SUPER KAOS

Joe Bridi with the Super Kaos - - - the pattern threat for '73 in the competition circuit.

A giant step forward in a long line of contest proven pattern ships, the Super Kaos was designed to do the maneuvers more precisely and responsively.

BY JOE BRIDI

PHOTOS BY DICK TICHENOR

As time passes we seem to need a more responsive and more true flying aircraft and, only with time and experience, can we try to perfect a model that will do the maneuvers exactly as we want to do them. Different changes and ideas have to be tried – sometimes they are beneficial and, at times, they fall short of your expectations.

In designing the Super Kaos, we tried to keep the excellent slow flying characteristics of the Kaos, yet fly as well, if not better, than other top competition models currently in the pattern circuit. There were many minor changes made in updating the Super Kaos and, as we continue in this article, we will mention a few of them.

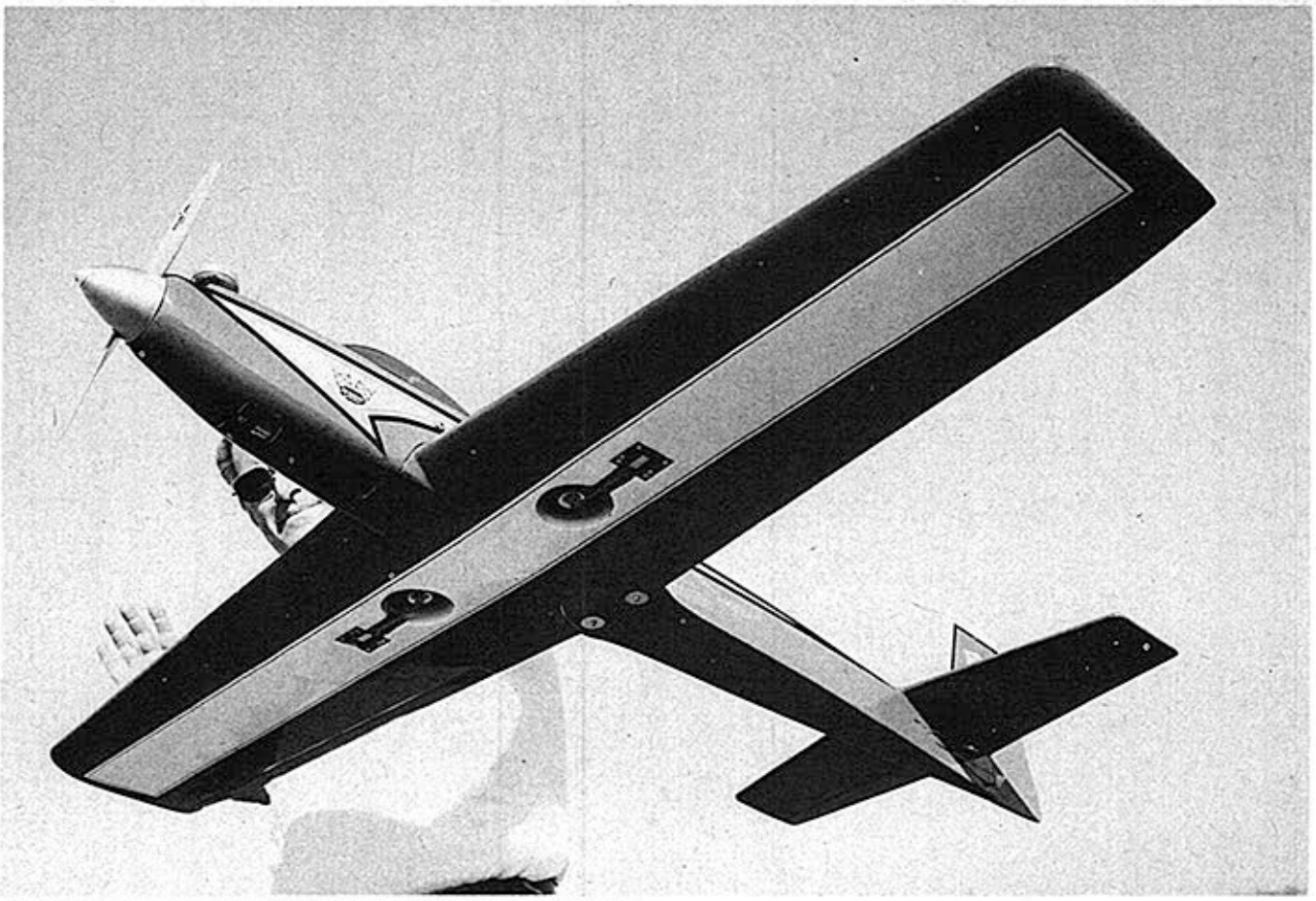
The wing rib patterns are the same as the Kaos although the tips and aileron size as well as the aileron location have been changed. The rudder is slightly smaller, but fuselage height has been added in the rear doing away with the sub-rudder. The elevator was brought forward approximately 2½" which helped the Figure M and the Spin maneuvers.

The wing position was raised ¼" up and ¼" forward. The hatch was eliminated for strength in the nose section. If retracts are installed, the latter would be weak if both a nose gear or retract and a hatch were installed. Access to the fuel tank is now through the wing section.

