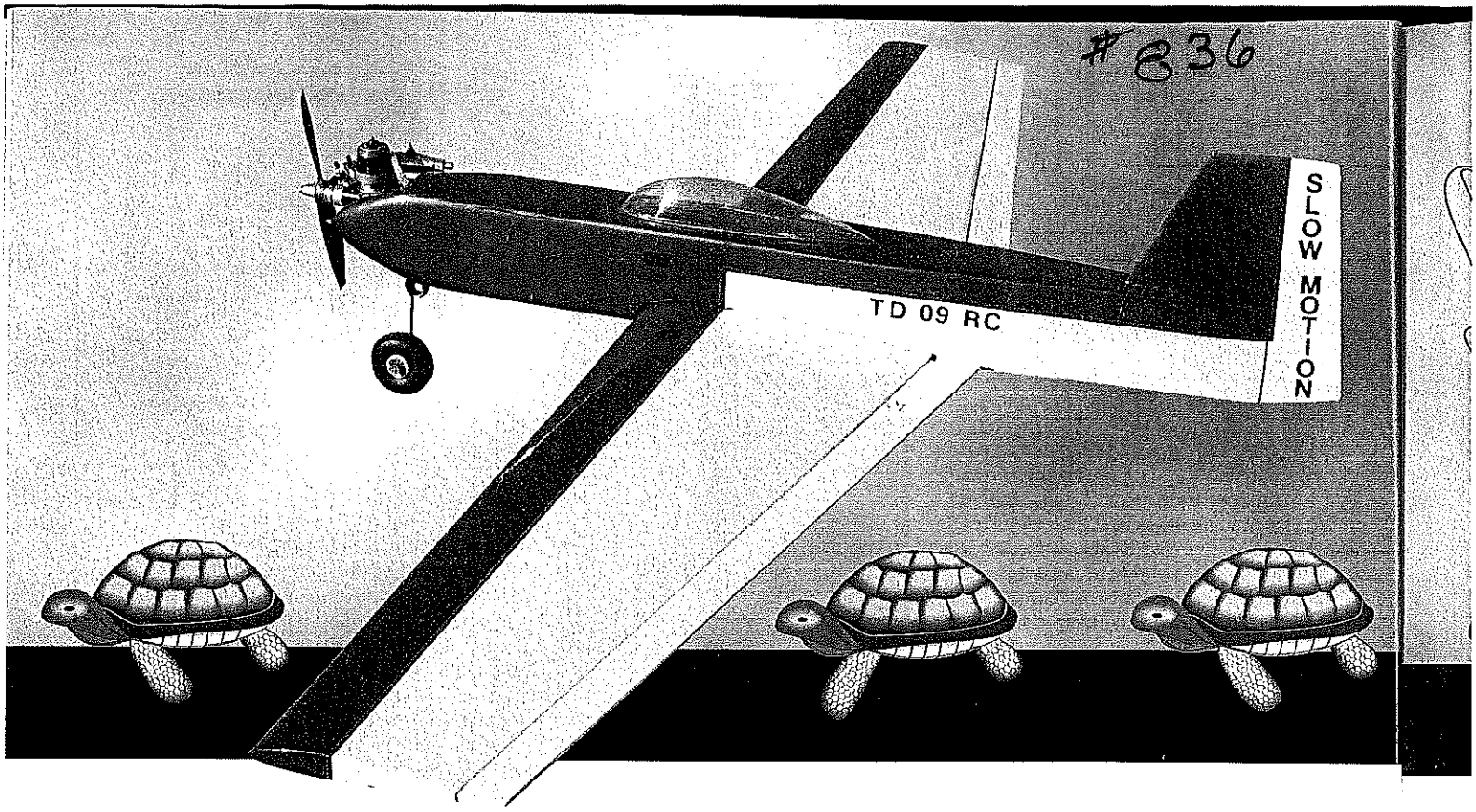


The .09 Slow Motion is the third Slow Motion design in the 21st Century Simitar Series.

Many times I'm asked "Why no horizontal stab and elevator? Why the 'flying wing' concept?" My reply is, "Performance!" The Space Shuttle, the Concorde, the SR-71 Blackbird, and the B-2 bomber are flying wings; all have proven performance that makes them tops in their class. Likewise, the Simitar series of RC models have top-of-the-line performance; no tip stall, directional stability, wider speed range, and tighter turns.

Thoughts and ideas that give inspiration to the design of new Simitar aircraft come from many directions. The first Slow Motion (.15-.40, *Model Aviation* January 1987) began with Bill Winter telling me that he would like to have a slow-flying Simitar.

Before long, a Senior Slow Motion was on the board. It was inspired by the fact that so many plans were sold for the first Slow Motion, a larger .40-.60 size was needed. The Senior Slow Motion was published in the October 1993 *MA*.

The .09 Slow Motion development began when I was sent a prototype of Cox's first .09 with a true muffler and a speed-controlled carburetor. Now, what to put it in? Thoughts began to stir. Size? Weight? Which wing? Tail-dragger of tricycle gear?

I came to the conclusion that the ideal wing was the 48½-inch span version used on the original Simitar (*RCM,* December 1976).

The fuselage type was the next item to decide. It was just a matter of scaling down the original Slow Motion, using the tri-gear system from the Senior Slo Mo, and getting with the program.

After these momentous decisions, I set to work. About an hour for fuselage construction, another couple of hours for the wing, and

The author and .09 Slow Motion at test field near Bishop CA—altitude 10,000 feet, but no problem, says Bill.

