QUICKIE

PHOTO BY EBERHARD WINKLER

Impressed with the looks of the full size homebuilt, the author created this 1/2A powered sport scale model. With much flight testing and improvements, the final version is very realistic and stable in the air.

BY SIEGFRIED GLOECKNER

ABOUT THE AUTHOR

Siegfried Gloeckner, age 29, lives with his wife in Schwaebisch-Gmuend, West Germany. He has recently completed his education as a mechanical engineer.

Siegfried began building model airplanes 17 years ago and was soon designing his own models. He became interested in 1/2A activities in 1975 after reading R/C Modeler for the first time.

Siegfried became acquainted with an astonishing plane called the Cutie, that could fly on a Cox reed valve engine and carry a custom radio gear with two servos. This plane sparked his interest in 1/2A modeling which was nearly unknown in Germany. He went on to build other planes of this size.

In researching the building techniques of lighter models, Siegfried learned about, and became involved in, Peanut modeling. He has a special interest in unorthodox designs.

Siegfried has been building 1/2A or smaller aircraft since 1975 and, at the same time, he has been perfecting his English by reading and studying English language airplane magazines.

The full size Quickie is a very small lightweight plane. The wingspan is 16 ft. and weighs 240 lbs. (empty). It can carry a load equal to its own weight, resulting in a gross weight of 480 lbs. With an 18 hp., two cylinder four stroke engine, it cruises at 121 mph. The range is 570 miles on 5.8 gallons of fuel. It stalls at 53 mph and is acclaimed as a very safe and stable flyer.

The first picture of the Quickie that I saw was in a German aircraft magazine. I was amazed by its appearacne and hoped to get more information. Sometime later I bought the March '78 issue of the Aeroplane monthly magazine, with a more detailed article on the plane as well as many photos. I regretted that there was no 3-views. One year later, I finally found another article on the Quickie, with a 3-view in a "flight" magazine that I purchased by accident at a railway station bookstore. Now I had what I needed to design a model from scratch.

The Quickie pleased me because of its unusual fuselage shape, its economy, and the ingenious idea to integrate the landing gear into the front wing, reducing weight and drag. At first I built a balsa profile glider in order to research stability. The glider proved the stability of the design. After wondering about what size model should be built, I decided to build it with a slightly smaller span than my 1/2A monoplanes (because it has two wings) and gave it 700mm (27.5 in.) wingspan. This might not seem very scientific, but it was a good solution. The next step was to draw a side and plan view of the intended model. I was upset because of the small wings. Working with low Reynolds numbers, it seemed impossible to me that the wings would give enough lift to fly the model at reasonable

QUICKIE
Designed By: Siegfried Gloeckner

TYPE AIRCRAFT
1/2A Sport Scale
WINGSPAN
Front 25⅛ Inches
Rear 27½ Inches
WING CHORD
Front 3⅜" (Avg.)
Rear 3⅜" (Avg.)
TOTAL WING AREA
176 Sq. In.
WING LOCATION
Canard
AIRFOIL
Flat Bottom
WING PLANFORM
Front — Tapered L.E. Swept
Rear — Tapered L.E.
ANHEDRAL, EACH TIP
Front Wing 1 Inch
DIHEDRAL EACH TIP
Rear Wing 1 Inch
O.A. FUSELAGE LENGTH
30½ Inches
RADIO COMPARTMENT AREA
(L)13" x (W)3" x (H)3"
VERTICAL FIN HEIGHT
5½ Inches
VERTICAL FIN WIDTH (incl. rudder)
3 Inches (Avg.)
REC. ENGINE SIZE
.049 Cu. In.
FUEL TANK SIZE
Cox Tank Mount
LANDING GEAR
Conventional
REC. NO. OF CHANNELS
2 (3 Optional)
CONTROL FUNCTIONS
Elev., Ail.,(Throt.)
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa, Ply
Wing ..... Balsa
Empennage ..... Balsa
Wt. Ready To Fly ..... 18 Oz.
Wing Loading ..... 14.8 Oz/Sq. Ft.

speeds. The drawing was put aside and I looked for other planes that might be worthwhile to build.

But I could not forget the Quickie. I re-read the articles on the full size plane, checked the 3-view, and looked at my drawing again and again. I did not want to enlarge it, because that would increase weight and drag, and I did not want to use a larger engine. Two weeks after the first drawings were done, things went quickly. The wing chord was increased slightly so as not to disturb the airplane's appearance, and a light building structure was worked out. One problem was to find a canopy to match. The rear part of the canopy of the Graupner Cumulus sailplane was the solution. I'm sure there are many others than can be modified and used.

Three weeks later the plane was ready.