A 2¾" spinner was used instead of a 2½" diameter unit since we felt the added room would be put to good use giving the modeler more room in which to work. The bottom of the tank compartment is also deeper to accept any retract that you may want to install. Overall, similar construction to the Kaos was maintained since we felt that this simplified the building task considerably. I know that you would rather be flying instead of building at home but, even with the ease of construction, we wanted to present a highly competitive aircraft that would, in the hands of a proficient competition flyer, outfly the best in the pattern circles.

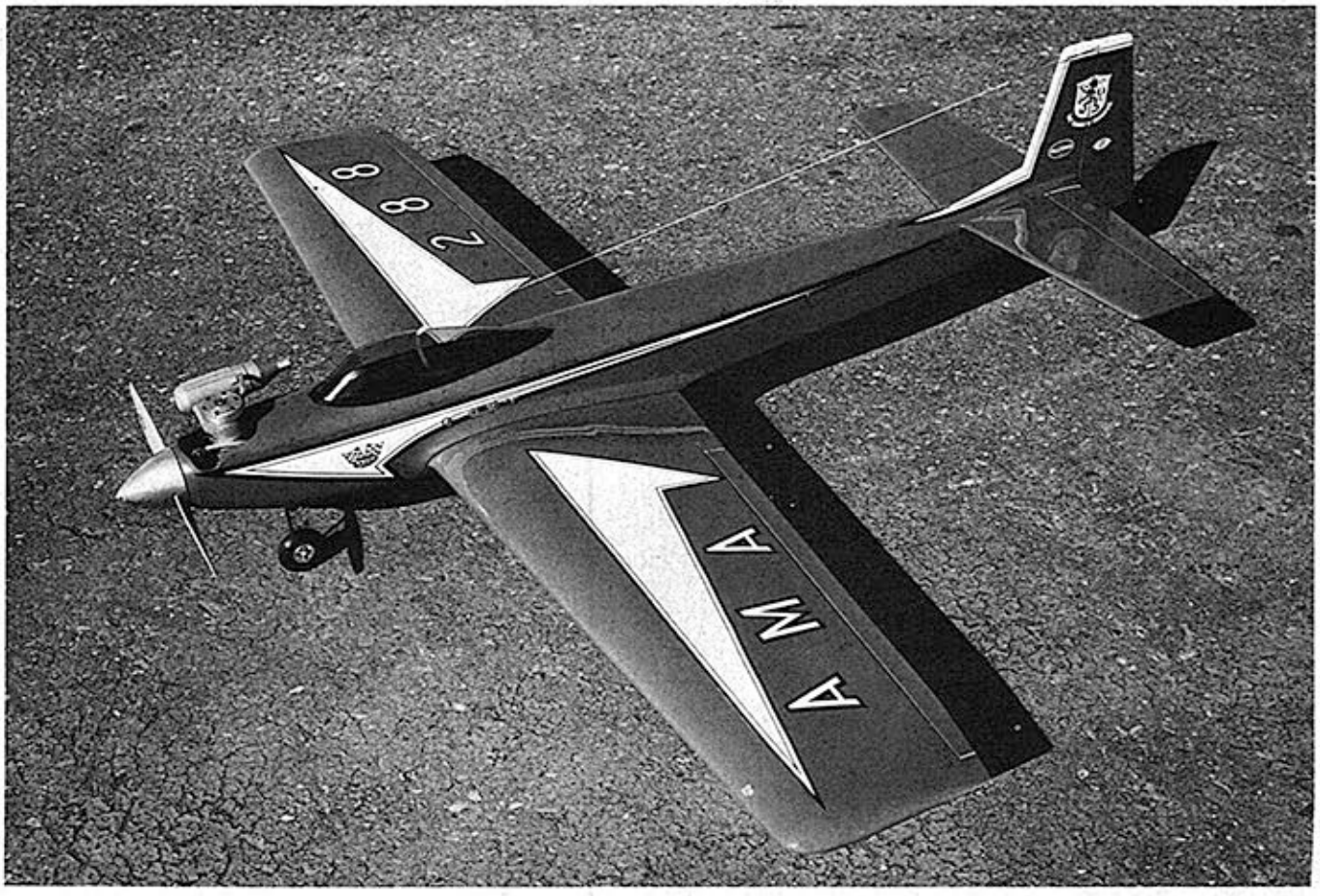
A lot of thought went into the Super Kaos prototypes - - - eight of them, to be exact. It has done quite well for the author and I hope it will do as well for you.

Before getting into the general construction, a few notes are in order. The amount of aileron, elevator, and rudder travel may vary with each model, but here are the surface travel dimensions that have worked well for the author: ailerons – ¼" up, ¼" down; elevator – 3/8" up, 3/8" down; rudder – the more the better! The Center of Gravity can vary slightly from model to model. The author prefers an aircraft to virtually sit on its tail and almost stay in that position when the tank is empty, presuming



Joe holds the Super Kaos so that the retracted gear can be clearly seen.

Clean lines, low drag, proper moments add up to a winning combination.



your radio is in the position marked on the plans.

Anything else we could say about the Super Kaos would only be superfluous. When you bring home the contest hardware in 1973, you'll know how we feel about this design.

