SPINIFEX 100

By John O'Sullivan

"Spinifex 100," designed by John O'Sullivan of Nova Scotia, is a Standard class thermal soarer using the Eppler 193 airfoil. Performance is excellent and will handle ballast well, so load it up for slope flying.

The Spinifex 100 is a standard class thermal soarer using rudder and elevator control. Optional spoiler installation is also shown on the plan. The word Spinifex comes from a needle-like grass which grows in clumps in the Australian semi-desert areas (good thermal country).

Generally, I use a fiberglass fuselage on this design but reverted to a ply fuselage of the same profile for this version as it is easier to present in plan form. There is no difference in performance between the two versions, and weight and strength are similar. Several variations of this model have been built by a number of modelers throughout Atlantic Canada, and they are to be thanked for their constructive comments.

The wing section is the well-tested Eppler 193 which has slight undercamber and adequate thickness to produce a strong wing. Fully sheeted leading edge, webbed spruce spars, and capstripped ribs make for a light rigid wing structure.

CONSTRUCTION

Fuselage:

Cut out the sides from 1/32" ply, 48" long. Cut out the holes for the spruce leading edge and triangular trailing edge, wing joiners and for wing locating dowels. Make sure that these cut-outs match exactly on both sides, otherwise a difference of incidence between wings will occur. Note that I have used 10mm x 1mm vertical flat steel joiners for the wings. These give a very rigid vertical joint while allowing the wings to flex forward or backwards during a hard landing.

SPINIFEX 100
Designed By:
John O'Sullivan
TYPE AIRCRAFT
Standard Sailplane
WINGSPAN
100 Inches
WING CHORD
8½ Inches (Avg.)
TOTAL WING AREA
837 Sq. In.
WING LOCATION
Shoulder Wing
AIRFOIL
Eppler 193
WING PLANFORM
Tapered L/E
POLYHEDRAL EACH TIP
1¾ Inches at W16
3¼ Inches at Tip
O.A. FUSELAGE LENGTH
54 Inches
RADIO COMPARTMENT SIZE
(L) 14¾" x (W) 1¾" x (H) 1½"
STABILIZER SPAN
24 Inches
STABILIZER CHORD (incl. elev.)
4¼ Inches (Avg.)
STABILIZER AREA
94 Sq. In.
STAB AIRFOIL SECTION
Symmetrical
STABILIZER LOCATION
Fin Mounted
VERTICAL FIN HEIGHT
10 Inches
VERTICAL FIN WIDTH (incl. rud.)
6½ Inches (Avg.)
REC. ENGINE SIZE
NA
FUEL TANK SIZE
NA
LANDING GEAR
NA
REC. NO. OF CHANNELS
3
CONTROL FUNCTIONS
Rud., Elev., Spoilers
BASIC MATERIALS USED IN CONSTRUCTION
Fuselage ..... Balsa & Ply
Wing ..... Balsa & Ply
Empennage ..... Balsa
Wt. Ready To Fly ..... 2 Lbs. 4 Oz. (36 Oz.)
Wing Loading ..... 6.2 Oz./Sq. Ft.

John O'Sullivan and Spinifex 100, foggy and snowy January day.

These joiners are not readily available in modeling stores so I have shown a conventional joiner system using 1/4" diameter steel rod on the plans.

