CENTURION II

What may well be the ultimate 100" span sailplane to date, the Centurion II can be handled by the novice, yet has an impressive number of competition trophies to its credit.

BY DON DEWEY AND HUGH STOCK

PHOTOGRAPHY BY MAX MILLS

THE CHALLENGE

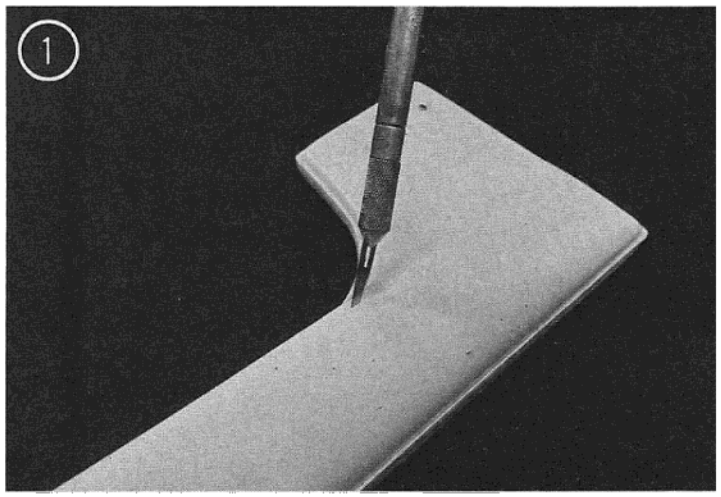
To design a beginners R/C Sailplane, which will withstand considerable punishment and yet provide outstandingly stable performance which is mandatory to maintain a novice's interest and heighten his enjoyment of the sport of R/C Sailplane flying. In addition, this same design must be capable of top calibre contest performance.

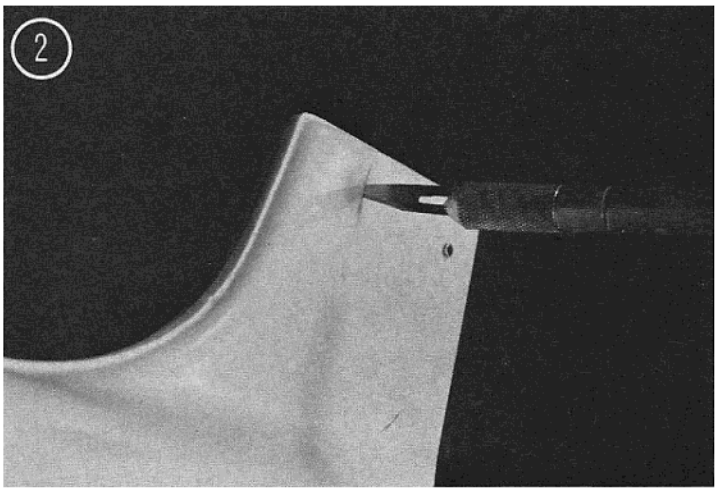
THE SOLUTION

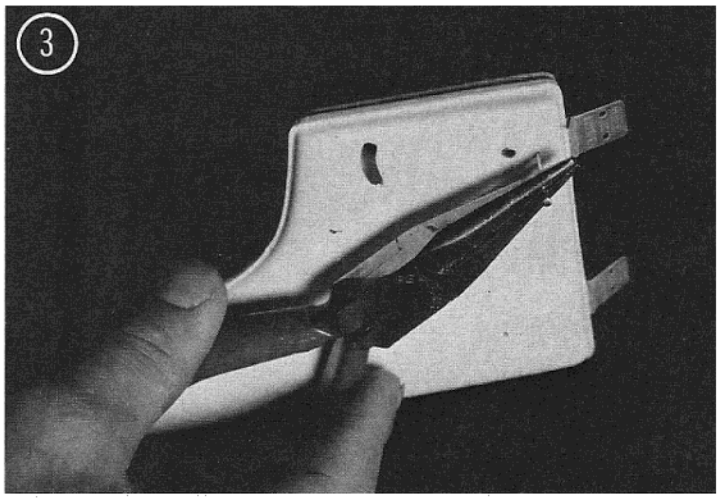
Don Dewey, Editor of R/C Modeler Magazine, and Hugh Stock of Soarcraft Products, collabroated on this challenge and, using their combined years of experience in design and materials, conceived the Centurion II. At last the new flyer can achieve thermal flight proficiency even if he does not have the benefit of assistance from an experienced flyer. And this 100'' sailplane has demonstrated its ability to equal or exceed the best competition ships in its class.