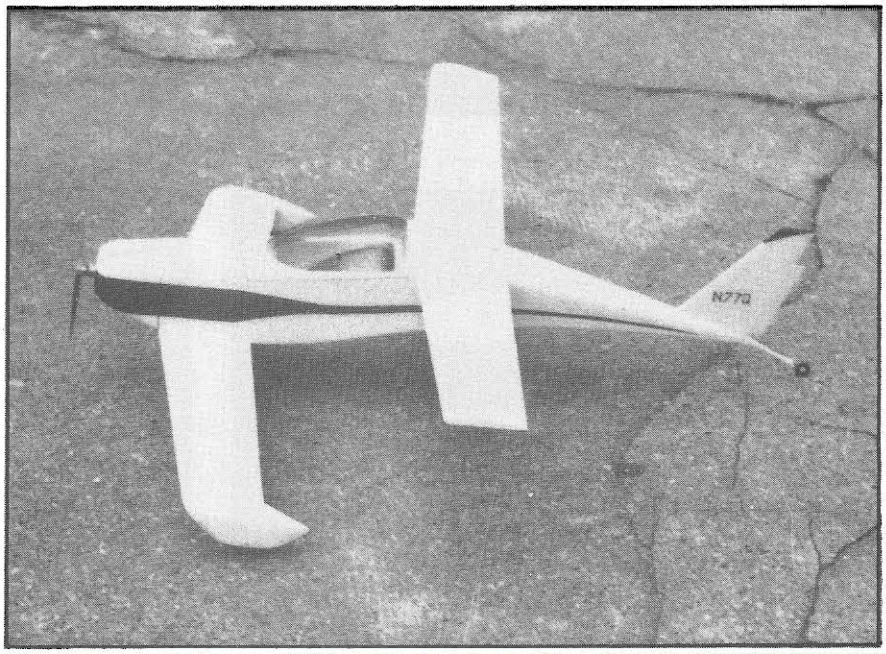
A serious problem was the C.G. location. It was not mentioned in the 3-view, so I used the C.G. of the hand launch glider. This was to give me some very exciting moments in the first flight.

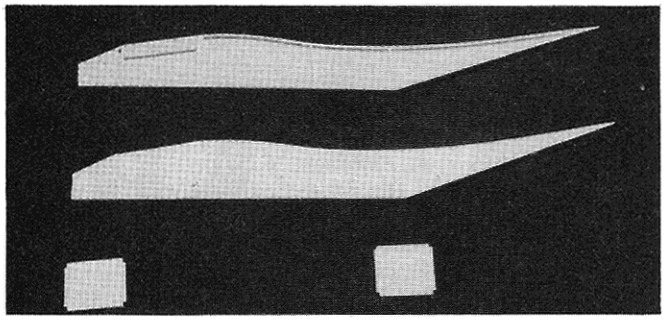
Out on the airfield, with the engine turning full rpm's, the model was hand launched into the wind. Then there was real chaos; the model climbed steep and fast into the air, rocking severely, and nearly impossible to control. Thinking it was radio failure, I throttled back, trying to control the descent. Still rocking, the plane hit the ground in a knife-edge position, proving how strong the airframe was. Only the front wing hold-down was broken and had to be repaired. Both wings were still sound and the radio was working fine. I guessed that the wing rocking was caused by the wrong C.G., but I was not sure.

Then, again by accident, I bought another "flight" magazine in which Rutan's latest designs were described. There were improvements on his VariEze mentioned, to stop wing rocking that some amateur builders complained of at aft C.G. position and high angle of attack. Before trying again and risking the loss of the model, I wrote a letter to the Rutan aircraft factory. Some photos of my model were included, along with a copy of the 3-views, asking for the correct C.G. position on the full size Quickie.

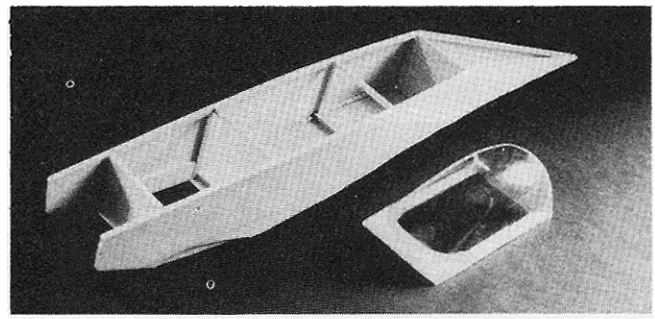
The Rutan people were very kind and sent me the information. I shifted the battery and receiver forward until the plane balanced properly. The next flights were without problems. After some aileron trimming the model flew very stable. Speed is gentle, and the plane looks very realistic in the air.