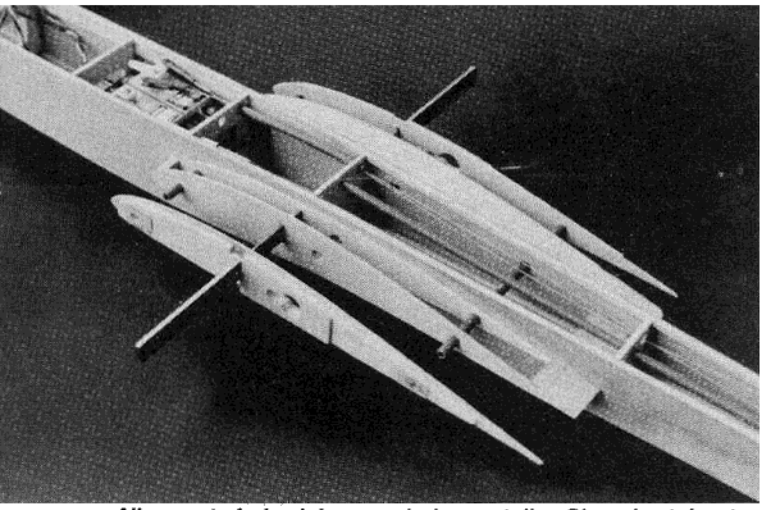
Add 1/8" square and 1/8" x 3/8" spruce longerons to both sides. Join the fuselage sides using formers F1 to F8 making certain that the fuselage is square and straight over its full length. Sheet the fuselage bottom with 1/32" ply with the grain running across the fuselage. Add the hardwood nose block and carve roughly to shape. Glue 1/8" lite ply reinforcement in the bottom of the fuselage behind F5 and add 1/4" x 3/8" maple towhook mount, securing to F5 and the bottom lite ply. Glue the leading edge, trailing edge, R1, R2, and the ply end ribs in place. Add the 1/4" inside diameter brass wing joiner tube and the 3/16" wing locating dowels. Sheet the area between fuselage and ply ribs with 1/16" balsa. At this stage go back over all the fuselage joints and reinforce glue joints. Reinforce the nose area with fiberglass cloth and polyester resin.

Cut the fin from 1/4" light quarter grain balsa. Choice of balsa is very important, especially for the tail components since any excess weight here may require nose weight to balance the model. Insert a piece of 1/4" x 3/8" maple as a tailplane mounting post. This helps to transfer the stresses to the fuselage rather than the fin. Drill a hole in the maple post to take the 1/8" I.D. tubing for the tail mount. Check that the hole is perpendicular to the fin in the vertical and horizontal axis.

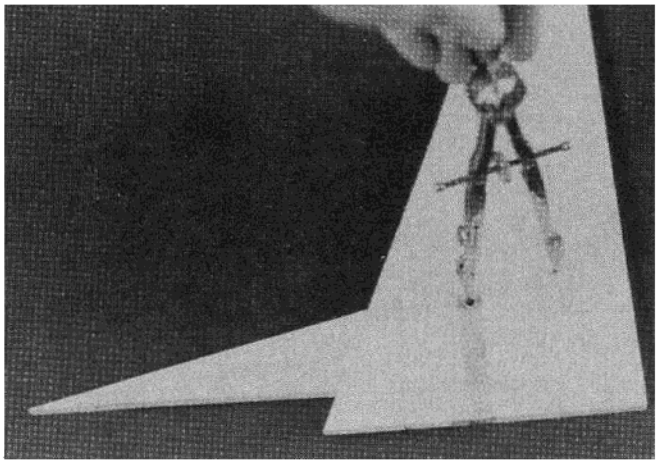
Using a compass, mark the cut-out for the actuating cable for the all moving tail. Make a groove to match in the fin and glue in the Gold-N-Rod outer. The nylon outer sleeve does not take glue very well so wrap cotton sewing thread around it before gluing in place. Glue the fin to the fuselage, threading the Gold-N-Rod through the holes in the formers.

Attach the front end of the cable securely to the fuselage side and F5. Pack scrap balsa between fin and fuselage sides making sure everything is square. Fit NyRod outer through central hole in formers as guide for internal antenna. Thread the nylon coated steel pull-pull rudder cables through the formers. If preferred, a regular pushrod or NyRod can be used for the rudder. Sheet the fuselage top from F4 back with 1/32" ply with the grain running the length of the fuselage. Add the triangular dorsal fairing between the fuselage and fin. Carve the canopy and front and rear decking from soft balsa. Attach to the fuselage and sand to shape. Sand the fin to the airfoil section. Round off the fuselage corners being careful not to cut too deeply into the spruce longerons. Cut the rudder from 1/4" soft balsa. Reinforce the fuselage forward of F2 with 6 oz./sq. yard fiberglass cloth and resin. The towhook is low-tech and consists of a cup hook straightened out and screwed into the maple mount. Use cyanoacrylate glue to secure.