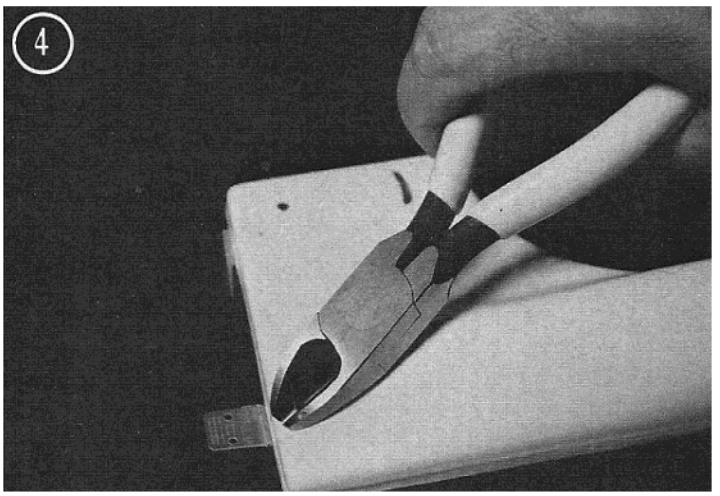
The Centurion II is, in actuality, a third generation design. Historically it began as the Gus, which was designed several years ago, by Willie Richards and was one of the most popular R/C Sailplanes of its day. In December of 1972, R/C Modeler Magazine published a construction article on the Centurion I, which was Don Dewey's optimized design of the original Gus. This design had some unique features such as the streamliined fuselage center section over the wing, which provided for the least possible drag at the wing, fuselage junction. Another oustanding Centurion I design was the break-away wing attachment design. This feature incorporates the use of nylon hold-down bolts which will allow the wing to shear away, should the wing unfortunately hit an immovable object in flight. This feature greatly reduces, or eliminates, wing structural damage.