.09 SLOW MOTION

Type: RC Sport

Wingspan: 48½ inches

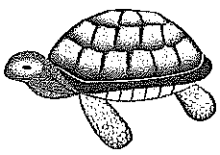
Engine: .09-.10 two-stroke

Functions: Elevons, throttle, steerable nose wheel

Flying weight: 40 ounces

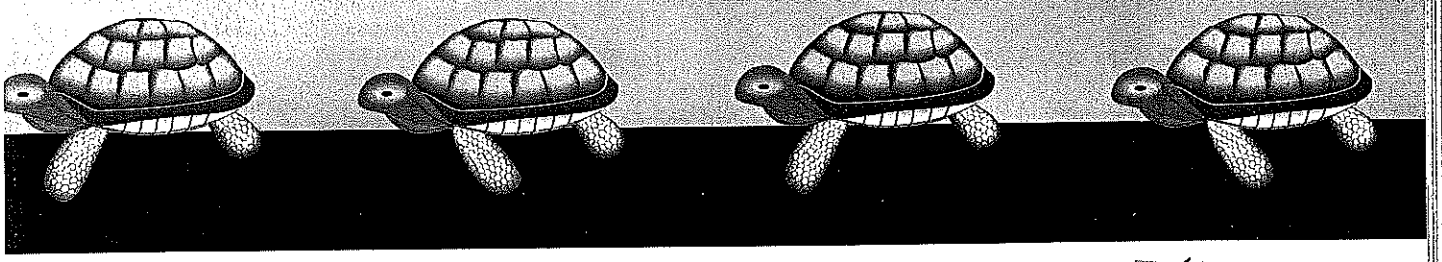
Construction: Balsa and foam

Covering/finish: MonoKote



SLOW MOTION

■ Bill Evans



836

ix to eight hours for covering and final assembly. (I just can't cover nd install all the components any faster.)

Finally, the moment of truth: the test flight. Once I had the engine lialed in to its proper performance, takeoff was routine. Climb to ltitude "a couple of mistakes safe," then loops, rolls, split-Ss, Cuban ights, inverted flight, and the usual Similar landing. The throttle vas responsive, and as usual, the model behaved well over a good peed range.

CONSTRUCTION

Wing: For those who do not cut foam, you may order cores from Soaring Research, 454 Wildrose Lane, Bishop CA 93514. Cores are $18 and shipping is $7.

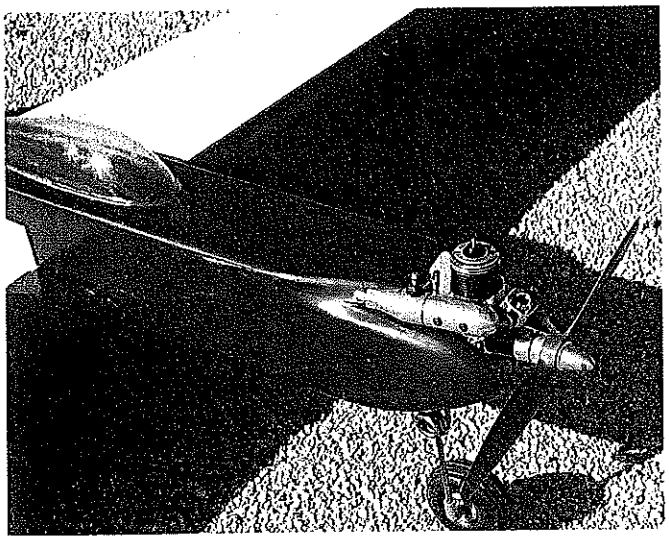
Be sure the wing panels are flat and straight; use weights (with he core on a flat surface) if necessary. Cement the ⅛ balsa trailing-dge spars to the trailing edges. Use carpenter's glue or the type of yanoacrylate (CyA) glue that will not attack foam ("regular" CyA vill not work). Set these aside to dry.

Fuselage: Cut all of the pieces; place and pin the top on a flat work surface. Mark the location of the firewall and bulkhead on the top and sides. Pin the ¼ square longerons in place ⅛ inch from the edge (use the side as a guide). Curve these longerons from the fuselage width at the wing/elevon hinge location to the centerline of the fuselage at the tail. Glue in place by applying thin CyA to the inside edge of the longerons (the CyA will run under the longerons).

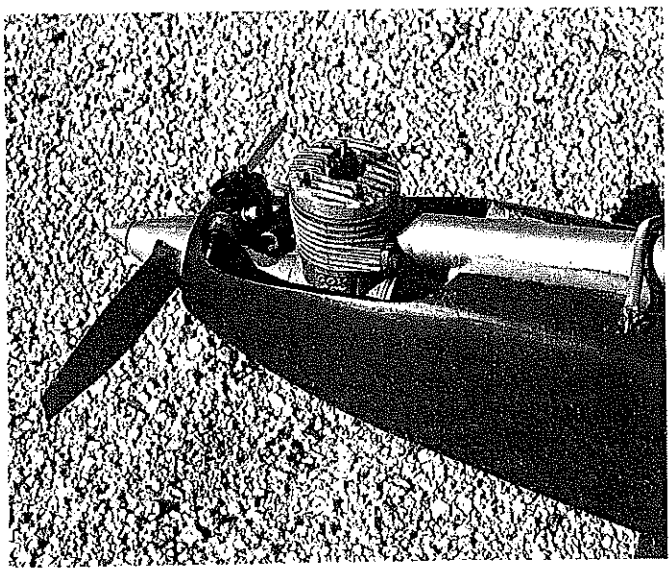
Pin the side to the top; pin the firewall and former in place against the top and side. CyA the side to the top, firewall, and former. Be sure to curve the side to the center at the rear. Pin the second side in position and CyA in place. Pin and glue the ¼ square bottom longerons into place against the sides. Pin and glue the ¼ square strips around the back side of the firewall.

