after a flight (doing everything in the book), the kids always ask, "Does the Smurf ever get sick?"

The Tequila sports a fully symmetrical airfoil and a very thick, fully symmetrical horizontal stab section. This combination makes a very good flying aircraft. The ailerons are full span, 3¼" wide, which allows them to react with lots of authority. The radio used in the original is a JR Unlimited, but a lot of the whistles and bells are not used, although the programmed snap button is used most all of the time. Any good four channel radio is sufficient; however, you will need five servos, one on elevator, one on rudder, one on throttle, and one on each aileron. If you're going to use an engine larger than the 1.08 or 1.2 4-stroke, I would suggest that you use two servos on the elevator by using a servo doubler. I use a standard 500 mA battery pack, but I never put in more than five flights in one day. It's no

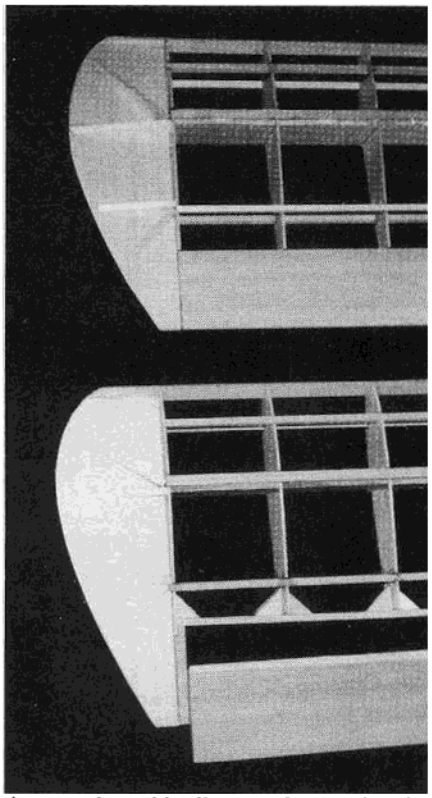


THE TEQUILA

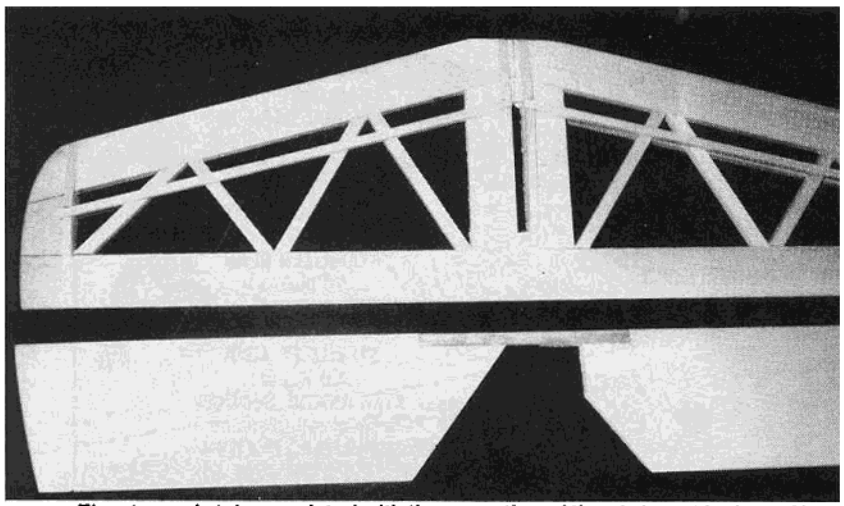
Designed By:
Chuck Cunningham
TYPE AIRCRAFT
Sport Biplane
WINGSPAN
72 Inches (both wings)
WING CHORD
12 Inches (both wings)
TOTAL WING AREA
1700 Sq. In.
WING LOCATION
Biplane
AIRFOIL
Symmetrical
WING PLANFORM
Constant Chord
DIHEDRAL EACH TIP
None
OVERALL FUSELAGE LENGTH
60 Inches
RADIO COMPARTMENT SIZE
(L) 12" x (W) 5" x (H) 4½"
STABILIZER SPAN
29 Inches
STABILIZER CHORD (incl. elev.)
10½ Inches (Avg.)
STABILIZER AREA
300 Sq. In.
STAB AIRFOIL SECTION
Symmetrical (diamond)
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
10 Inches
VERTICAL FIN WIDTH
11 Inches (Avg.)
REC. ENGINE SIZE
.90-1.08 2-stroke
.90-1.2 4-stroke
FUEL TANK SIZE
16 Oz.
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
4
CONTROL FUNCTIONS
Rud., Elev., Ail., Throt.
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Spruce & Ply
Wing ..... Balsa, Spruce & Ply
Empennage ..... Balsa
Wt. Ready To Fly ... 12 Lbs. 3 Oz. (195 Oz.)
Wing Loading ..... 16.65 Oz./Sq. Ft.