The Centurion II, retains the excellent

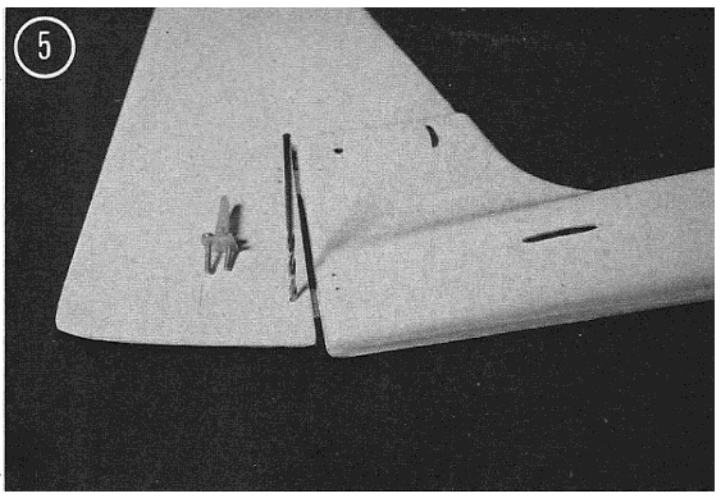


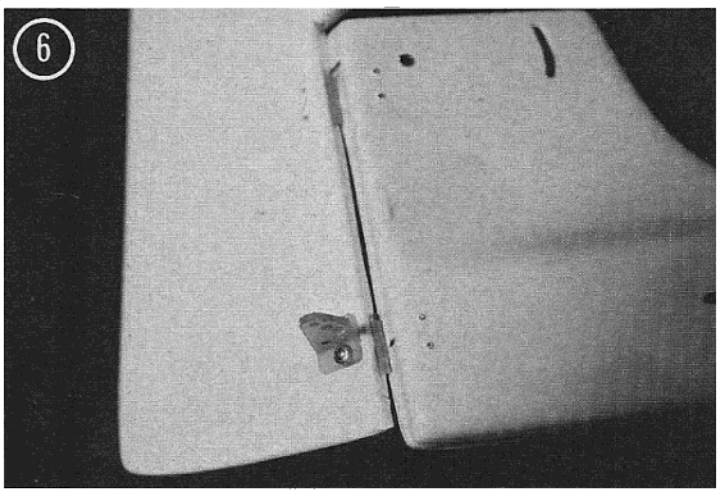


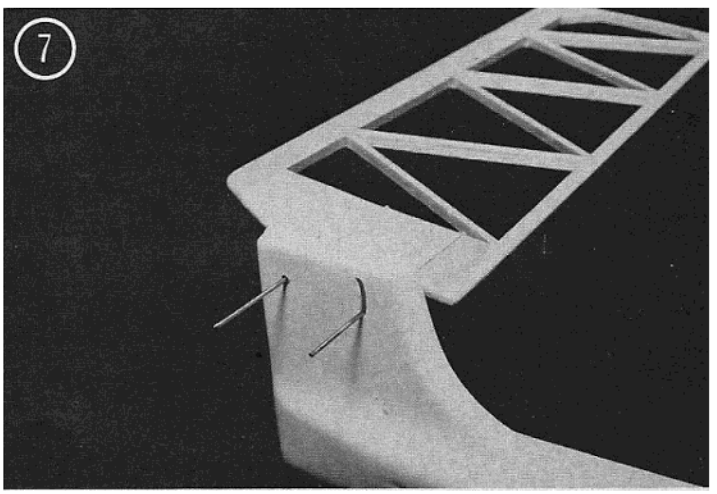


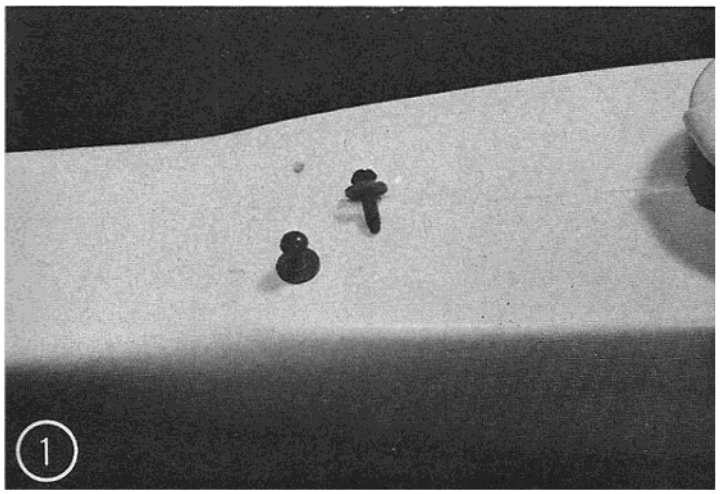


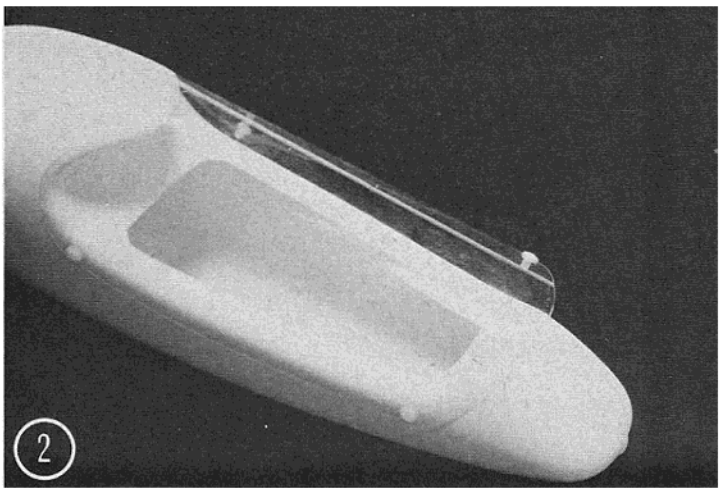
(1) Cutting the exit slot for the stab control rod. (2) Cutting the slot for the stabilizer pivot. (3) Pliers being used to push pins through the fuselage, locking hinges in place. (4) Cut off excess pin material with side cutters. (5) Drilling the hole for the installation of the rudder control horn. Hole is drilled through the hinge to lock the hinge in place. (6) View of completed all flying rudder installation. (7) Completetd all-flying stab in place on fuselage.