Sand the bottom edges of the sides flush with the bottom longerons. Pin and glue the front fuselage bottom in place. Add the ⅛ balsa bottom. Carve, plane, and sand the bottom rear and top rear to the taper established by the sides. Round the corners per the plan and apply sandpaper as needed.

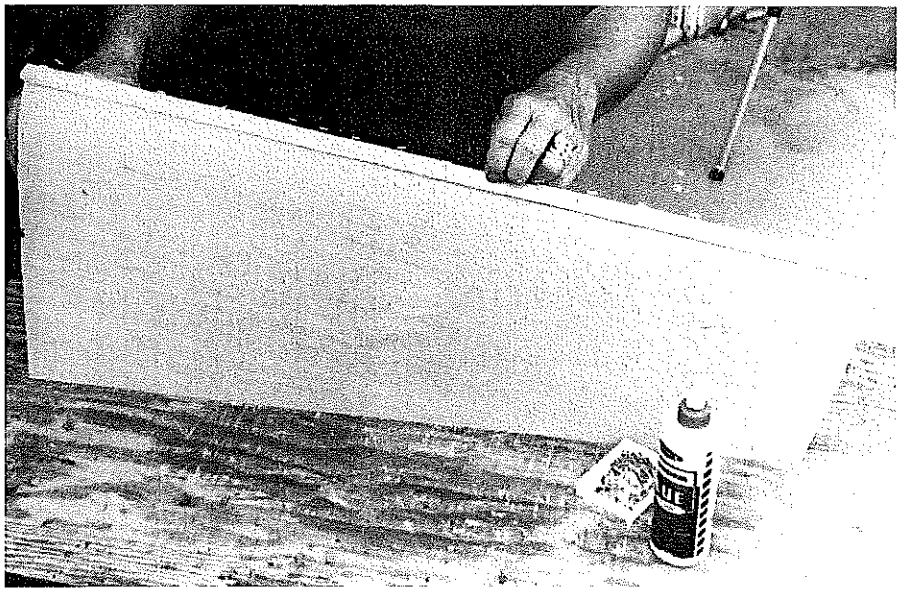
Plane and sand the ⅛ wing leading edge undercaps and trailing edge



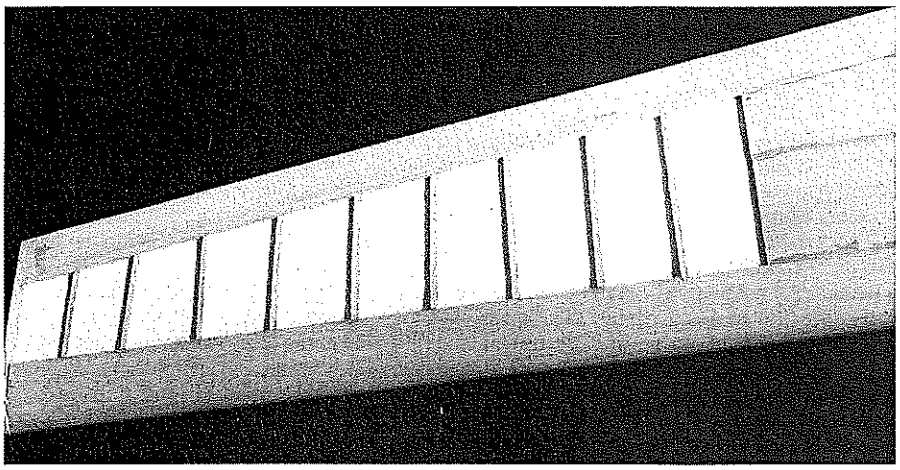
Cox Tee Dee .09 R/C was used on the original model, which is the hird (and smallest) Slow Motion in the series.



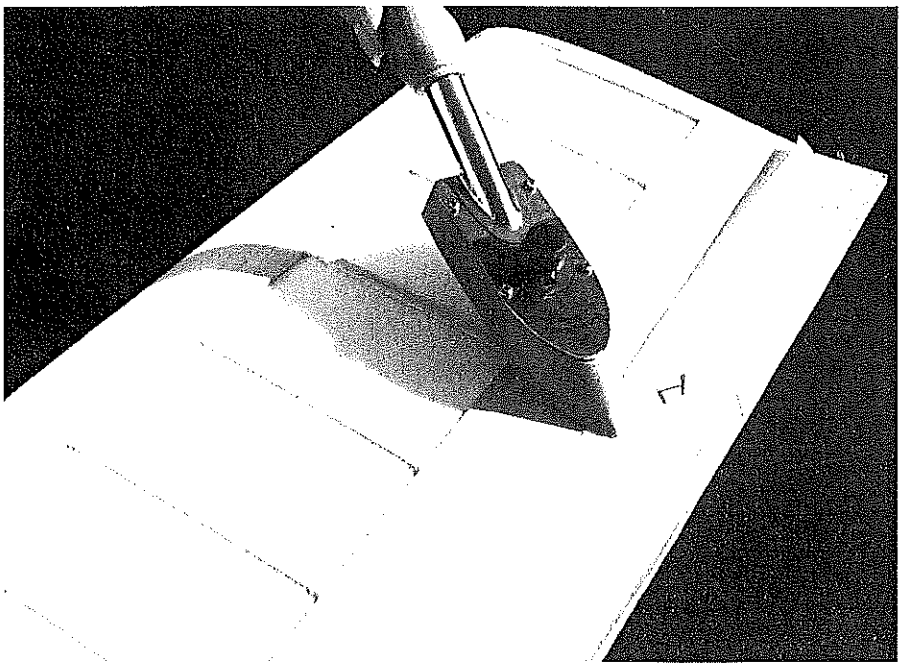
A Cox rear-exhaust .15 can provide some extra "top end."