CONSTRUCTION

STABILIZER:

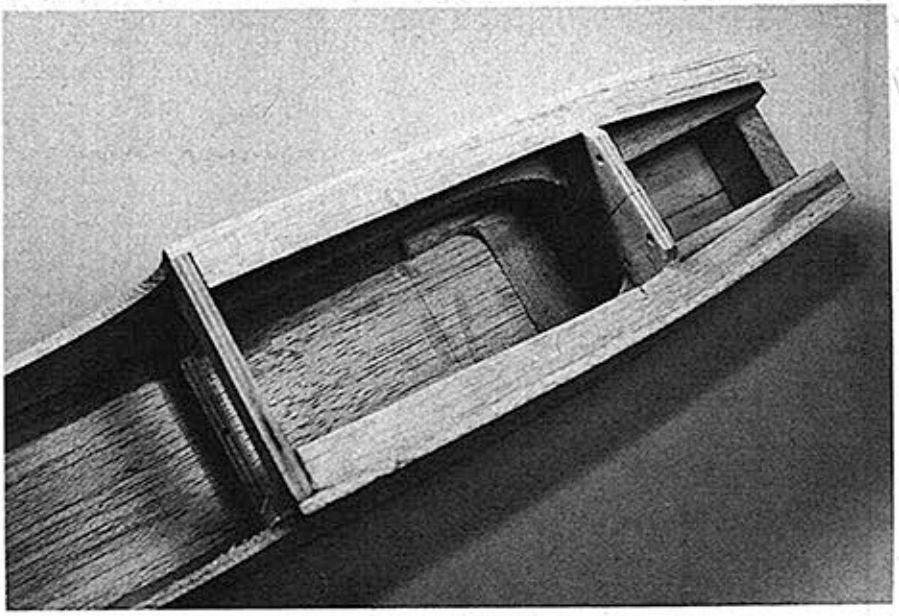
Edge glue the sheeting using masking tape to hold them together. Lay one completed sheet on the building board, glue trailing edge spar, tips, leading edge spars and center fillers in place on the completed sheet. Glue the ribs in place starting at the tip and working in to the center filler. Glue top sheet in place and sand the stabilizer to shape. Connect the two elevators together, using epoxy glue to cement the wire and horn to the elevator. Be sure to leave enough room between the elevator halves to clear the center section. Glue the center section to the stabilizer being sure **not to glue the elevator wire** to the stabilizer. Sand the elevators and center section to the correct shape.

FIN AND RUDDER:

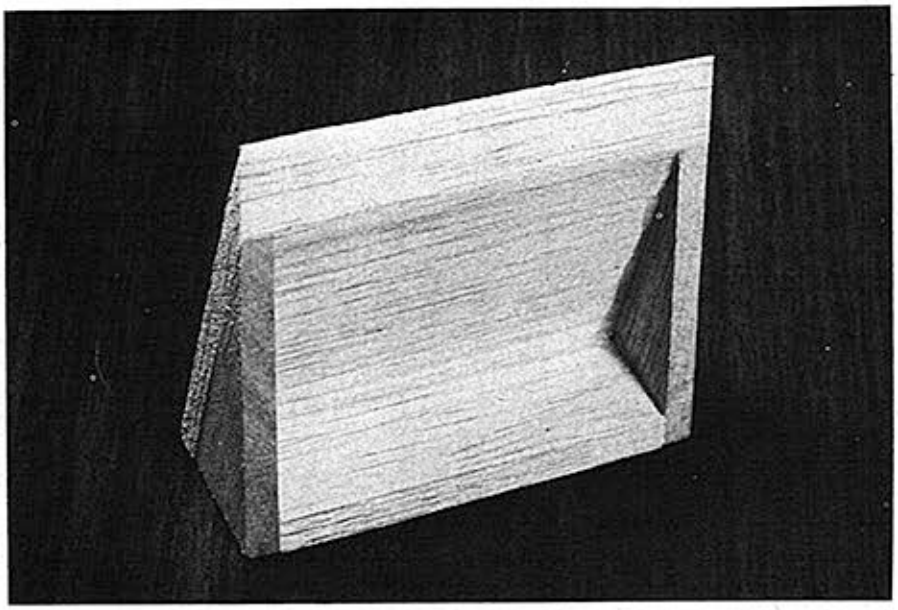
Glue the pine control horn insert, rudder bottom and rudder together. Do not glue the dorsal fin to the fin, since it is glued in place after the fin is glued to the fuselage.

WING:

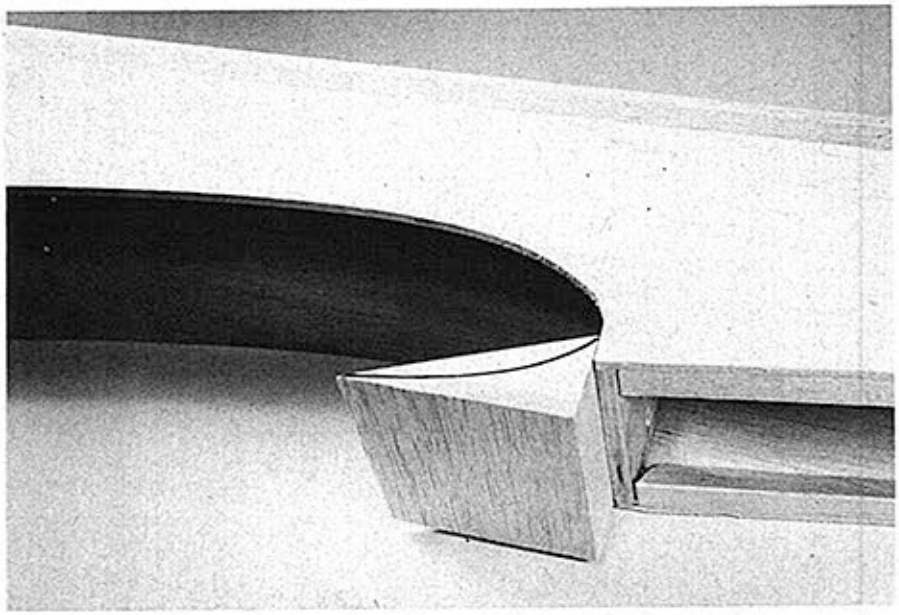
The RCM Wing Jig is highly recommended to assemble the wing. (See the August 1967 issue of R/C Modeler Magazine – Xerox copies of article available.) Using ¼" steel rods in the holes in the ribs, this jig can give you a true wing in much less time and work than usual construction methods. If you do not use the RCM Wing Jig, use a flat building board and make up small jig blocks. Pin the blocks to the position shown on the plans. Glue the ribs to the spar with the landing gear notch in ribs No. 2 and No. 3 down. Do not glue in the false ribs or the ¼" dowel. Glue the top spar into position. Glue the notched trailing edge to the ribs and pin to the jig blocks. Glue the notched leading edge to the ribs, let the glue dry before proceeding, then glue the front and rear sheeting in place (the leading edge of the front sheeting is tapered). It is recommended that the forward sheeting be dampened with water on the outside surface only. This will cause the sheeting to curl and conform to the rib

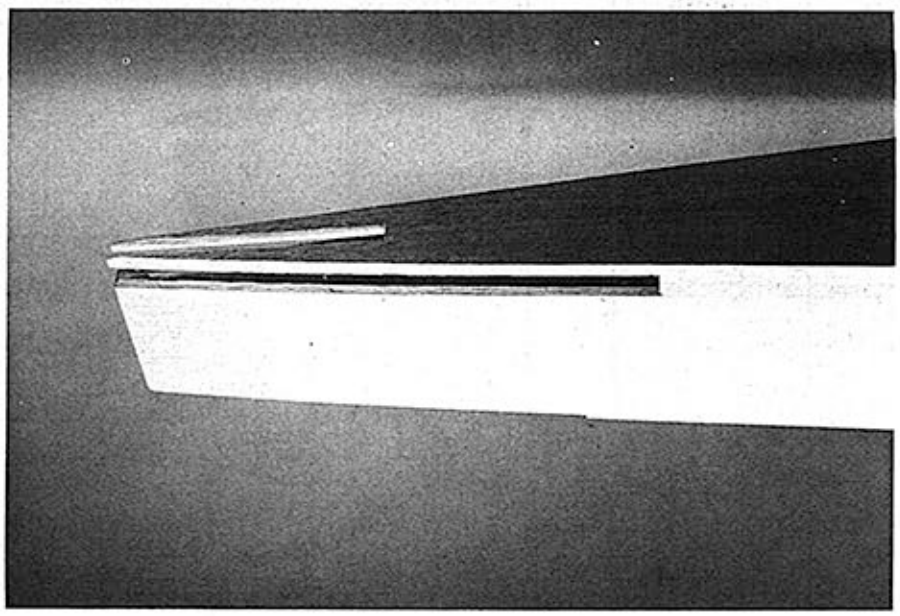


ABOVE: A bottom view of the fuel and engine compartment.

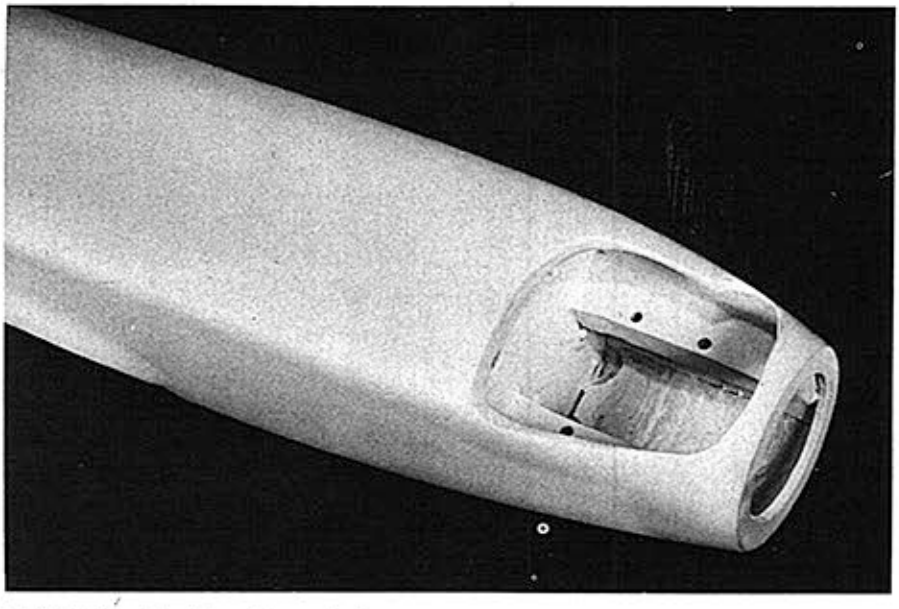


ABOVE: The roughed-out wing fairing block, shown in place, below.