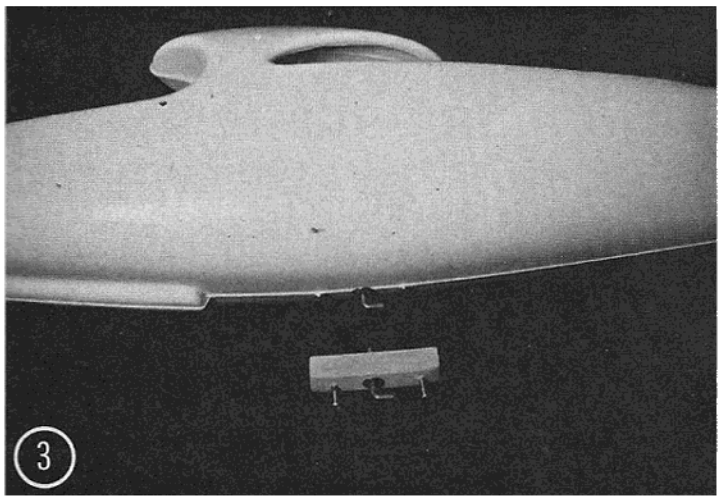




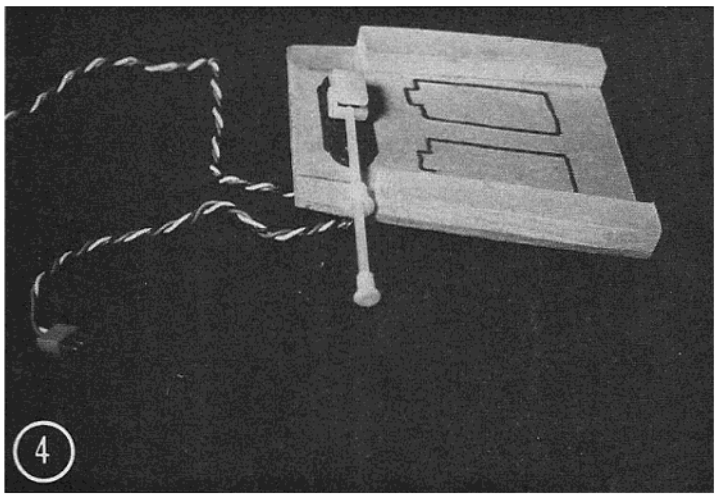


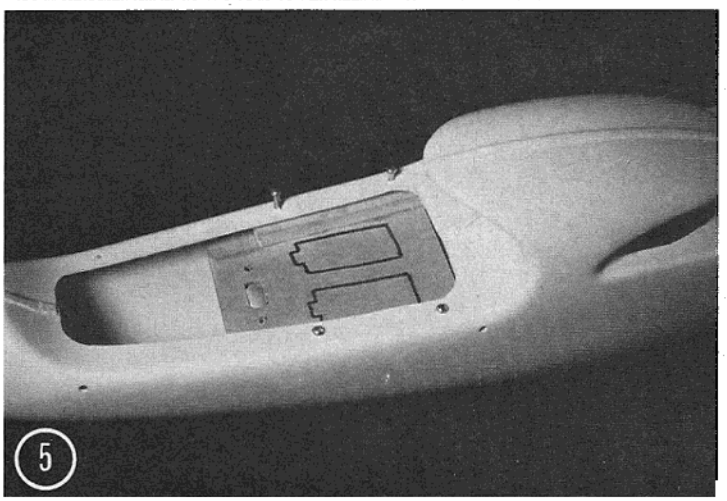


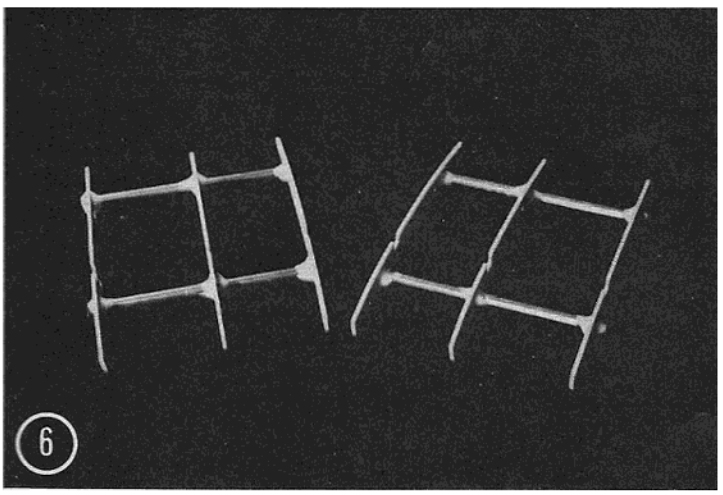


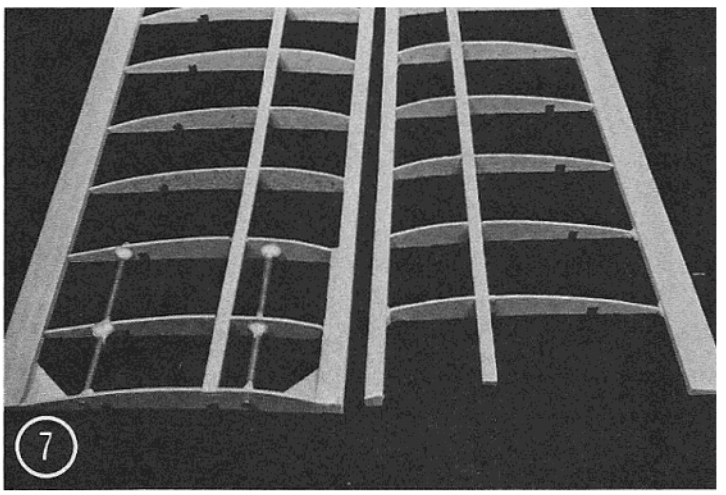


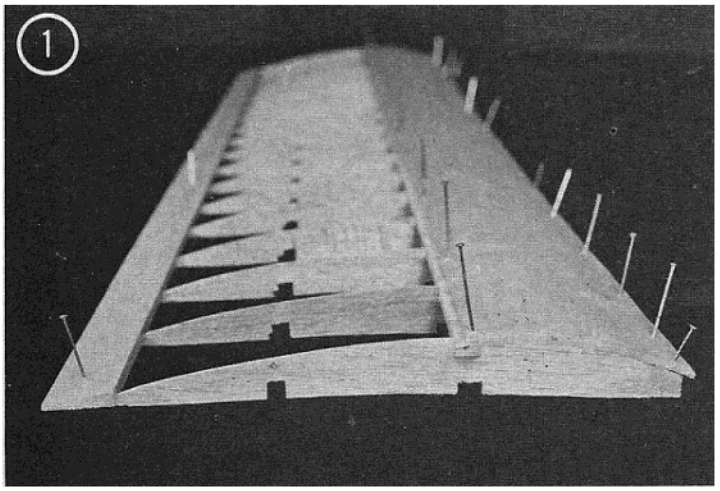
(1) View of nylon wing attachment bolts. (2) Canopy attachment technique utilizing nylon snap plugs. (3) View of towhook. Wooden block is actually mounted inside the fuselage with hook only protruding. (4) Completed servo tray and spruce mounting spacers. EK switch actuator used for external access. (5) View showing servo tray installation. (6) Assembled wing root section. (7) View of wing assembly showing leading edge, trailing edge, and upper spar installed.