Use aliphatic-resin glue and plenty of pins to attach the balsa leading edge undercap and trailing edge spar on each wing panel.



Mark cores for capstrips and inboard sheeting, then sheet wings top and bottom.



Pin elevon to trailing edge of wing and iron X-hinge to both sides of wing.

spars so that the sheeting will fit over them. Do not sand away any of the core.

Sheet the wings. We used Corefilm to apply the 1/16 sheeting to the leading edges, trailing edges, and center section. Sand the leading edge sheeting flush to the undercap, and pin and cement the 1/4 x 1 leading edge cap to the leading edge. Apply the 1/16 x 1/4 capstrips on two-inch centers from the end of the inboard sheeting to the tip of the wing.

Shape and sand the leading edge. The leading edge bottom is nearly flat, and the leading edge top curve is fairly steep. Do not round the leading edge; a maximum radius of 1/32 inch is desirable.

Apply the wingtips; carve and sand to airfoil shape. Finish-sand the wing panels and join them with five-minute epoxy.

Fit the elevons to the wing. We used X-Hinges to attach the elevons. (If you use mechanical elevon mixing, form and install the elevon control rods before you attach the elevons.)

Cut and cement end-grain balsa into the wing at the bolt location to guard against crushing of the wing when it's bolted to the fuselage. Fit the 1/4 plywood wing plate into the leading edge of the wing at the center section.

Set the wing and wing plate into place on the fuselage and check for fit before gluing the wing plate in place. Using waxed or greased temporary 1/4 dowels, set the wing and plate into place, align them, and glue the plate to the wing with five-minute epoxy.

Place hardwood gear blocks at the correct location on the bottom of the wing; mark the area and remove the sheeting and foam so that the blocks are flush with the sheeted bottom wing surface. Glue these in place with five-minute epoxy.

Sand and cover the wing. (If you use electronic elevon mixing, install 1/8 plywood servo plates flush with the bottom surface of the wing and remove foam for the servo pocket prior to covering the bottom of the wing.)

Complete, sand, and cover the vertical fin. Complete, sand, and cover the 1/4 triangular fin fillets.

Cover the wing and fuselage; epoxy the vertical fin to the fuselage; epoxy fillets to the fin and fuselage.

For those new to the concept of the Simitar series, an explanation of the control-surface function and component installation may be helpful:

A Simitar requires only pitch (elevator) and roll (aileron) functions for perfect flight. Except for Pattern flying, a rudder is not required.

Simitar control surfaces are elevons that serve as ailerons and elevators. In essence, consider the control surfaces as full-strip ailerons that counter-actuate to provide aileron control and also actuate simultaneously to provide elevator control. This means that some form of mixing is needed—by mechanical or electronic means.

The best mechanical method is to use my sliding tray:

One of the servos in the tray is set up as you would for strip ailerons. The second servo is for elevator, and its control arm is attached to the stationary bulkhead at the front of the tray so that it will slide the tray fore-and-aft to give the elevator function.

Electronic mixing can be provided by a radio

with built-in mixing or by using Ace's Christy Mixer or the Quillan Mixer, which plug in between the servos and the receiver. Both mixers work very well and are in the $25-$45 price range.

Alternatively, some of the newer radio systems have built in elevon mixing or flaperon mixing functions. I have used several of the Futabas in this line, such as the 6VA, 7NFK, 7UAF, 7UAFS, 7UAP, and 9VP.

Sliding Tray Mixer Control Setup: The sliding tray fore-and-aft formers are of ¼ plywood. Drill the ⅛ holes for the dowel through both formers at the same time; this will make the holes parallel. Cut the ⅛ plywood tray to fit both aileron and elevator servos. Push the dowels into one of the formers, then slide the red outer Nyrod over each dowel, then push the other former onto the dowels. Cement the tray in place onto the Nyrods (be careful not to get cement inside the Nyrods), then install the servos as shown.

Electronic Mixer Control Setup: Use ⅛ plywood trays to mount the servos into the wing; epoxy the trays flush on the bottom of the wing after sheeting. Grind a hole in the top center of the wing and use a piece of piano wire with a hook bent on one end to tunnel out for each servo lead. The lead is then easily fished through with a piece of string.

Final Assembly: Install the landing gear, engine, fuel tank, and all radio components. Hook up all controls and check to make sure there is no binding. Check to make sure your aircraft balances (level to slightly nose down) at the location indicated on the plans (approximately one inch behind the leading edge of the wing, with no fuel in the tank.)

Control throws? I put in as much as I can get, then use what I need; ⅜-½ inch of up, down, left, and right is fine. Remember, control is not like a light switch (*on* or *off*), it's like a dimmer switch—use only as much pressure on the stick as you need to make it do what you want!