Now, let's see how to build it. Construction photos are of the prototype so some parts on the photos vary with those on the plans. The parts were changed as

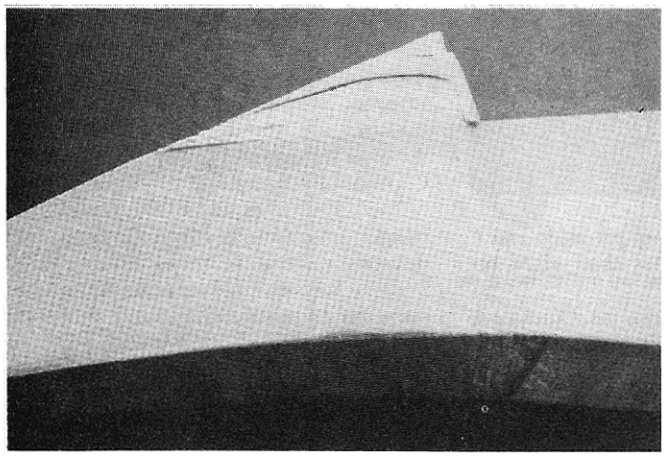




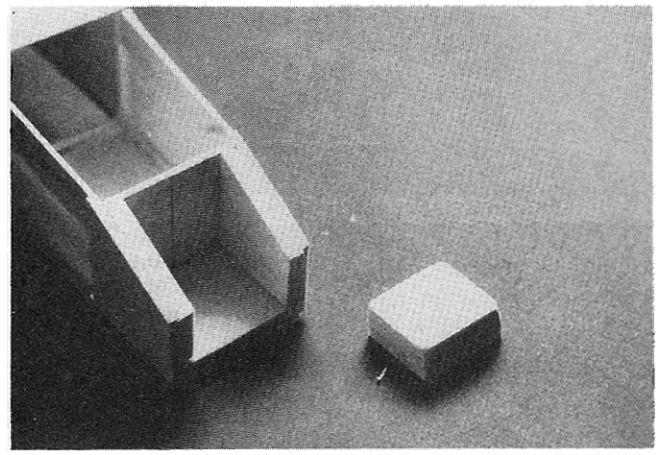
Fuselage sides with reinforcing strips assembled.



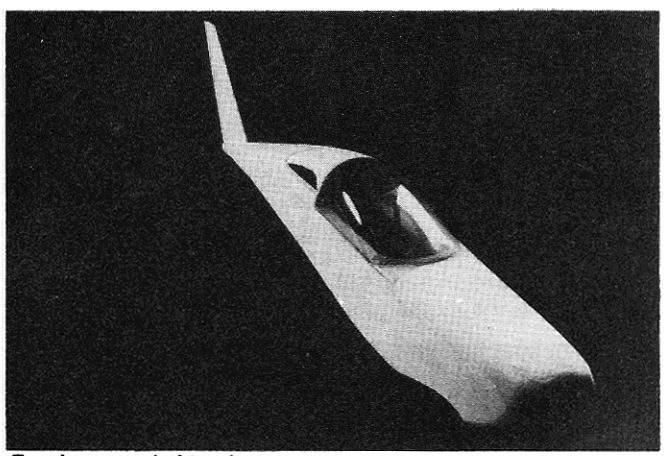
Partially built fuselage and assembled canopy.



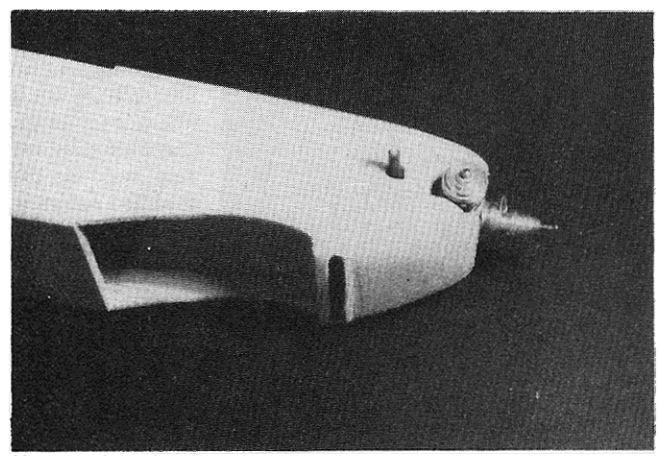
Reassembled and installed part F12.