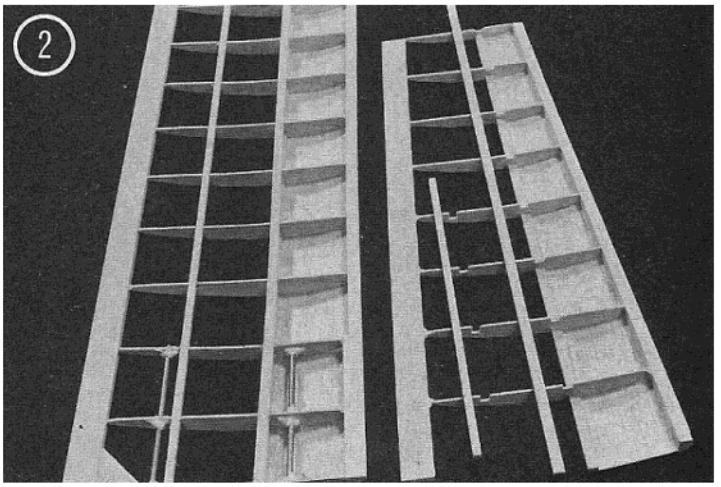




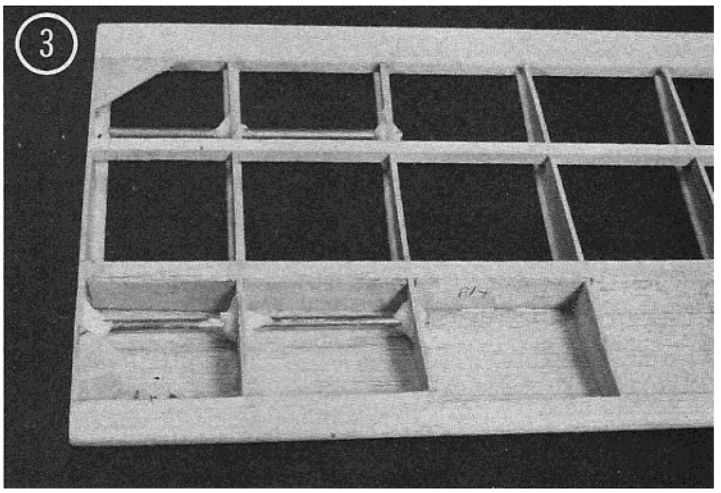


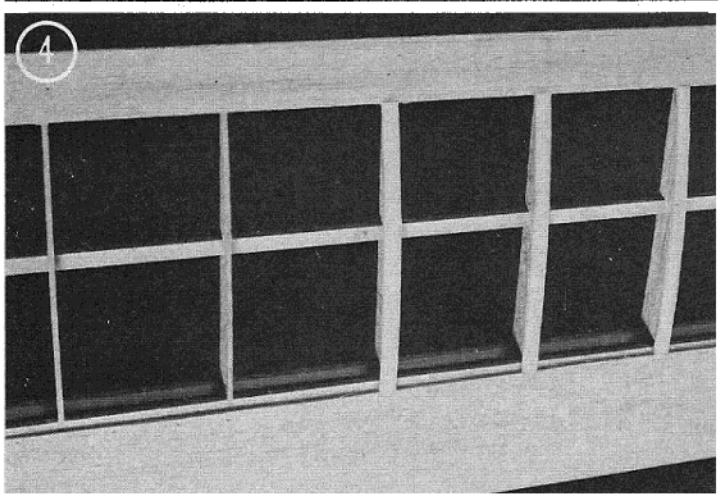


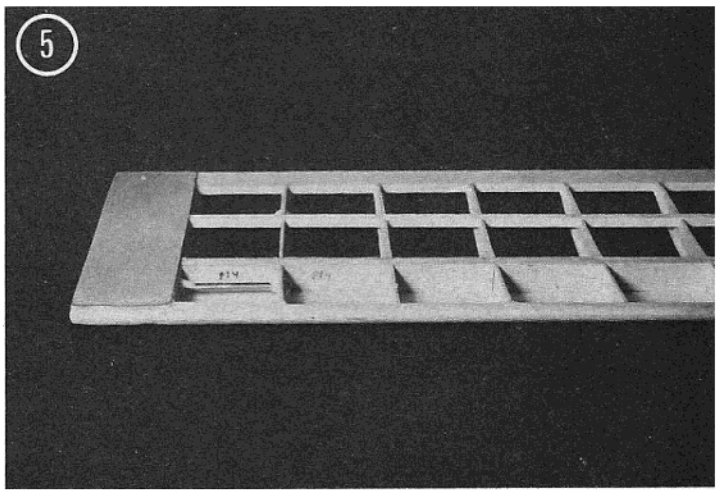


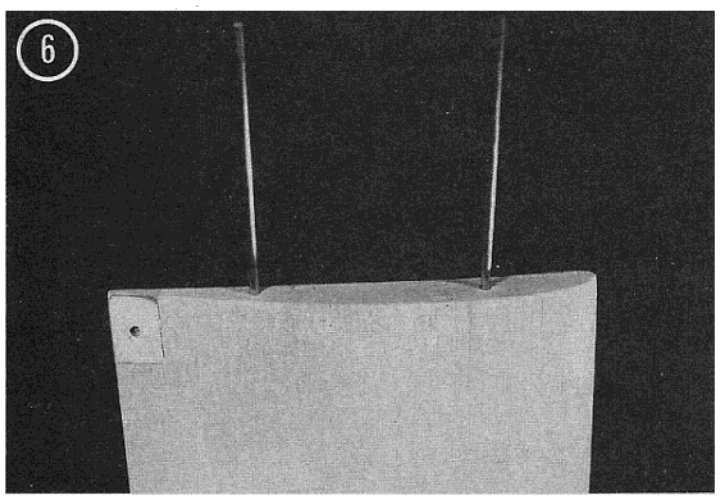


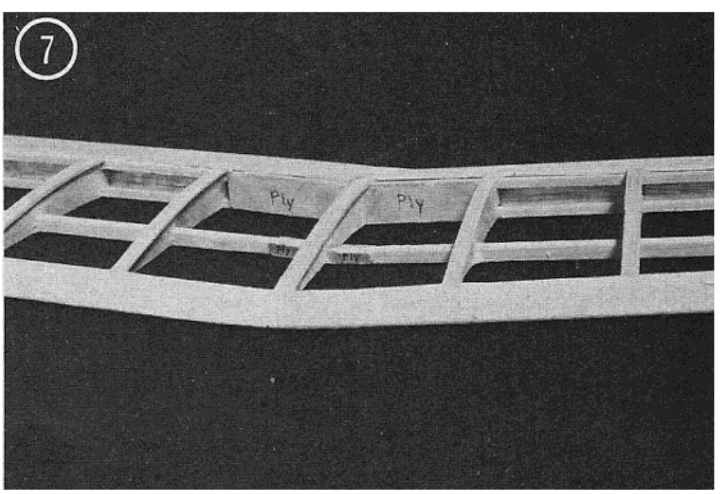
(1) End view of wing prior to adding bottom spar. Leading edge is sanded to wing rib contour. (2) Bottom spars being installed with the wing inverted. (3) Plywood webbing used in first three rib bays. (4) Installation of capstrips. Note that leading edge sheeting terminates half way back on the top main spar. (5) Root section with 1/32" ply on first rib bay. Note that ply webbing extends one bay past wing wire tubing. (6) Wing