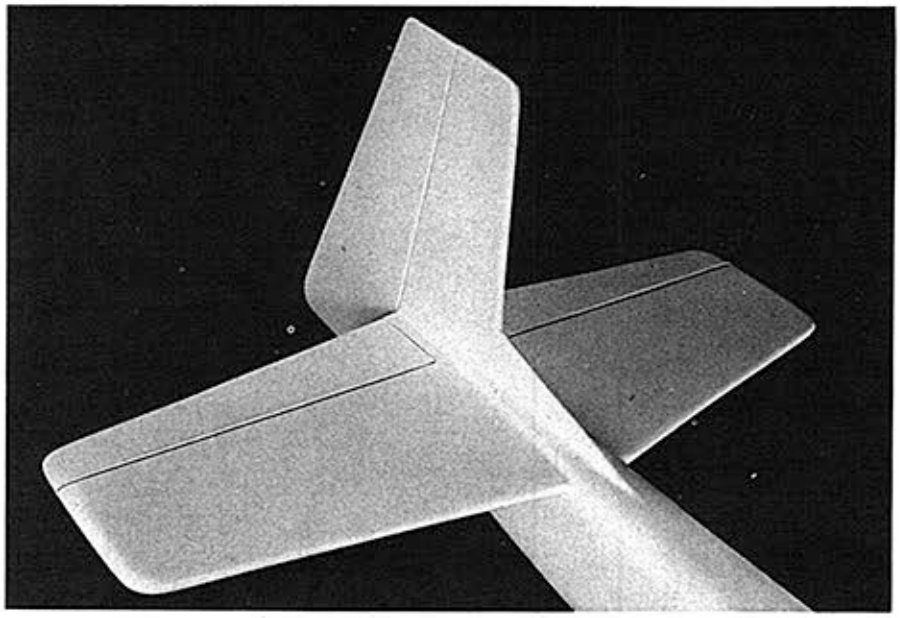




ABOVE: The unsanded empennage section. BELOW: View of the engine compartment.



BELOW: Note clean lines of completed empennage.



curve more easily without the possibility of splitting the sheet. Glue the cap strips in place. When all glue is thoroughly dry, turn the wing over and glue the rear sheeting. Glue the plywood landing gear doublers to the ribs and install the landing gear parts as shown on the plans. To install the wing tip blocks, cut any overhang of sheeting, spars, etc., flush with the tip rib and sand flat with large sanding block. If you wish to hollow the tip blocks, glue at two small spots and sand to the shape on the plan. Now break loose and hollow inside then glue into position. To build the other wing panel repeat this process being sure to **keep the landing gear notches up** so you will have a right and left wing panel. Remember that this panel is upside down, so do not glue leading edge sheeting in place. When the wing panel has dried, turn it over and complete the top sides.

FUSELAGE:

Start the fuselage by first drilling all necessary holes in bulkheads No. 1 and 2. Drill the holes for the motor control, gas tank vent and nosegear nylon block. If retracts are to be installed, drill the necessary holes. Be sure to keep retract nosegear as low as possible on bulkhead No. 1. Next, drill the motor control and nosegear steering holes in bulkhead No. 2. The fuselage is built upside down. Start construction by placing the fuselage top on the building board and draw a line down the center of the top block and another across the top block at the rear of the 3/8" motor top block and glue the motor top block to the fuselage top. Add the 5/8" x 3/8" triangular top stringers. Notice that they do not go all the way to the rear, but stop at the stabilizer leading edge. Glue in all fuselage 1/4" x 3/8" cross stiffeners. The fuselage sides and bulkheads 2 and 3 are glued to the top block at the same time, making sure that the sides are square to the building board. Add the ¼" square fuselage rear stiffeners to the sides. Measure the fuselage sides 5-7/8" forward of bulkhead No. 2 for bulkhead No. 1 position. Glue the motor mounts and bulkhead No. 1 in place (epoxy recommended); use small C type clamps to pull the sides into place. Add the upper ring filler block between the sides at the front of the fuselage. The outside measurement at the nose is 2-7/8" before the plywood spinner ring is glued into place. Glue the 3/32" balsa sheet planking on the

bottom of the fuselage cross grain, again checking that the sides are square to the building board. Glue the plywood wing nut plate into position on bulkhead No. 3. Glue the two 5/8" x 5/8" triangular stock to the bottom of the tank and engine compartment. Water soak these parts so they will bend without breaking. The fuselage can now be removed from the building board. Cut the triangular glue blocks and glue in place as shown on the plans. Now cut a hole in the top of the fuselage for the motor. Completely mount the motor using blind nuts (notice that there is no side thrust). The chin block and spinner plywood ring are added later. A light coat of epoxy is recommended for the entire tank and motor compartment. Glue the wing fillets together at the beveled joint. Do not glue the fillets to the fuselage as yet. Sand the entire fuselage, then glue the stabilizer and fin in place. Check that the stabilizer is parallel to the top of the fuselage. The fin is centered and at right angles to the stabilizer. After they are dry, add the dorsal fin.