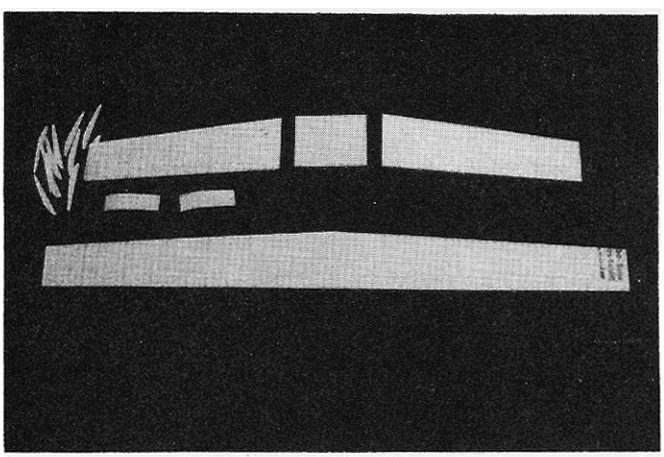
Motor mount prior to installation.



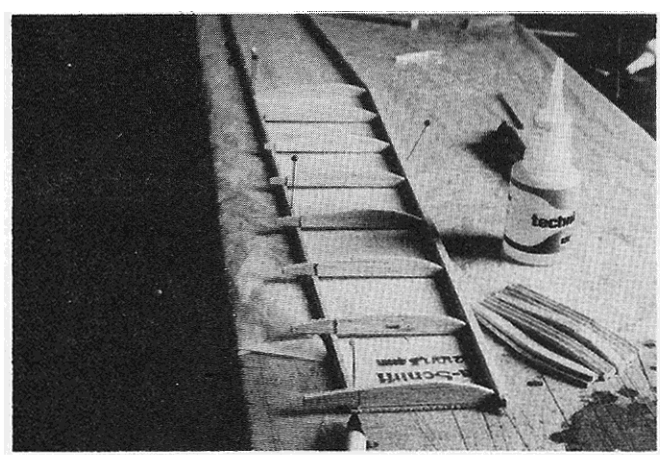
Fuselage sanded to shape.



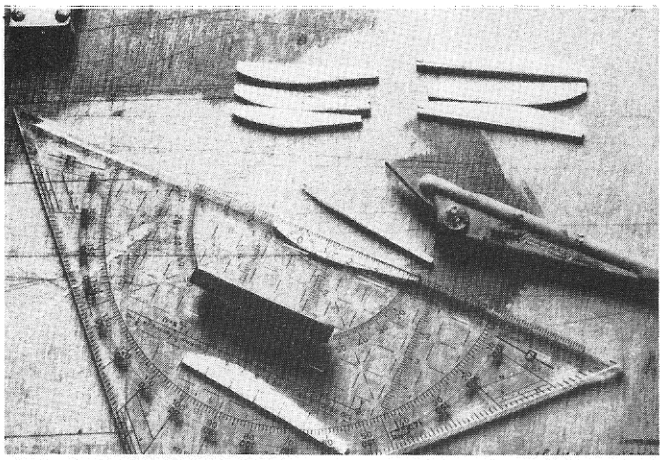
Nose and engine installation.



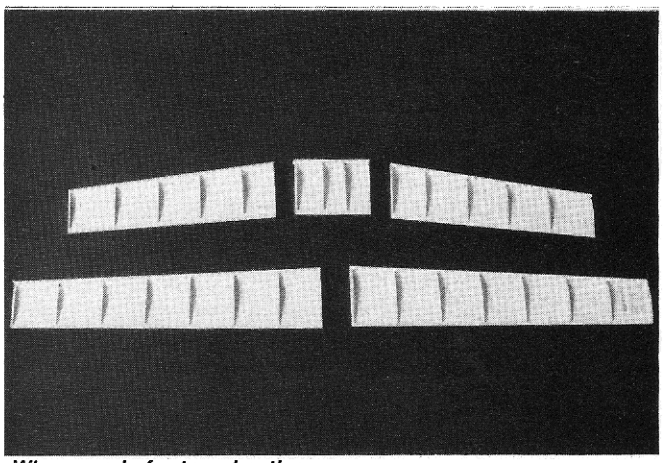
Wing bottom sheeting and ribs.



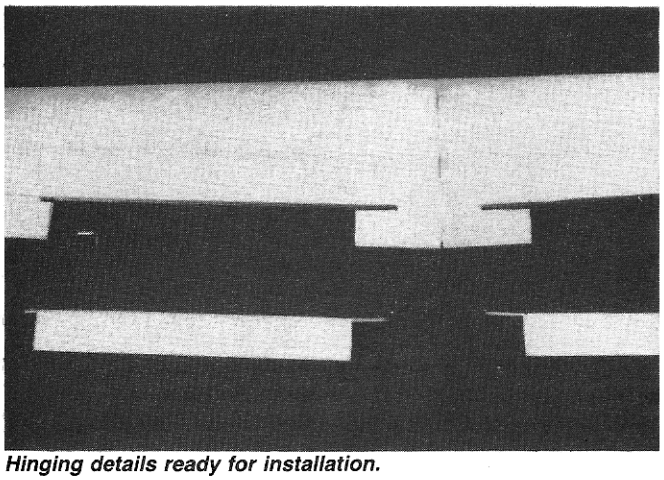
Rib length is marked for tapered ribs.