root with planking and plywood insert through which wing attachment bolt goes. (7) Plywood polyhedral braces installed on both main and secondary spars.

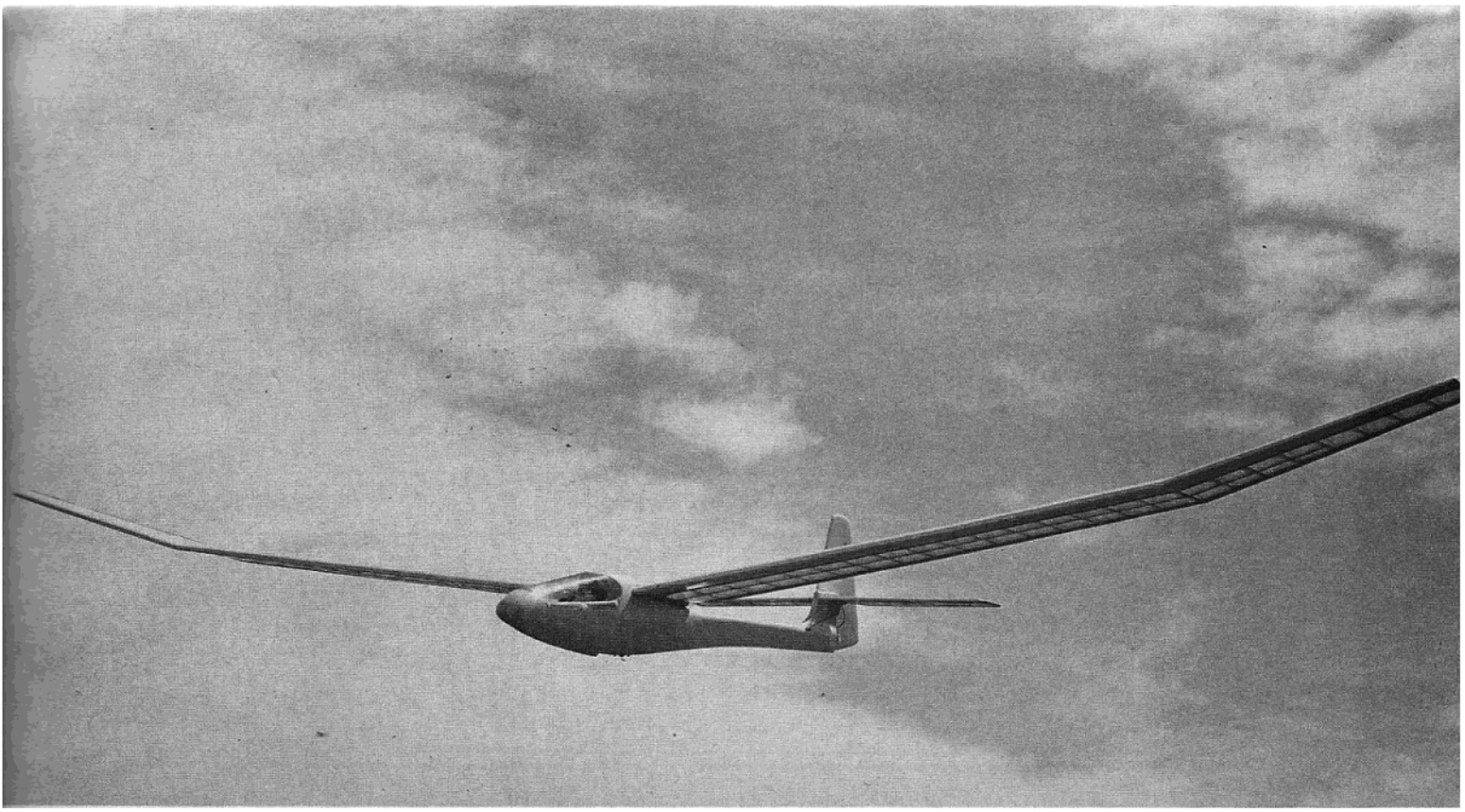












design features of the Centurion I, but has incorporated a new airfoil, 100" wing length and an all flying rudder. To achieve the ruggedness necessary for a beginners sailplane, the authors solicited the assistance of the plastics industry to develop a plastic material and forming process which would provide a fuselage with optimum strength and durability. The plastic selected is easily bondable with an ordinary plastic model cement or solvent such as Methyl Ethyl Keytone.