JOINING WING PANELS AND AILERONS:

Trim all overhang flush with the root rib. Place the bottom of the wing down on a flat building board and block up the tip one inch. With your sanding block, sand square across the wing until the rib is 90 degrees to the building board. When both panels are sanded, check for proper fit. Now glue the two panels together with epoxy or Titebond glue using the ¼" dowel ¾" long in the jig holes for alignment between the two panels. Now epoxy the aileron linkage into the trailing edge stock that has been grooved to accept it. Be sure to coat each end of the linkage with mold release or vaseline. The linkage is correct when the servo connection is on the **top** of the wing (make one left and one right). Glue the trailing edge, with linkage, to the wing. Glue the plywood wing bolt plate in place with ¼" overhang at the trailing edge. Block the wing 1/16" down in the fuselage wing saddle, making sure it is square in the saddle. Now mark the leading edge of the wing through the ¼" holes in bulkhead No. 2 through the bottom of fuselage tank compartment. Remove the wing and drill a ¼" hole through the leading edge of wing. Glue the ¼" dowel and false ribs in place. Complete the bottom of the wing leading edge sheet-

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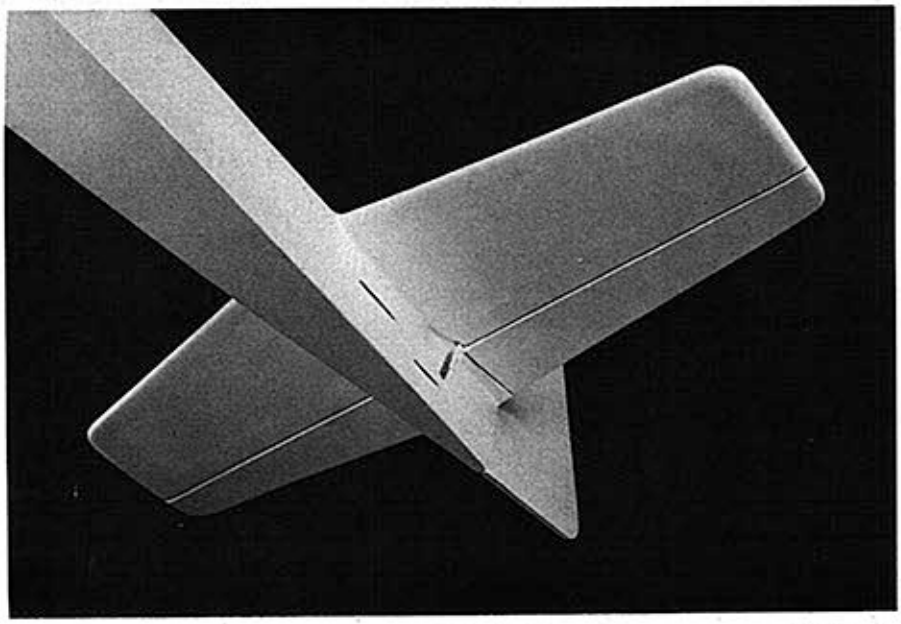
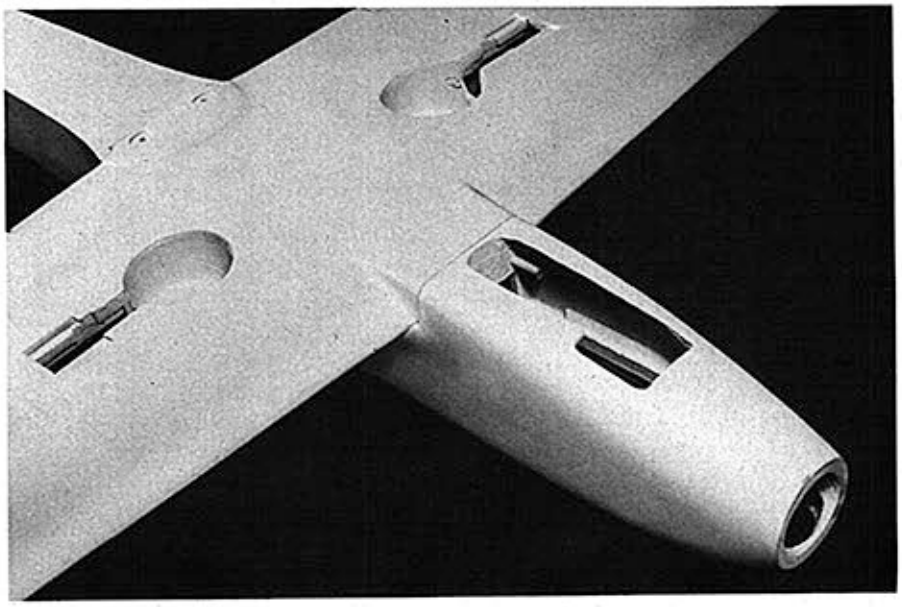
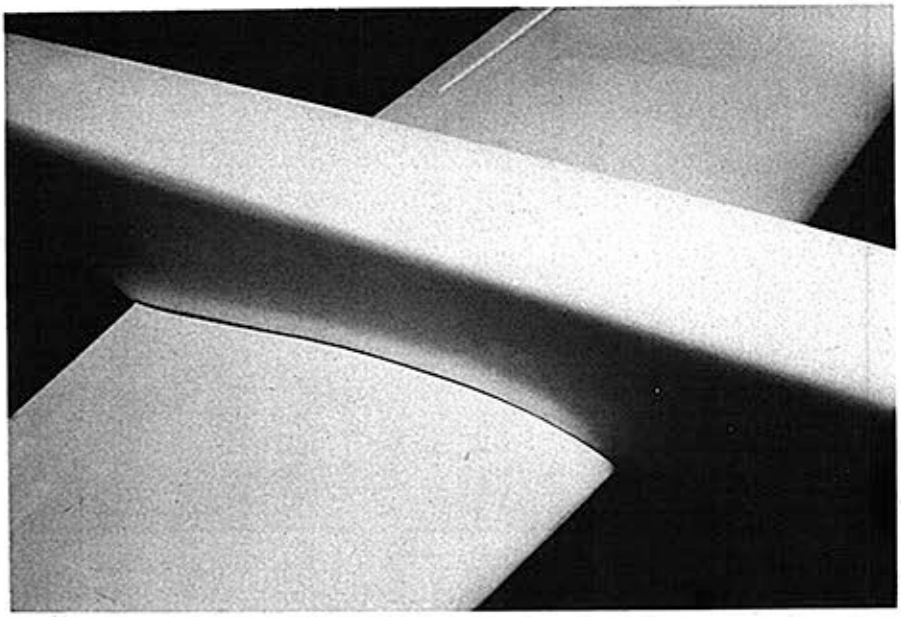