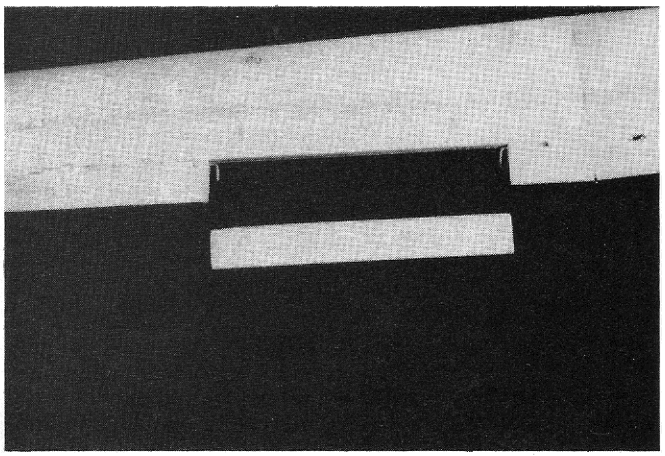
Bottom of ribs is trimmed to match rear spar depth.



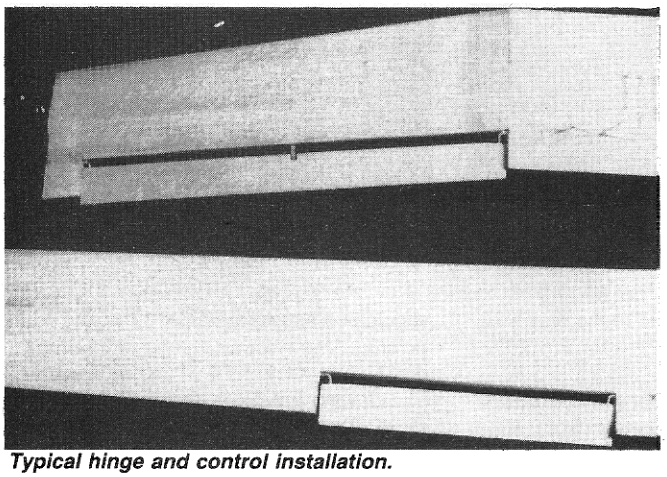
Wings ready for top sheeting.



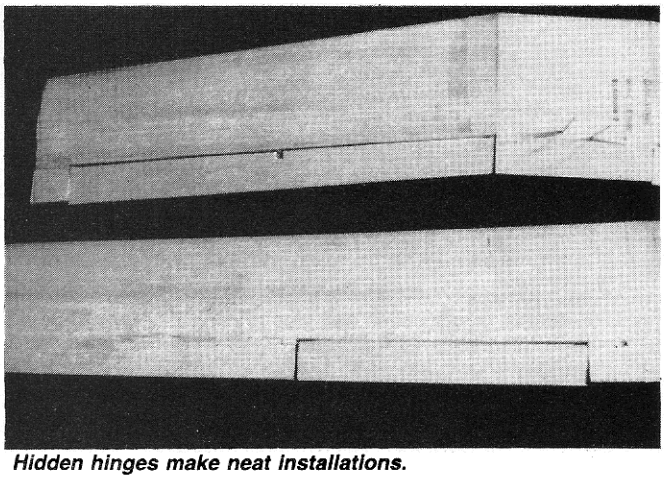
Hinging details ready for installation.



Another view of hinge and control installation.



Typical hinge and control installation.



Hidden hinges make neat installations.

improvements were worked out during the flight testing.

CONSTRUCTION

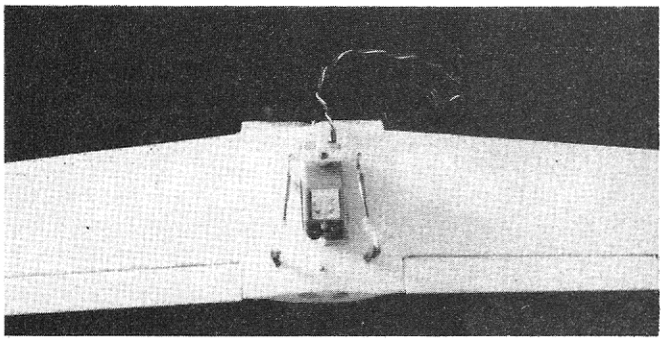
Select light, strong balsa, perhaps indoor quality, for sheets. Blocks should be the lightest wood available. Different glues were used. To speed up building, cyanoacrylate glue and 5-minute epoxy were used generally. Contact cement was used to sheet the wings.