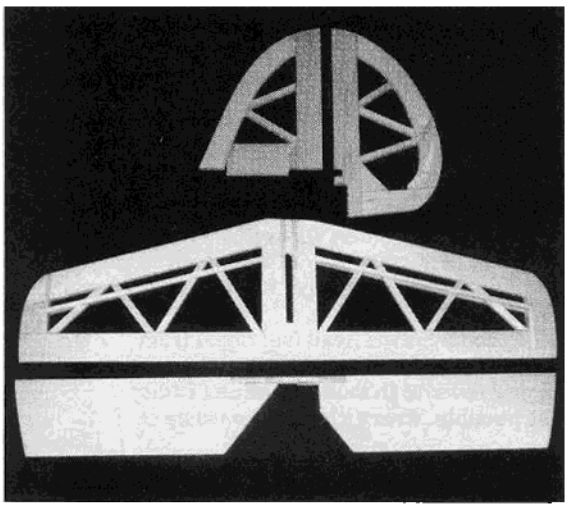
Wings are completed and ready to be covered.



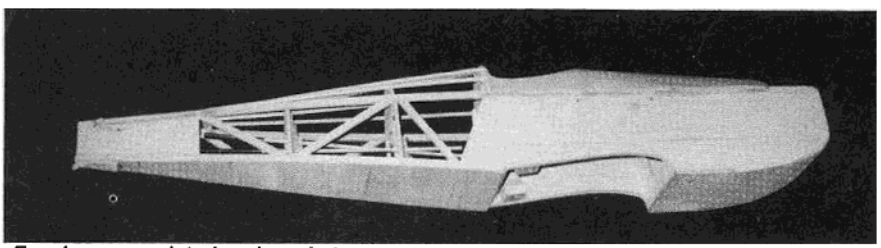
Lower wing with ailerons shows triangle gussets at rib trailing edge. Plans show a different method. Wing tips are sheet balsa.



Elevator and stab completed with the exception of the ply insert for horn. Note slot for fin.



Complete tail group.



Fuselage completed and ready to cover.

problem to use a 1200 mA pack, and you really need to do this if you're going to use six or more servos. The extra weight of extra servos and a larger battery pack are no problem to the Tequila. If you want to build a bipe that will allow you to show off your flying skills, yet is easy as pie to three point land, then you'd better start chopping balsa --- the Tequila is just right for you.

CONSTRUCTION

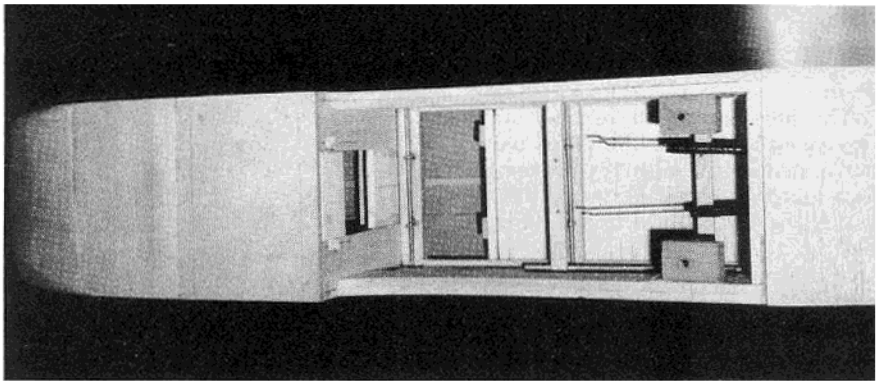
Wings:

This is a great place to start building a biplane and, besides, you need the wing structures fabricated in order to mate everything to the fuselage while it is under construction. The first step is to cut out and sand all of the wing ribs. You're going to need a total of 26 "B" ribs, and 12 "A" ribs. The top wing is constructed exactly like the bottom wing. The center section cutout in the top wing is formed after construction. The ailerons are cut loose from the bottom wing after construction.