Set the nose wheel height so that while resting on a flat surface, the leading edge of the wing is ¼ inch higher than the trailing edge, measured at the hinge line. The trailing edge of the elevons are set ⅛ inch up with the transmitter trim at neutral.

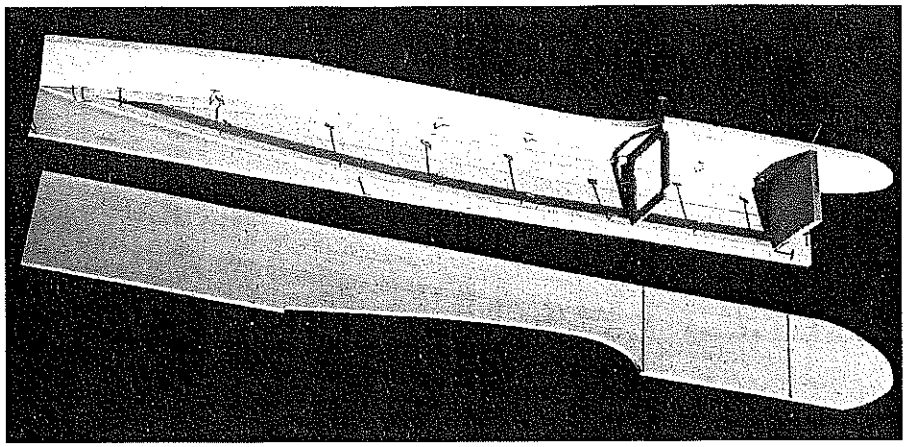
Check all surfaces for proper motion. Remember, left aileron command results in the left elevon going up and the right going down; and the up-elevator command results in both elevons going *up*!)

Flying: Flight performance is very smooth and graceful; the model gives the feeling that it's an extension of yourself in the air; it seems to always do the right thing, often before you command it. Are the thumbs quicker than the eye?

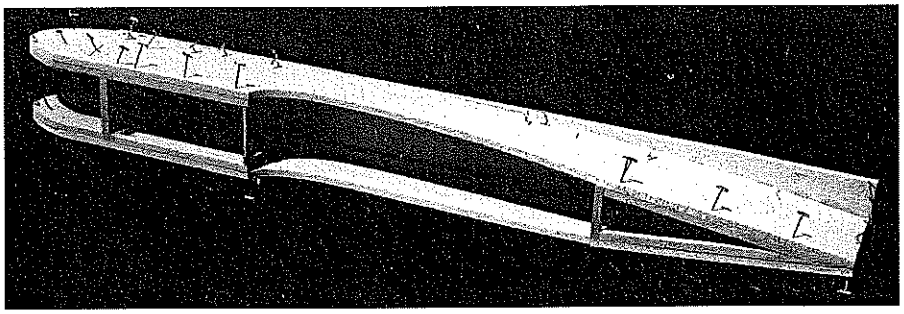
Bill Winter once said to me, "Why does my Similar do what I want it to before I tell it to? Does it read my mind?"

Remember, be safe, be courteous to other fliers, and have fun—and tight turns!

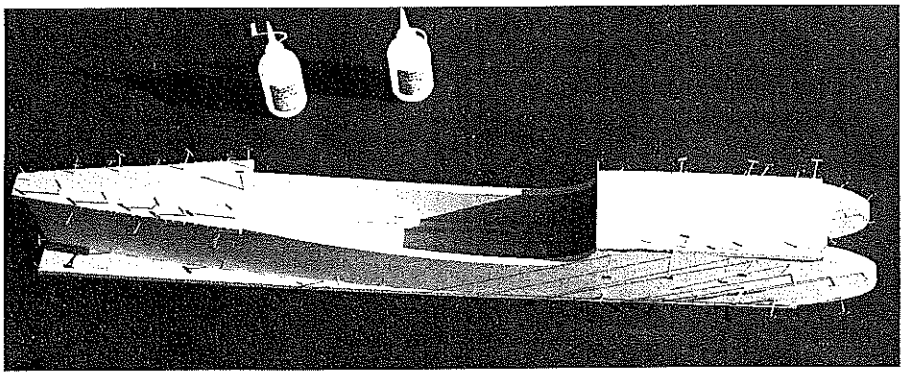
Bill Evans
454 Wildrose Ln.
Bishop CA 93514



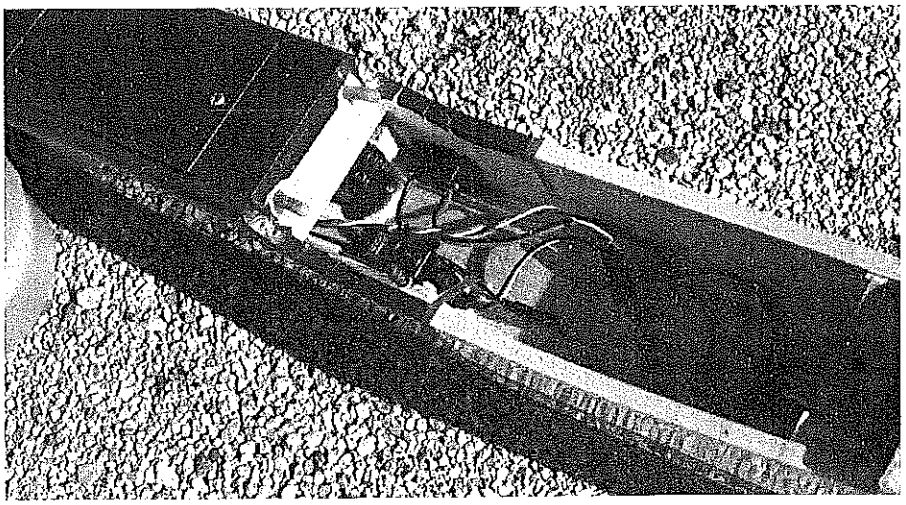
Right side of fuselage has had firewall and former attached.