Fuselage:

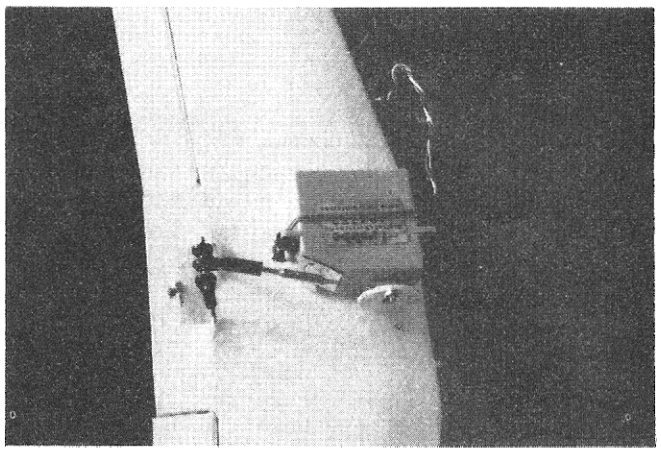
Cut out the two fuselage sides, and add the longerons. Make sure the two fuselage sides are of the same density wood. The bottom longerons may have to be notched to bring them around the curves. Add the bracings of 3 x 3mm (1/8'' square), and parts F3 and F13. Be sure to build a left and a right side. Sand the longerons at the aft end of the fuselage to match together as shown on the plan. Mark the motor mount location on firewall F1. Glue the fuselage sides together at the ends, and put F1 in place. Turning the fuselage upside down helps to align the fuselage sides on the workbench. Add F2, F4 and the spreaders of 5 x 3mm (3/16'' x 1/8''). Hold together with rubberbands or clamps until glue sets. Epoxy the wing hold-down F9 to F8, together with the 6mm (1/4'') triangular balsa. The triangular balsa should be covered completely with epoxy for added strength. Install F8 to the fuselage sides. F4 and F14 are installed later. When you have completed the fuselage to this stage and are sure it is properly aligned, you can cover the bottom with 1.5mm (1/16'') sheet balsa running cross-grain.

Now smear some epoxy around the assembled motor mount parts F10 and F11 and epoxy to F1.

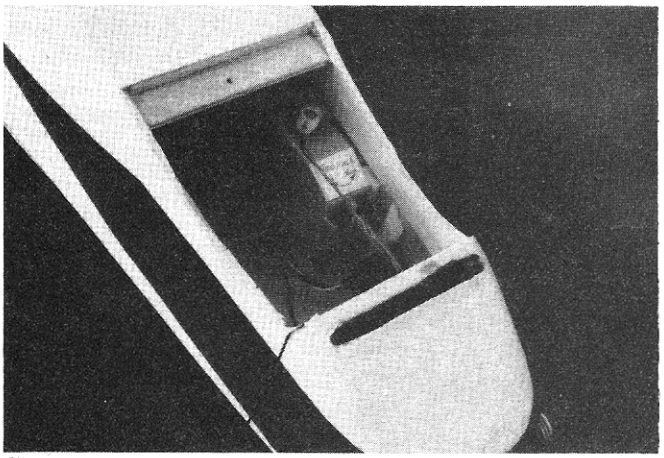
Match the bottom nose block to the



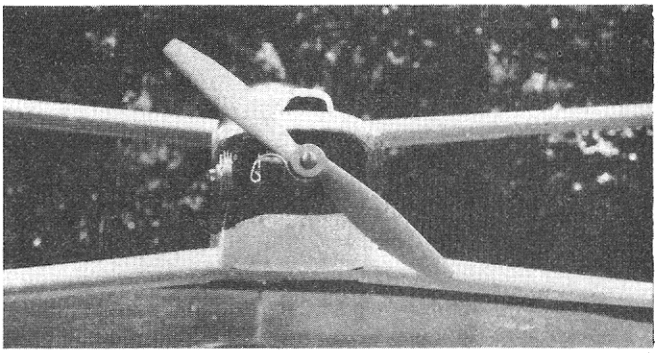
Aileron control arrangement is straightforward.



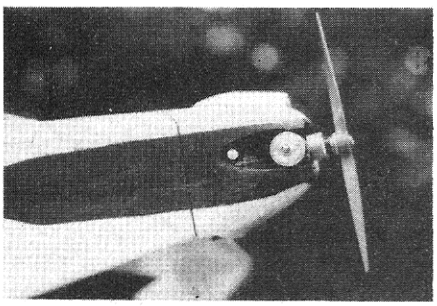
See text for elevator servo hook-up.