Cut out the hardwood bolt blocks, and drill and tap for 1/4" nylon bolts. Cut out the wing tip parts and the dihedral braces. Note the location of the support to hold the wing ribs at the correct angle. Use the bottom rear spar material pinned in place over the plans to support the ribs correctly. Pin the main 1/4" x 1/2" spruce spar over the plan and glue the tip ribs in place. I like to use Hot Stuff Super T and accelerator for this operation. Next, glue the adjacent piece of webbing to this rib and the main spar. Then add the next rib, then the next piece of webbing, working from the tip toward the center. When you come to the end of the B ribs you must shim the A ribs in place with a scrap piece of 3/32" balsa because these ribs are more narrow to accommodate the wing center section sheeting. Note also that both top and bottom wings are built flat on the plan, with no dihedral in either wing.

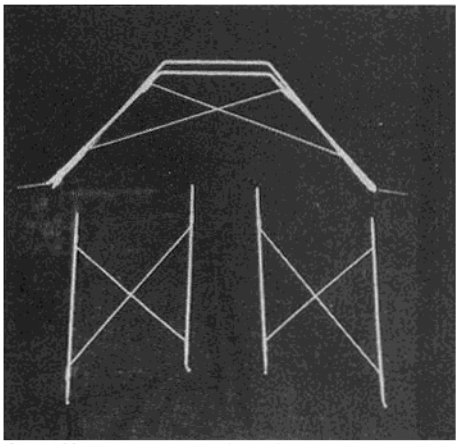
When you have all of the ribs in place add the top 1/4" x 1/2" spruce spar, then the leading edge of 1/2" sq. medium hard balsa. Next glue the leading edge spar and the trailing edge spar in place. Glue the trailing edge sheeting (3/32" balsa sheet) in place. Remove the wing from the building board, turn over, and add the bottom spars and trailing edge sheet.

Gently cut the slots in the wing ribs to accept the plywood dihedral braces.

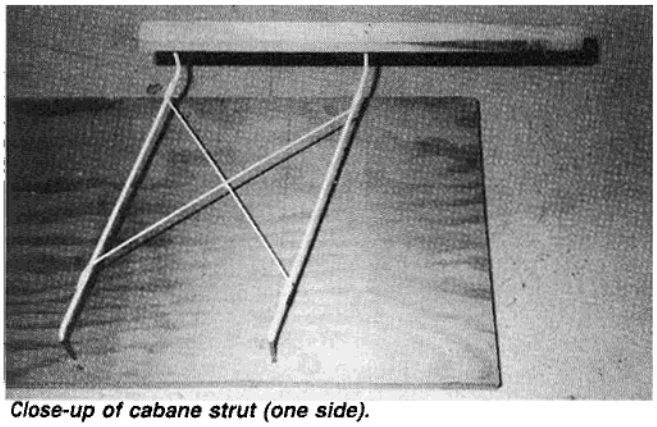


Looking into radio compartment with pushrods already in place. Note brass tubing for cabane strut plug-in.

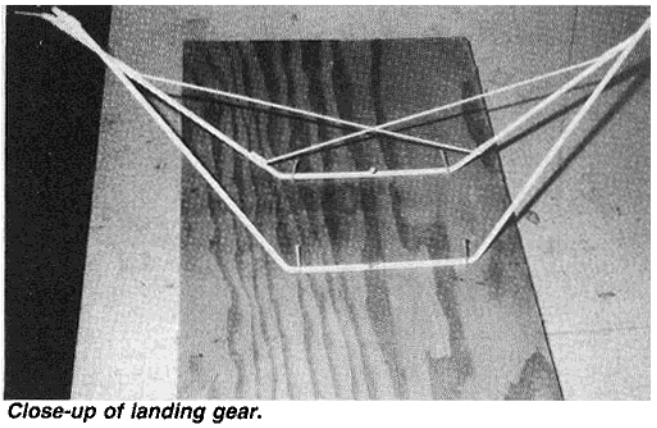
Slide these into position, making sure that everything is perfectly lined up. Flow on lots of Super T and hit it with accelerator. Now, glue the bolt blocks in place. Add the tips and braces to each wing tip; then add center section sheeting and center cut out. Be sure to mark the location on the bottom