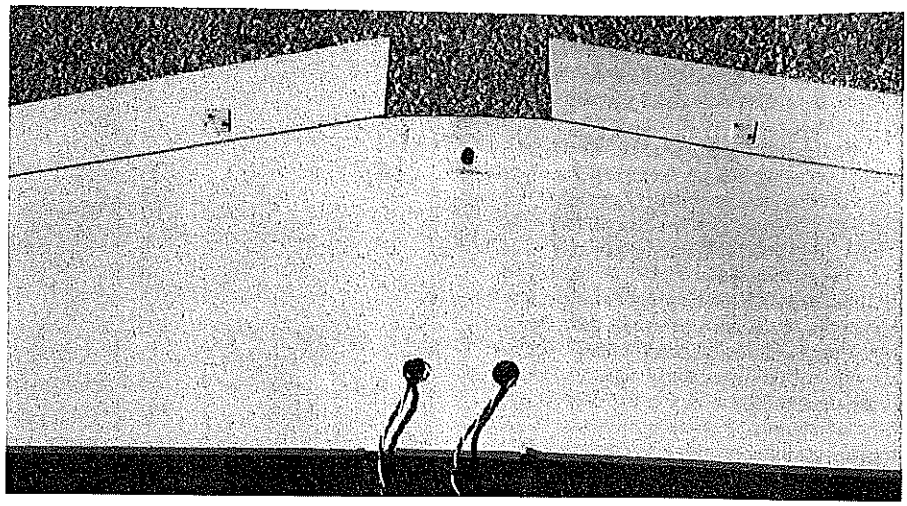
Sides up, bottom squares and cowl cheeks in place.



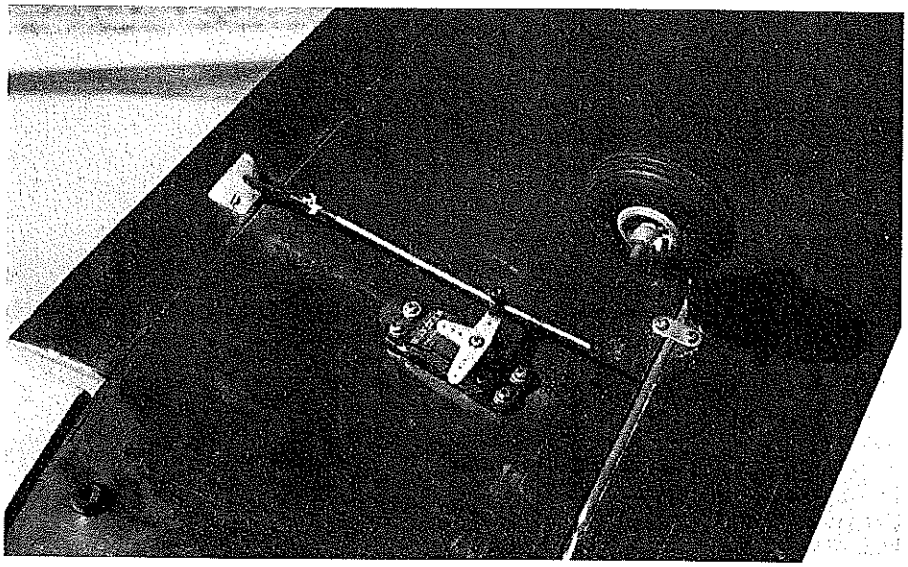
Construction of fuselage shell is complete. Final shaping and sanding next.



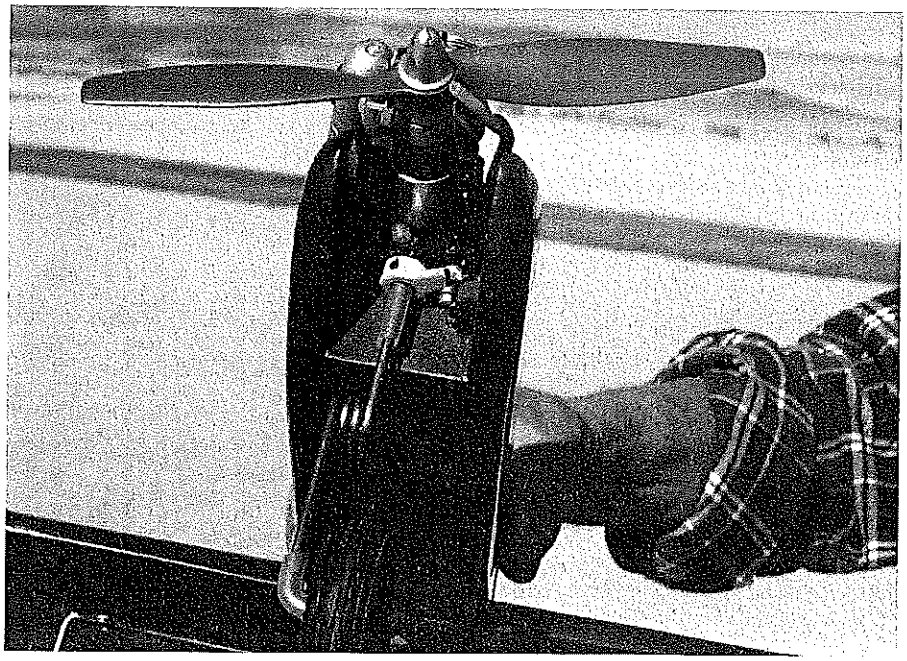
Interior view of fuselage shows placement of throttle and nose wheel servos.