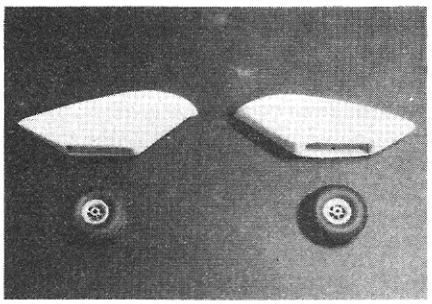
Throttle servo is mounted with foam mounting tape.



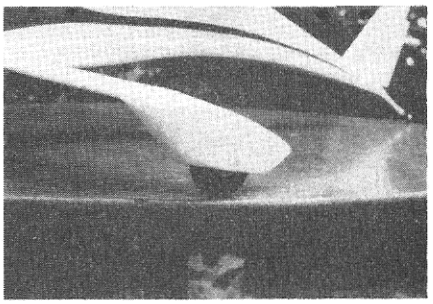
.049 side mounted engine viewed from front.



Carved out area is for cooling.



Wheel pants.



Wheel pants and wheels installed.

fuselage, cut out the air outlet, and glue to the fuselage. Glue parts F3A in place.

Cut parts F12 as shown on plan. Parts F12 are pre-cut, because they are difficult to cut equal at both sides, when installed to the fuselage. I cut out the whole wing section and reassembled the parts. F12 is reassembled to help in sanding the turtledeck properly. When the reassembled F12 is in place, add the balsa block for the turtledeck. Cut out canopy frame F5, add F6 and T.E. stock. Make the canopy fit to the frame and glue. Do not glue the assembled canopy to the fuselage yet. Sand the turtledeck and check the canopy to make sure the contour is flush with it. Glue the front top balsa block in place and sand to match the canopy. Do not glue the canopy in place at this time. Sand the fuselage front end and add the front nose block. Cut out the air inlet before you do this.

Sand everything and cut the turtledeck behind the canopy as indicated on the plan. This part will be matched to the rear wing later.

Wings:

Construction of the front and rear wing is similar. Cut bottom sheeting from 1mm (1/16") balsa. In this case 1/16" sheet will have to be used and finished wing can be sanded. Use light wood for the rear wing and stronger wood for the front wing. Note that the bottom sheeting extends from under the L.E. to under the rear spar 2 x 3mm (3/32" x 1/8"). Glue the L.E. and rear spar in place. Cut out the ribs and glue them to the bottom sheeting. Make the shorter ribs as shown on the plan and construction photos. Glue the root ribs at the proper angle for dihedral. Use contact cement to glue top sheeting. Take the T.E. stock for the wings and center section, cut out the controls and glue the non-moving parts of the T.E. in place.

The hinges of tubing and wire hooks were designed so as not to be visible. The wire should be a matching fit into the tubing with no slop. Use brass or aluminum tubing so that 1/16" wire will fit the inside diameter. The elevator linkage is similar to that of the flaps. Actuating wire ends do not move parallel because of anhedral and sweep back. The solution to the ball links shown on the plans and photos works very well. There is no negative aileron effect when aileron is used. Note there should be some play between balls of the ball links, as the balls are moving together when up elevator is applied. You need differential on the elevator. You need more up than down elevator. When up elevator is given, control surface deflects down; remember it is a canard. When giving down elevator, the control moves up, forcing the nose down. No differential was used on the ailerons.

Bend up the four torque rods using 1/16" wire and 1/16" I.D. tubing. Install ailerons and elevators as per plan. Robart hinge

points can be used on all surfaces if desired. Either hinge as plan shows or use your favorite hinge.

Assemble the rear and front wing with epoxy and glass tape. Block up the center section of the front wing to get correct anhedral.

If you fly from a very rough field, I suggest that you glass the entire center section of the front wing out to the first rib past the center section. The 1/8" hardwood dowels can now be installed using epoxy.

Pants:

Cut out the necessary parts and glue the two blocks for the right and left pants together. Drill holes for the wheel axle, and glue the washers on the inner sides of the pants in place to act as bearings. Cut off enough wood around the holes on the outer sides to hide the 4-40 nut and screw head. Sand the pants to match the front wing, and epoxy in place. Do not forget the glass reinforcement.

Assembly:

Match the rear wing to the cut off part from the turtledeck. Install 1/8" I.D. tubing to F6 at proper location. Glue the canopy to the fuselage. If the aileron servo is installed as shown on the plan, cut out the hole for the servo in the rear wing. It still has enough strength to take its share of loads. Glue the cut out part of the turtledeck to the rear wing now. Epoxy F9 with triangular stock to F2. Triangular balsa should be covered completely with epoxy. Epoxy 4-40 nuts to parts F9. Drill holes in the wings for the wing hold-down screws. Drill a hole into the fuselage end to take the rear wheel strut, made from 4mm (1/8") hardwood dowel. Install wire for the tailwheel as shown on plan. Make cut-out for engine head and cooling on right fuselage side.