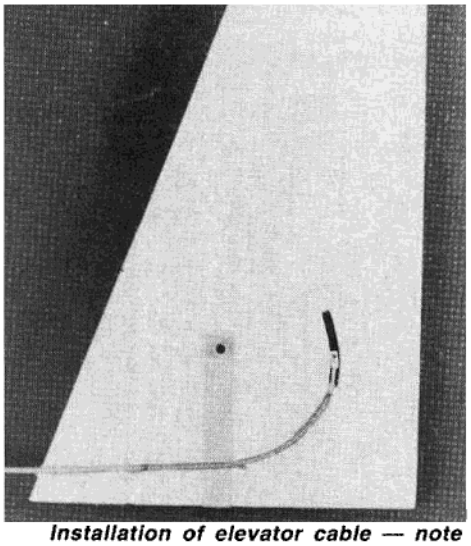
Cut out the wing ribs using the sandwich method. Twenty-three rectangles of balsa are sandwiched between the tip and root templates and are shaped using a razor plane and sandpaper. These form W2 and W24. Cut out W1 from 1/8" balsa and W25 from 3/8" balsa. Allow about 1/4" excess at the front and rear of the ribs made by the sandwich method. Cut the spar slots using a razor saw. These spar cut-outs are used for alignment of the ribs during construction, with the front and rear of each rib trimmed as required to fit the leading and trailing edges.



Alignment of wing joiners and wing root ribs. Glue wing tubes to wing root rib before building wing.



Marking out groove for tailplane cable.



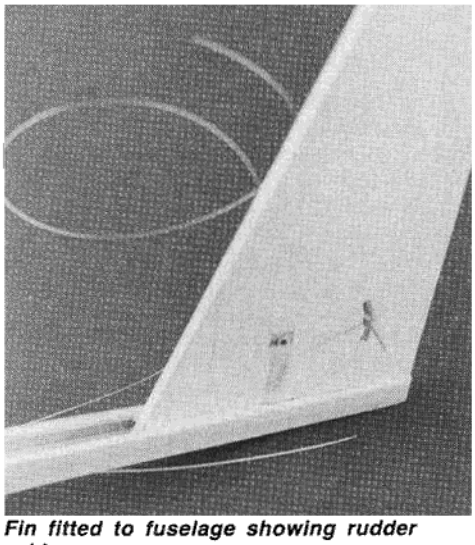
Installation of elevator cable — note maple tail mounting post.

Cut out the trailing edge parts and assemble from 1/16" x 1/4" basswood (or spruce), 1" x 1/4" balsa and 1/16" x 1/4" balsa. The 1/16" x 1/4" balsa is glued at the front of the trailing edge and acts as a locating jig for gluing the ribs. Trim the trailing edge to a triangular section using a razor plane before construction of the wing.

Prepare the root ply ribs and glue W1a and the reinforcing pieces of 1/32" ply at the wing dowel locations. Slide the wing joiner tube through the fuselage and add the wing joiner wire and wing joiner tubes. Slip the wing root ribs over the joiner tube, flush against the fuselage. Glue the wing joiner tube to the root rib. This ensures that the wing joiners are properly aligned.

Glue the bottom leading edge sheeting to 1/2" x 3/8" leading edge and add 1/4" x 1/8" bottom spruce spar. Pin the assembled leading edge, bottom sheeting and bottom spar on the plan, and also the trailing edge. Block up the leading edge 1/16" and the front of the trailing edge 1/32". Fit the wing ribs using the precut spar notches as a guide and trim the front and rear of the rib to fit leading and trailing edge. Glue prepared root rib and joiner tube in place checking to see that 3½° center panel dihedral is present. This is equivalent to 1¾" at the dihedral joint.

Add the top spars and 1/16" balsa webbing to front of spars. Use vertical grain on the webs and make sure they fit well without gaps. Remember, the webs add appreciable strength, but, if one web is not properly glued, the stresses on the rest of the wing are transferred to the weak point resulting in a greater localized stress than if no webbing had been used.