ABOVE: View of underside of empennage. BELOW: All retract gear cut-outs completed.



BELOW: Completed airframe with wing saddle fillets.



NOTE: CENTER SECTION BUTTS TOGETHER ONLY. NO CENTER DIHEDRAL BRACES ARE NEEDED. CLOTH, GLASS CLOTH, CELASTIC OR OTHER MATERIAL IS REQUIRED TO SUPPORT CENTER SECTION. EXTEND MATERIAL 2" – 3" ON EACH SIDE OF CENTER RIB.

3/8" SQ BALSA LEADING EDGE
1/4" HARDWOOD DOWELS
3/16" BALSA FALSE RIBS BOTH SIDES OF DOWELS
MAIN GEAR IN RETRACT POSITION
LINE OF 3/32" BALSA SHEETING
1/16" PLY
3/8" X 1/2" BALSA SPARS
LINE OF 3/32" X 3/8" BALSA CAP STRIPS (TOP & BOTTOM)
END OF CENTER SHEETING
1/16" PLY PLATES
ALL RIBS 3/32" BALSA
BLOCKING
LINE OF 3/32" BALSA SHEETING
3/16" X 1/4" BALSA TRAILING EDGE
BLOCK NO. 2 11/16" THICK
CENTER LINE OF HINGE
1/8" WIRE AILERON HORN
3/8" X 1-1/8" BALSA
BLOCK NO. 1 7/8" THICK

3/4" UNDER EACH TIP — DIHEDRAL DETAIL — 3/4" UNDER EACH TIP

1/2" BALSA BLOCK NOTE GRAIN DIRECTION
1/2" HARDWOOD MOTOR MOUNTS
5/8" TRIANGLE STOCK
NO. 2
S&O MK. 1 RECEIVER
NO. 3
TOP
6-32 BLIND NUTS
1/4" PLY DOWN
2-3/4" SPINNER VECO OR MIDWEST
NO. 1
1/4" TRIANGLE BALSA
CARL GOLDBERG NYLON TILLER ARM, NOSE BEARING & WIRE STRUT
1/4" TRIANGLE BALSA (TYPICAL)
1/2" BALSA FILLETS
FUSEL NOTCH NO. 2

USE 11-7-1/2 PROP FOR BEST RESULTS
VECO 61 SERIES 72 ENGINE SHOWN
3/8" BALSA BLOCK
1/4" TRIANGLE STOCK
2 OZ. FUEL TANK
BULKHEAD NO. 1 1/4" PLY
1/4" TRIANGLE STOCK
S&O MK. 1 RECEIVER
BULKHEAD NO. 2 1/4" PLY
THROTTLE PUSHROD WING FILLET
BULKHEAD NO. 3 1/4" BALSA
LEF
STEERING PUSHROD
POWER PACK POSITION
(2) 1/4" HARDWOOD WING DOWELS
C.G.
AILERON SERVO POSITION
1/4" PL 1/4
2" DOWNTHRUST
1/8" PLY RING
1/2" HARDWOOD MOTOR MOUNTS
5/8" TRIANGLE STOCK
BALSA BLOCK
NOSE GEAR IN RETRACT POSITION
WING SET AT 1/32" POSITIVE INCIDENCE
6-32 BOLTS
1/16" PLY WING PLATE
SECTION 1A
CUT TO OUTSIDE LINE & BEVEL INTO SPINNER
2-1/2" DU-BRO NOSE WHEEL
2-3/4" DU-BRO WHEELS
1/8" PLY NOSE RING
1/16" PLY WING PLATE TEMP
BULKHEAD NO. 1 1/4" PLY

BALSA TIP BLOCK HOLLOW TO REDUCE WEIGHT
BLOCK NO. 3 1/2" THICK
ALL RIBS 3/32" SHEET BALSA
TYPICAL 1/4" X 3/8" BALSA CONSTRUCTION
STAB COVERED BOTH SIDES WITH 1/16" SHEET BALSA
3/8" BALSA
CENTER LINE OF HINGE