The final material selected for construction of the fuselage has a beautiful white finish. This finish will accept paint (except for laquer) should the flyer desire something different. The Centurion II fuselage is entirely pre-fabricated and requires no adhesives. It is far stronger than fiberglass and can sustain shocks that would shatter most conventional materials. In addition, it is stable over the widest range of temperature variations.

While we have previously stated that the Centurion II was basically conceived as an R/C Sailplane Trainer, the prototypes which have been used for testing purposes, have racked up many impressive contest trophies. It is recommended that if the Centurion II is to be used as a trainer, the control surface responses be minimized to prevent over-reaction.

The light weight characteristics of the plastic used definitely fall within the weight specifications of the Centurion I even though the wing has been extended to 100" The Centurion II excells as a contest ship due to its light wing loading thus making it very responsive to light thermal lift. Its ability to turn on a dime and give four cents change makes it excellent for centering in small thermals. Pre-production tests of the Centurion II on slopes with winds of up to 30 mph have demonstrated its exceptional penetration and broad forward speed envelope. It can be flown quite slowly to catch thermals and quite rapidly when it is necessary to cover distance to find new thermal activity.

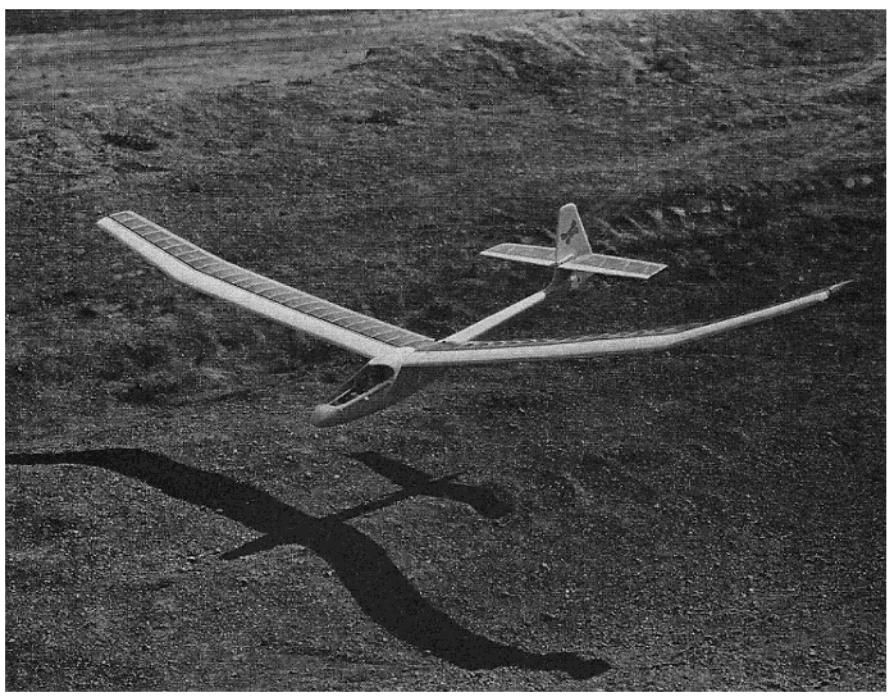
CONSTRUCTION

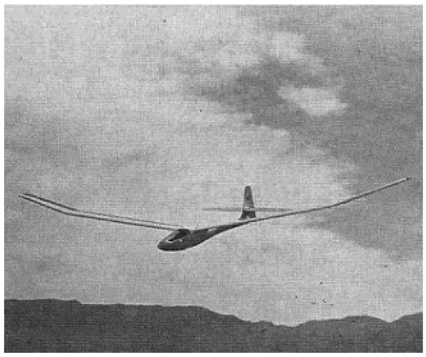
In accordance with the design basis on the R/C Sailplane Trainer, the construction of the flying surfaces have been greatly simplified to provide for minimum building time and effort. It has been found that without really extending ones self, the model can sacrifice one weekend of flying and completely construct the Centurion II and therefore gain many hours and weekends of future flying pleasure.

The construction of the Centurion II is simple and straightforward. Begin with the fuselage and then continue with construction of the tail section and complete with the wing construction.

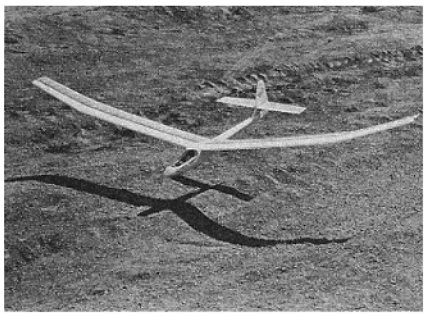
Fuselage Construction:

1. The fuselage has indentations marking the exits for the stab pushrod, rudder pushrod, and the front stab wire clearance hole.