Fin and Rudder:

Cut from 4mm (1/8") light balsa and sand edges. The rudder does not move, but is built separate for better appearance. Drill the holes for 1.5mm (1/16") dowels.

Covering:

First, epoxy the motor area thoroughly and paint it black. The scoop on top of the cowling may be shaped now, to be installed when the fuselage is covered.

I covered the entire plane with white MonoKote. For the wheel pants and the scoop, several small strips were used, to form around the curves. Do not forget to cover the control surfaces. Blue plastic film was used for coloring and lettering. Glue the scoop to the cowling. The canopy and cowl outlines were marked with black striping tape.

Final Assembly:

Put some epoxy into the holes on the control surfaces and the non-movable rudder also. Glue the controls in place making sure that they do not stick to the tubing.

The wheels can be added now.

Engine Installation:

The Cox Black Widow has to be changed before installation. Loosen the four screws in the backplate. Take engine, tank, and backplate apart. Reassemble the motor with the engine and backplate turned to the right.

For the needle valve extension, take a wire of about 1.5mm (1/16") and drill a hole of the same size into the top end of the needle valve about 3/32" deep. File the plating from the top end of the needle valve then insert the wire into the hole and solder together.

If you want to use engine control, use an Ace throttle sleeve, it works well.

The engine is installed through the air inlet. You have to twist a little bit to get it in place. To place the screws, slip a piece of fuel tubing over the blade of a small screwdriver. Push the screw into the tubing with the slot fitting into the blade. This method was in a For What It's Worth idea in RCM. You also can fix the screws with Hot Stuff to the screwdriver. When the engine is in place, install the modified needle.

Radio Installation:

I mounted the elevator servo with servo tape to the front wing. The tape, being soft, adapts to the airfoil. Two wire hooks are glued to the center section to enable the elevator servo to be secured with a rubberband. With this installation, there has been no problems. (See RCM September 1977, page 85.) The aileron servo is installed in the accustomed way. Metal snap links were soldered to the actuating wire. The photos will show how the ailerons are connected to the servo.

If you want to use a throttle, mount the throttle servo to the right fuselage side with a plastic servo mount or servo tape. The model is balanced by moving the battery and receiver in the fuselage. When the model balances properly, remove the wings and install F4 and F14. There is good access to the inner fuselage when both wings are removed. The radio shifting is easily observed through the large canopy. For flying, a thick piece of elastic foam is stuffed under the canopy to hold the battery and receiver in place. I slipped the antenna through a piece of pushrod tubing from F2 to the fuselage end.

Flying:

Be sure the model balances properly, and the controls move the correct way with the movements shown on the plan. Remember it is a canard and the elevator deflects opposite to normal aircraft. The ailerons in the rear wing move the normal way.

To fuel the tank, drill a hole through the top of the cowling and slip a piece of fuel tubing on the filler tube of the tank. This is shown on the plan and is very practical. Any overflow runs out the air outlet at the bottom of the cowl. I had no switch on my plane. The battery was connected to the receiver before flight. I did not use a switch because I did not know where to install it without disturbing the plane's appearance. I used a 250 mah battery pack with my plane to reduce weight. Using this smaller battery instead of 500 mah saves about 2 oz. which is a lot on 1/2A planes. To compensate for less flying time with the smaller batteries, I take two battery packs to the field. My plane weighs 18 oz. and I advise you to stay under 20 oz.

With the engine running full rpm's, hand launch the model into the wind. Give some up trim before launch. Do not wait for something strange to happen when the plane is airborne. When accurately built, the model begins to climb in a left hand circle. Speed is rather gentle, there is no dashing around. The model has a remarkable rate of climb, which proves that no hotter engine is needed. A Cox Black Widow with 6/3 prop and 10% nitro fuel is a lot of power for this ship. Grey props are a little better than the black ones. I usually throttle back after getting some height, circling around and enjoying the sight of the plane in the air.

When the engine cuts, transition to glide is smooth. Let the model have some speed during glide. Without prop wash, the ailerons are less effective at low speeds.

At a very high angle of attack and high G-loads, wing rocking still occurs. That might be cause through the constant chord of the ailerons. If you give too much up elevator, the elevators cause some wash-in that might result in tip stalls. But the plane will not spin, being a canard, the wings will rock. To stop this rocking, ease up on the elevator stick a little bit.

Although this model is very docile, I would not recommend it as a beginner's first plane. However, you need not be a racing pilot to be able to fly it.

If this model of the Quickie looks exciting to you, build one and enjoy it in the air.

Happy flying and good landings. □

By H.E
RCModeler
July 1981