* BLOCK NOT SHOWN FOR CLARITY
* WING HOLD BRACE
AGE SIDES ARE ED FOR BULKHEADS & 3
3/16" BALSA SIDES
INDICATES POSITION OF LONGERON
CENTER SECTION OF STAB 1/4" SHEET BALSA
* BALSA TOP BLOCK
3/8" X 5/8" BALSA LONGERON (ORIGINAL SHAPE OF LONGERON)
1/4" X 3/8" BALSA (TYPICAL CROSS BRACING)
CROSS SECTION AT THIS POINT
STAB SET AT 0° INCIDENCE
T SIDE NOT SHOWN FOR CLARITY
ELEVATOR & RUDDER PUSHRODS
1/4" SQ BALSA VERTICAL BRACING
CUTOUT FOR ELEVATOR PUSHROD (LEFT)
CUTOUT FOR RUDDER PUSHROD (RIGHT)
PINE INSERT
* WING HOLD DOWN WITH TRIANGLE STOCK ON BOTTOM
3/32" BALSA BOTTOM (CROSS GRAIN)
MIDWEST CONTROL HORN
1/4" BALSA SHEET
, BLIND NUTS & WASHERS

SECTION 1A
1/4" BALSA
BULKHEAD NO. 2 1/4" PLY
BULKHEAD NO. 3 1/4" BALSA
LANDING GEAR PATTERN 5/32" MUSIC WIRE

WING SPAN 58-1/2"
WING AREA 644 SQ IN
LENGTH 54-1/4" (INCLUDING SPINNER)
ENGINE DISPLACEMENT .61
WEIGHT WITHOUT RETRACTS 6-1/4 LBS
WEIGHT WITH RETRACTS 7-1/4 LBS

SUPER KAOS

DESIGNED & DRAWN BY	JOSEPH BRIDI	INKED BY	DICK KIDD

0 1 2 3 4 5 6

or this will almost certainly result in a tip stall with the inevitable cartwheel. The model should prove quite docile if allowed to take off itself with perhaps a little of usual right rudder. When airborne, climb gently and straight for as long as possible before turning, and climb still higher before attempting to trim. After trimming one should be able to fly 'hands-off' without difficulty, even though the aerobatic performance is fantastic if the model is kept down to a reasonable weight.

Try climbing almost vertically and then apply full-up and left then, when the machine is pointing straight down, let go of the sticks – slight up should then pull it level again. If not, you don't have enough height or the C.G. is wrong.

Three-point landings are easy if the throttle and elevator are used together and, in fact, are highly recommended to preserve the cowl!

Happy landings!

NOTE: Professionally made fiberglass moldings can be obtained for $25.00 per set, including shipping, from: Norman McFarland, 13, Broadway, Helmshore, Rossendale, BB4 4Hb., Lancashire, England.

SUPER KAOS

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ing and cap strips. Refer to the plans for completing the center section reinforcements.

TANK COMPARTMENT BOTTOM AND FILLETS:

Place the chin block tank compartment bottom in position and mark the sides. Remove and cut to shape and drill a hole for the nose wheel, then glue in place and allow to dry. Now mount the motor and glue the spinner ring in place. Sand off the nose of the fuselage enough so that at least 1/16" clearance exists between the spinner and plywood ring. Place the wing in the saddle and bolt in place. Block the wing down 1/16" from the fuselage sides. Now check all alignment again including wing incidence. When you are satisfied that all is right, glue the wing fillets to the fuselage allowing 1/16" clearance between the bottom of the fillets and the top wing. The 1/16" gap will allow the use of wing sealer tape. Now, **completely** finish the airplane. Install all equipment, engine, tank, wheels, pushrods, etc., except the fuselage servos.

BALANCE:

With the airplane complete except for the servos, make sure the battery pack is pushed to the rear of the tank compartment. Now place the servos on top of the fuselage and move fore and aft until the desired balance is found. Mount the servos inside at this position. If a change in CG is found necessary after flying, the battery can now be moved for a CG change.

FINAL SET-UP:

After the proper balance has been achieved, set the completed airplane up, with the wing mounted, on a flat surface. Set the elevator at zero

(straight back). Block up the wheels, as necessary, to obtain the same height, reading from the flat surface to the center of the stabilizer leading edge and the elevator trailing edge. Block up the wheels, as necessary, to obtain the same reading from the flat surface to the center of the hinge line on either end of the stabilizer. Repeat until all height readings are okay. Measure the wing leading edge to the flat surface and the trailing edge to the flat surface. The leading edge should be 1/32" higher than the trailing edge; shim or sand as necessary to obtain the correct height reading. Measure the wing tip to the flat surface; both tips must be the same height from the flat surface. Shim or sand to obtain the necessary height. Measure from the top of the rudder to each wing tip and adjust the wing until the distance is the same on each side then mark the wing and fuselage so the point can be found again when assembling the airplane at the field. Remove all the blocks from under the wheels and bend the main gear so that the wing tips are equidistant to the ground. Adjust the nose wheel landing gear height for equal distance to the ground at the stabilizer/elevator. Elevator travel should be 3/8" up and 3/8" down. Aileron travel should be 1/4" up and 1/4" down. Rudder travel is optional.

PRE-FLIGHT:

Always check your controls for direction and any possible binding. Check the CG for proper position - - - the CG on the plans are approximate. Move the power pack, etc., to suit the flight characteristics you may desire. The Super Kaos is capable of all F.A.I. and A.M.A. maneuvers with ease, yet docile enough for the advanced novice.

Happy Flying! □