Servo leads exit top of wing center for attachment to receiver.



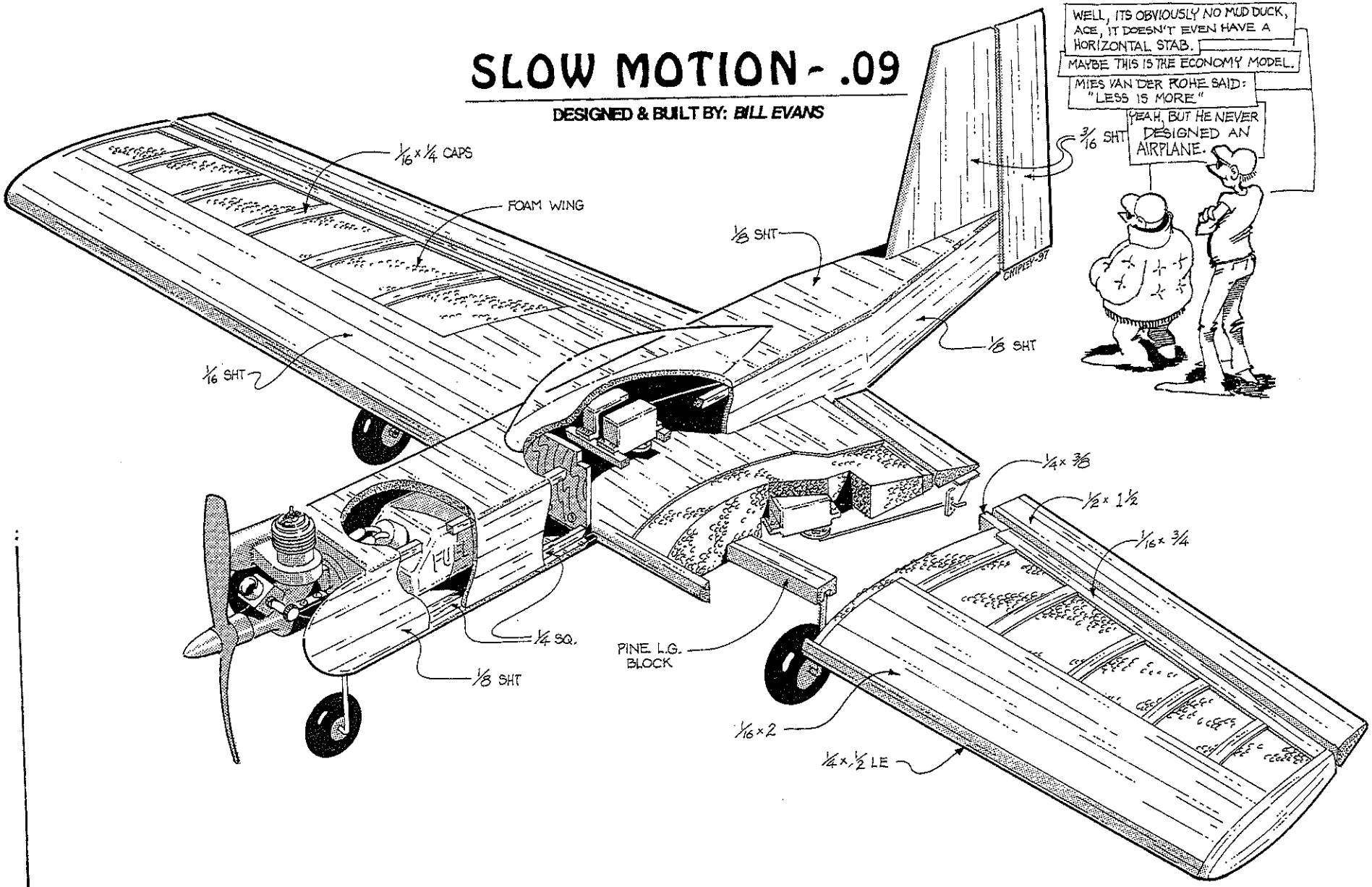
Elevon servo mounted when using electronic mixing. Trays are ⅛ plywood.