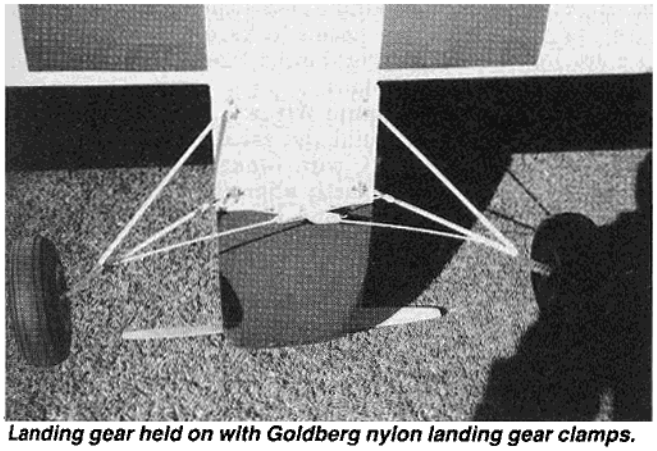
Landing gear and cabane struts completed and painted.



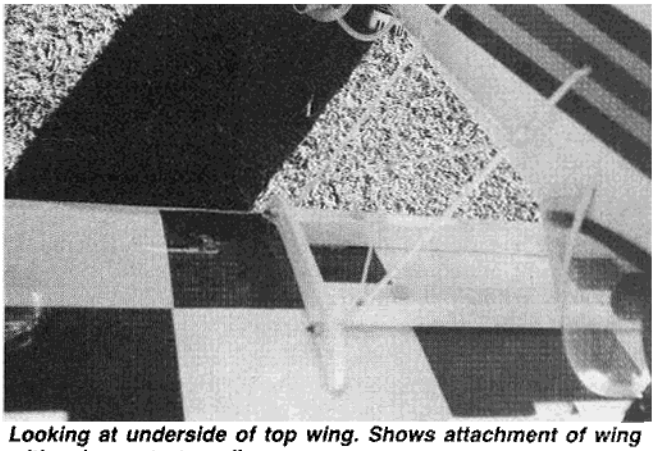
Close-up of cabane strut (one side).



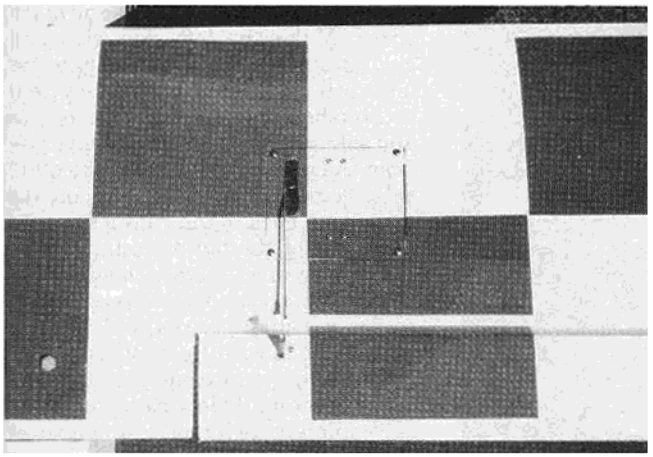
Close-up of landing gear.



Landing gear held on with Goldberg nylon landing gear clamps.

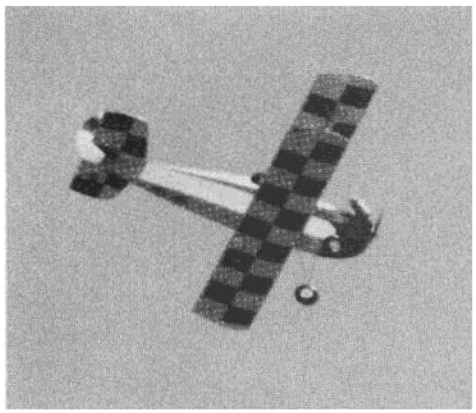


Looking at underside of top wing. Shows attachment of wing with cabane strut cradle.



Aileron servo mounted in each wing panel. Servo was moved to center of aileron on plans for better action.