CENTURION II



TO ORDER YOUR CENTURION II PLANS AND ADHESIVE BACKED TEMPLATES, SEE ORDER FORM ON PAGE 126. THIS IS ONE SAILPLANE YOU WON'T WANT TO MISS BUILDING.

2. Drill the canopy snap tab holes marked by the indentations. Do not use a drill bit bigger than 1/8", or the snaps will not properly set.
3. Determine the rudder hinge locations on the drawing and locate on the fuselage. With a sharp knife, cut the slots in the exact center of the fuselage.
4. Slide the nylon hinges into the slot and pin in place by pushing two straight pins through the fuselage and hinges with pliers. Cut off all excess material. (Pin.)

That completes the fuselage construction except for the installation of the servo tray at a later date.

Rudder Construction:

1. Cut out the rudder parts per outline on the plan and cement together. When the cement has dried, sand the rudder to airfoil configuration.
2. Match the rudder to the fuselage, cut slots in the rudder to match the hinge locations and epoxy the hinges in place. Note: After covering the rudder, the bolts holding the rudder control horn in place will also lock the bottom hinge in place.

Stabilizer Construction:

1. Cut out the stabilizer root section from 3/16" balsa and carefully embed the 1/8" brass tube in place as shown on the plan. It is important that the tubing be embedded at equal depths.
2. Cut the 3/16" x 3/16" leading edge and stabilizer tip and 3/16" x 3/4" trailing edge per the outline on the plan.
3. Place waxed paper over the plan and glue the root section, leading edge, tip and trailing edge in place over the plan.
4. Cut the 3/32" x 3/16" diagonal braces per plan and glue in place.
5. Glue in gussets as shown.
6. Cover the stabilizer assembly. Attach the large control horn just aft of the rear stabilizer pivot tube as shown on the plan.
7. Fabricate the rudder and stabilizer pushrods using hard 1/4" x 1/4" balsa. Bend the wires to the configuration shown on the plan.

Servo Tray Construction And Installation

1. Fabricate the servo tray out of 3/32" plywood and add the 3/8" x 3/8" spruce stringer on each side of the upper surface of the tray.
2. Remove a 1/4" section of spruce stringer on one side to allow for the installation of the switch actuator.
3. Sand the upper and outer corner of the stringer, to the contour of the fuselage so that the completed assembly can be screwed to the fuselage canopy flange by using 4 small screws.
4. The radio installation should be as far forward as possible. This will provide the necessary Center of Gravity, without adding additional weight.
5. The radio battery should be installed in the nose, but it is **very important** to place a generous amount of foam rubber between the battery and the nose of the fuselage.
6. The servo tray, when installed, should hold the battery in place.
7. Should the modeler desire to attach any wood or plastic parts to the fuselage, it can easily be done by using plastic model cement. However, the plastic cement requires a 12-18 hour drying time.

Wing Construction:

1. Begin by placing waxed paper over the drawing and laying the 5/16" x 5/16" leading edge, and 3/16" x 3/4" trailing edge in place. The leading edge and the trailing edge should be pinned flush with the drawing at this time.
2. Assemble the wing root sections over the drawing by placing the 5/16" brass tube through the holes in the first three ply ribs. Note: Pre-roughen the tubing and attach to the ribs with epoxy. Use a template made from the drawing to obtain the correct angle on the root rib.
3. When this is dry, place on the drawing and glue to the leading edge and trailing edge.
4. Glue the balsa ribs to the leading and trailing edge all along the wing except for the last balsa rib at the polyhedral break.
5. Install the top 1/8" x 1/4" spruce spar in the rib notches.
6. Carefully sand the leading edge to rib contour.
7. Install a 1/16" balsa rib at the polyhedral break at an angle matching the polyhedral angle on the drawing.
8. Using 1/16" balsa planking, cover the leading edge to the center of the 1/8" x 1/4" spruce.
9. When this assembly is thoroughly dry, remove from the building surface and install the bottom spars.
10. Sand the polyhedral section root to match the straight section.
11. Install the 1/16" plywood webs on the first three rib bays on the leading edge side of the spar.
12. Install 1/16" plywood webbing on the trailing edge side of the spar for the first two bays only.
13. Continue with the webbing, beginning on the fourth bay with 1/16" balsa on the leading edge side of the spar for the full length of the wing except at bays next to the polyhedral break.
14. Add 1/32" plywood planking to the full width of the first bay only.
15. Place the wing right side up on the drawing and join the polyhedral section to the wing using 1/16" plywood braces on the front and back of the main spar and one side of the 3/16" x 3/16" spar. Note: Block up the polyhedral in position and make sure that the tip is 2½" from the work surface as shown on the drawing.
16. Using 1/16" balsa, plank the first 2 bays on the top of the wing.
17. Add capstrips on the surface only, to each rib. Note: The wing incorporates a 3/16" washout in each tip and can be built in by shimming during construction or by warping into place by shrinking the MonoKote covering.

The plans, plus adhesive backed templates are available from R/C Modeler Magazine, for those who wish to build from scratch, while a fuselage, fuselage accessories and canopy, or a complete Centurion II kit, are available from Soarcraft Products.

Trim out your Centurion II carefully, making any adjustments in the test glides, then hook up the Hi-Start. Your're in for an all new experience in soaring! □

From RCModeler Apr. 1971