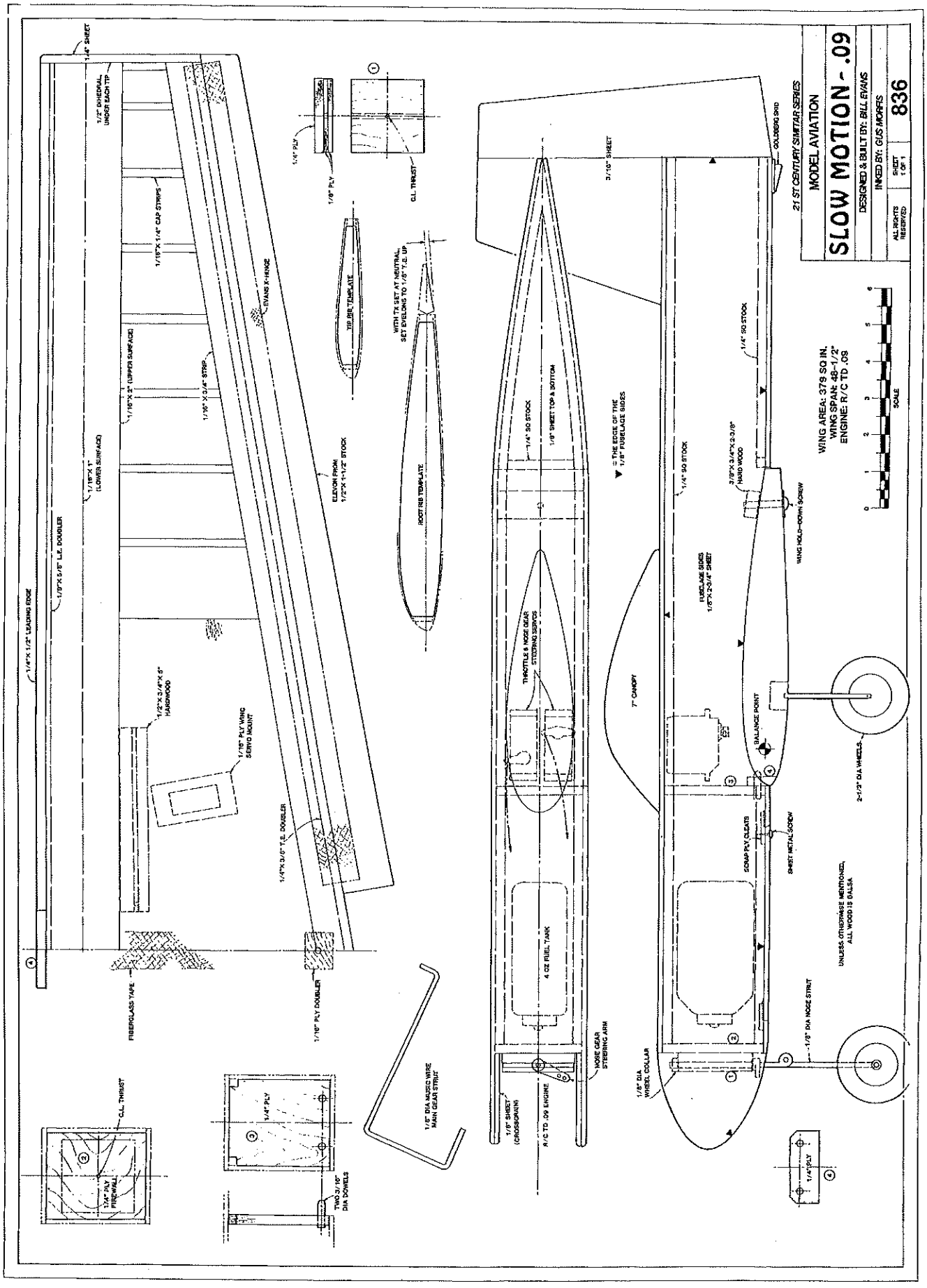


Nose wheel and steering arm detail. Nose wheel height is such that wing leading edge is ¼ inch higher than trailing edge when model is at rest on flat surface.

SLOW MOTION - .09

DESIGNED & BUILT BY: *BILL EVANS*




21 ST CENTURY SIMITAR SERIES
MODEL AVIATION
SLOW MOTION - .09
DESIGNED & BUILT BY: BILL EVANS
INKED BY: GUS MORFS
SHEET 1 OF 1
836
ALL RIGHTS RESERVED
WING AREA: 379 SQ IN.
WING SPAN: 48-1/2"
ENGINE: R/C TD .09
SCALE
1/4" SHEET
1/2" DIHEDRAL UNDER EACH TIP
1/16"X 1/4" CAP STRIPS
1/16"X 2" (UPPER SURFACE)
1/16"X 1" (LOWER SURFACE)
1/16" X 3/4" STRIP
1/4"X 1/2" LEADING EDGE
1/8"X 5/8" L.E. DOUBLER
EVANS X-HINGE
ELEVON FROM 1/2"X 1-1/2" STOCK
1/2"X 3/4"X 6" HARDWOOD
1/16" PLY WING SERVO MOUNT
1/4"X 3/8" T.E. DOUBLER
FIBERGLASS TAPE
1/16" PLY DOUBLER
1/4" PLY
1/8" PLY
C.L. THRUST
TIP RIB TEMPLATE
WITH TX SET AT NEUTRAL, SET EVELONS TO 1/8" T.E. UP
ROOT RIB TEMPLATE
1/4" SQ STOCK
1/8" SHEET TOP & BOTTOM
THROTTLE & NOSE GEAR STEERING SERVOS
4 OZ FUEL TANK
1/8" SHEET (CROSSGRAIN)
R/C TD .09 ENGINE
NOSE GEAR STEERING ARM
1/16" DIA MUSIC WIRE MAIN GEAR STRUT
TWO 3/16" DIA DOWELS
3/16" SHEET
7" CANOPY
FUSELAGE SIDES 1/8"X 2-3/4" SHEET
3/4"X 3-1/4"X 3-3/8" HARDWOOD
WING HOLD-DOWN SCREW
BALANCE POINT
2-1/2" DIA WHEELS
SCRAP PLY CLEATS
SHEET METAL SCREW
UNLESS OTHERWISE MENTIONED, ALL WOOD IS BALSA
1/8" DIA NOSE STRUT
1/8" DIA WHEEL COLLAR
1/4"PLY
GOLDBERG SHID