Prototype had an O.S. 108 2-stroke in front and had super performance.



sheeting for the holes for the nylon wing bolts. This wing is ready to sand.

The bottom wing is constructed exactly like the top with one exception. Prior to joining the two wing panels together, cut out the ailerons. Use a razor saw and gently cut each rib right at the edge of the top and bottom trailing edge sheet. Then, recut each rib 1/2" nearer toward the leading edge of the wing panel. Glue in place the 1/4" sheet piece that forms the edge of the wing ahead of the aileron. Glue in place the 1/4" x 1/2" balsa pieces that are the hinge backup pieces. Finish the bottom wing as you did the top wing.

The ailerons are easy to finish; cut along the bottom sheeting with an X-Acto knife, then saw the ribs again to build in the proper slope. Add the leading edge balsa sheet and extra tip ribs. Except for sanding, the wings are done. One other point on the bottom wing — be sure to put the 1/4" wing dowels in place prior to adding the top and bottom center section sheeting. If you have made and installed the 1/4" dihedral pieces correctly, the dowels will come right into place with a minimum of effort, and are securely anchored. When you sand the wings, make sure that you sand the leading edge to a nice, blunt, round radius. No sharp pointed wing leading edges!

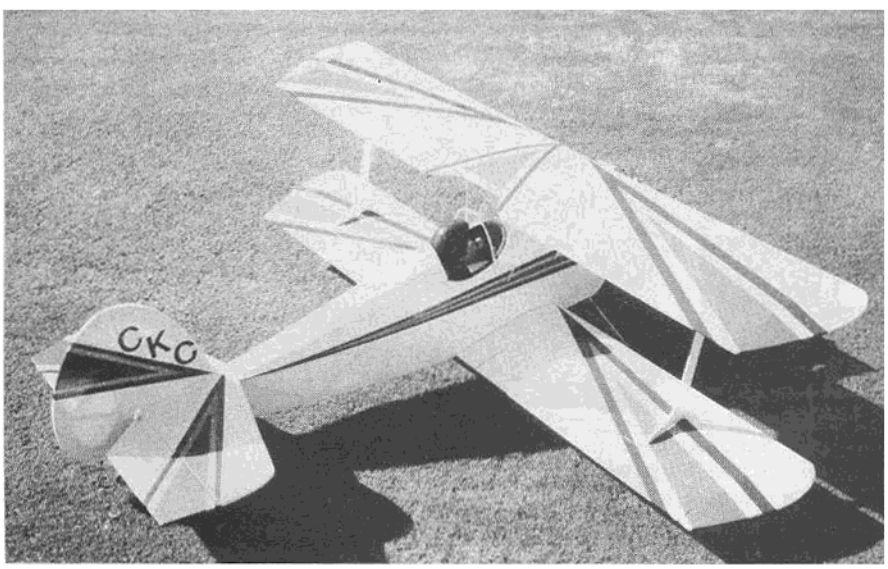
Tail:

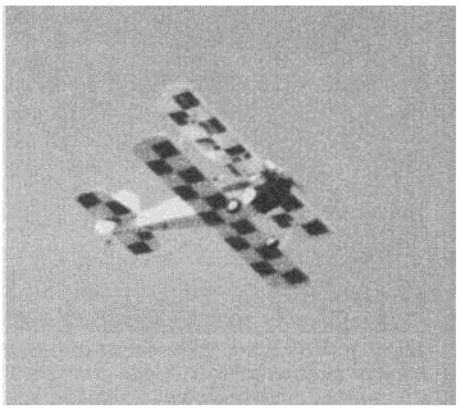
The horizontal and vertical stabs are constructed over the plans using 3/8" balsa sheet. After the horizontal stab has been removed from the plan, add the tapered spars to the top and bottom to give it the thick airfoil shape. No ribs are needed except at the root and tip since the covering forms the diamond airfoil shape. The elevator may be constructed of a solid piece of 3/8" sheet rather than being built-up. I would suggest that you add lightening holes to it if you use one solid piece.

Fuselage:

Lay waxpaper over the plans and construct one fuselage side. Do not remove from the plan. Put another piece of waxpaper over the first side and construct the second side on top of it. Remove the two sides from your building board and add all of the inside doubler pieces. Note that the doublers form slots for bulkhead B and D. Build these bulkheads from hard 1/4" sheet balsa and mark a centerline on each. Carefully mark the location of the 3/8" x 3/4" hardwood cabane support pieces on the fuselage sides and cut these openings. Make sure that everything lines up perfectly. Glue bulkheads B and D to one fuselage side, then place this over the top view of the plans and glue the other side in place, making sure that everything is "square" as you go along. Bring the two sides together over the centerline of the plan at the tail and glue. Add all of the cross braces. You can add the bottom cross grained sheeting aft of the wing and the ply tail wheel bracket support at this time. Remove everything from the building board and glue the firewall in place. Make sure that the engine has right thrust as shown.

Next, add all of the top formers, the cockpit floor and all of the top





stringers. Attach the 5/32" brass tube to the cabane support blocks with J bolts. Make sure that everything is lined up, remove the J bolts, glue the cabane braces in position, then add the brass tube and J bolts. Make sure not to tighten the J bolts too tight; the cabane wire must slide into the tubes easily.

Make the 1/32" plywood top turtledeck as shown on the plans and glue in place. Take a bit of care with this and you will find that you have a completed fuselage top in no time. Add all of the other pieces of the fuselage except the bottom blocks ahead of the wing. Mate the lower wing to the fuselage, making sure that everything is lined up. When everything is correct, glue the ply wing dowel retaining piece in place, then add all of the nose blocks and landing gear support blocks. Sand the fuselage and it's done.

Cabane Wires:

Build the cabane wires from 1/8" music wire. Make sure that they are all exactly alike. This is important as one wrong length cabane wire will make a mess of the wire birdcage. After these wires are bent, make the top plywood supports and drill the holes for attaching the cabane wires. Take a scrap piece of lumber and drill two 1/8" holes spaced exactly as far apart as the brass tubes in the fuselage. Insert two of the cabane wires in these holes and place one plywood top piece on the top end of the wires. Make the left side (the plan side) first. Swing the assembly to the left until the proper stagger has been established. Make the cross braces and solder them in place. Remove this from the jig board and build the other side; remember, the stagger on the second set goes to the right. Take the wires out of the building jig, remove the top plywood pieces, clean off the solder flux, and paint. The easiest way to paint cabane wires and landing gear wires is with Rust-Oleum paint. It comes in a multitude of colors that match almost all MonoKote colors and is completely fuelproof. Painted wires look a lot better than unpainted ones.

Be sure to cover the ends that are to be inserted in the brass tubes prior to painting. Make sure that end burrs are removed from the wire.

Radio Installation:

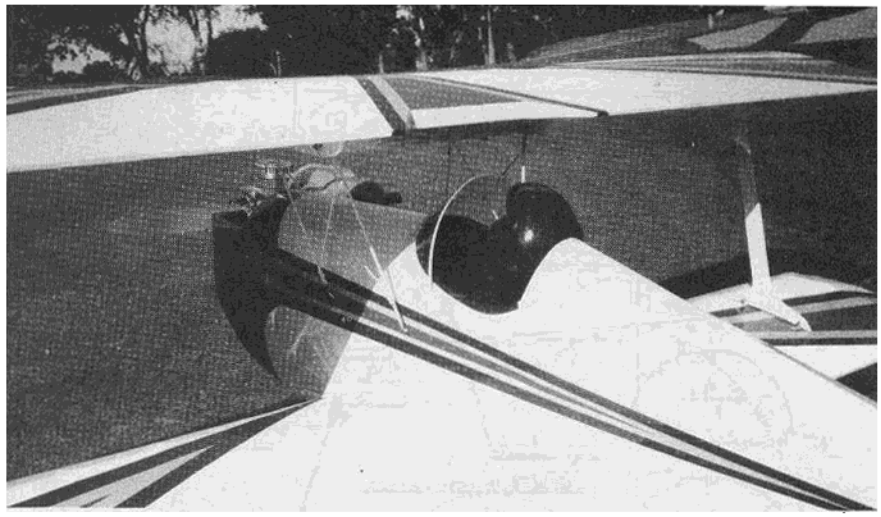
Install your radio gear in the fuselage prior to covering. This way you can be sure that everything is working properly. Add the pushrod "fences" where shown. This is most important on any large model. These fences keep the pushrod from flexing under a high air load. Install the aileron servos in the wings, using extension cords from the center of the wing to the servo location.

I have found that a piece of string, placed in the extension cord hole while the wing is under construction, is a nifty way to "fish" the aileron extension in place after the wing is completed. Simply tie the string around the aileron extension cord and pull it through the holes. If you wish to remove the radio at some future time, tie a piece of string to the aileron cord and draw the piece of string back into the wing to serve as the "fish" line the next time. This is simple to do and does away with rolled tubes, etc.

Assembly:

Build the top wing hold-down piece from the two top plywood pieces and two pieces of 3/4" square pine. Attach this to the top wing by drilling holes in the correct location on the 3/4" square pieces and then bolting through these holes into the wing bolt blocks with 1/4" nylon bolts. Sharpen the nylon bolts in a pencil sharpener to give them a point. This makes it much easier to locate the wing when you're bolting it in place. Either paint or cover this top assembly, but do not attach it to the cabane wires yet. Cover the aircraft with your choice of covering materials. I like Super MonoKote, and use it on all of my models.

When the aircraft is all covered and the windshield has been glued in place, attach the cabane struts to the fuselage by slipping them into the brass tubes. Put the top piece in place by slipping it over the wires. Install the top wing and see if everything lines up. If not, now is the time to get it all in correct order. Bolt the bottom wing in place, and make sure that it lines up with the top wing. If not, do a little shimming and bending until everything lines up. When it does, remove both wings and the cabane assembly. Now insert a bit of 5-minute epoxy into the brass tubes and then reinsert the cabane wires. Let this sit until everything has "set." Once again slide the top wood assembly in place and secure with 1/8" wheel collars. Do not use Hot Stuff to glue the wires to the brass tube, because you need time to get everything in place. Hot Stuff will set up too fast, and too permanent. You must have time to make sure that the cabane wires are slipped far enough into the brass tubes, and that everything lines up. Take a bit of advice, I used Hot Stuff Super T for this once, and the glue did too good a job. I couldn't get everything in location quickly enough, and had a heck of a mess on my hands. Had to cut the brass tube out of the fuselage, then grind if off of the cabane wires with a bench grinder, then start all over. Done correctly, this method of attaching cabanes to the fuselage is really very simple and foolproof. I started doing it this way almost ten years ago with the Lazy Ace and have repeated it on every bipe that I've done since that time.



Landing Gear:

The main gear is made of 5/32" music wire, with joints wrapped with copper wire and soldered with Sta-Brite silver solder, then painted with Rust-Oleum paint. The landing gear is held to the fuselage with Goldberg plastic landing gear clamps and 4-40 bolts and blind nuts.

Flying:

Set the control surfaces with 3/4" up and down elevator, 1½" side to side rudder, and as much aileron movement as you can get, at least 3/4" up and down. These control set-ups are to start. As you go along you may want to increase or decrease the throws according to your individual desires.

The original used an O.S. 1.08 engine, but any of the larger engines from a .90 4-stroke up to a 1.2 4-stroke and a .90 2-stroke up to the 1.08 will provide good power. I like a 16 x 7 Zinger prop on the O.S. 1.08. I used a 16 ounce Kraft fuel tank on the original. Make sure that your Tequila balances exactly where shown. A balance point a bit forward of this location is okay, but not further aft. Balance with the fuel tank empty. Start the engine, get it peaked just right, taxi out to the take-off spot, turn into the wind and pour the coal to her. She will track straight into the wind, the tail will lift up in about ten feet or less, and off she will go down the runway. When she begins to get light on her wheel, feed in a bit of up elevator and climb out. Make a couple of passes around the field to see that everything is working, then go ahead and wring her out. The Tequila will do anything that you can do. She is fully aerobatic and will fly through everything. Remember, the wings are fully symmetrical as is the stab and everything is zero to each other. When it comes time to land, bring her in with a little bit of speed, chop the throttle over the runway and come on in for a three point landing. Remember, if you've been flying a Lazy Ace, the Tequila will not land as slow as the Ace; nothing does, so keep up a little speed on landing. You will enjoy your Tequila, she is a good looking bird, and has enough room so that you can add a smoke system. She will give you many, many enjoyable flights.

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From RCModeler Aug. 1988