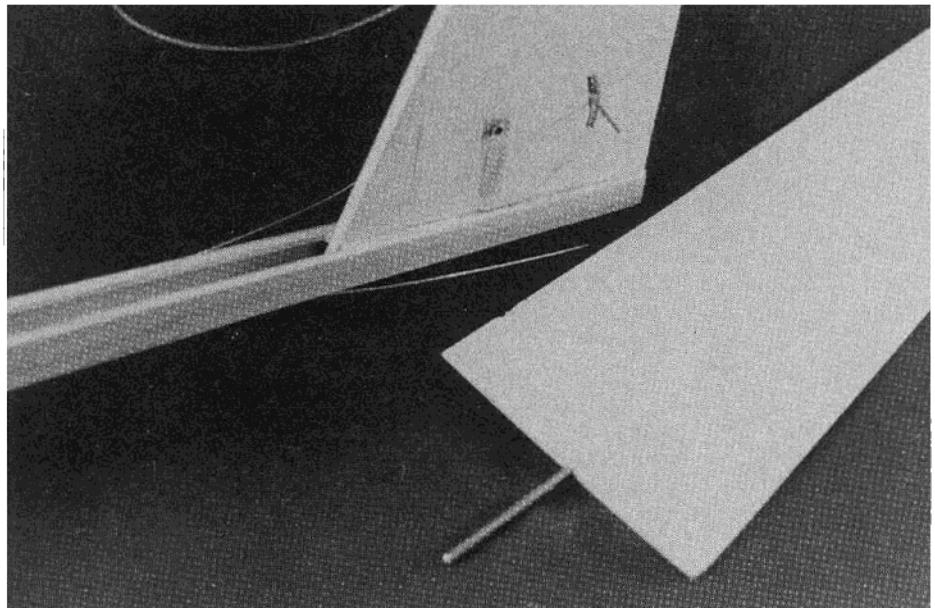
Fin fitted to fuselage showing rudder cables.

Pack a mixture of chopped fiberglass cloth and epoxy around the wing joiner tube. This bonds the joiner firmly to the spars and transfers the launch loads to the wing spar. While the epoxy is still wet, add the rear 1/16" ply web to the spar slotting W2 and W3 to ensure a proper fit.

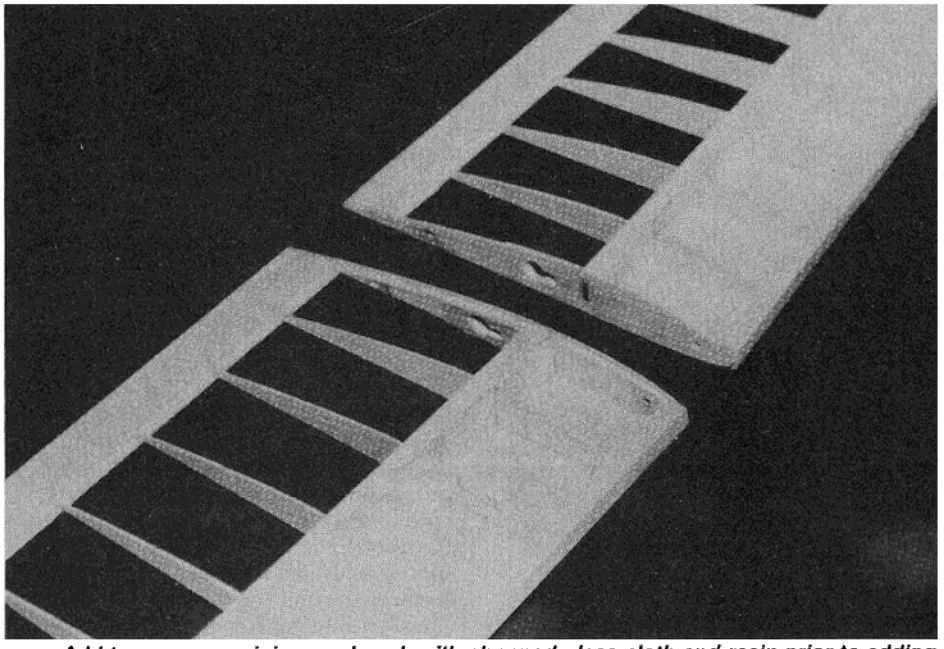
Add the top sheeting and capstrips, and join the tip panels to the root panels.

Spoilers:

I have shown details for optional spoiler installation on the plans. Slot ribs W8 to W11 to take 1/8" x 1/4" balsa subspars and add the 3/16" square spoiler stops on W8 and W11. Make spoiler blades by sandwiching 1/8" quarter grain balsa and 1/64" ply. Sand the top of the spoiler to match the airfoil section. Add the NyRod inner tube to the wing to take light nylon



Fin fitted to fuselage showing rudder cables and tailplane.



Add top spar over joiner and pack with chopped glass cloth and resin prior to adding webs.

of the wing and Solarfilm over the sheeted parts. Micafilm is a very tough film which adds considerably more rigidity than the other plastic films and is also tear resistant when flying in rough areas. The fuselage may be covered using 3/4 ounce glass cloth and epoxy resin. This reinforces the fuselage and makes a good base for a painted finish.

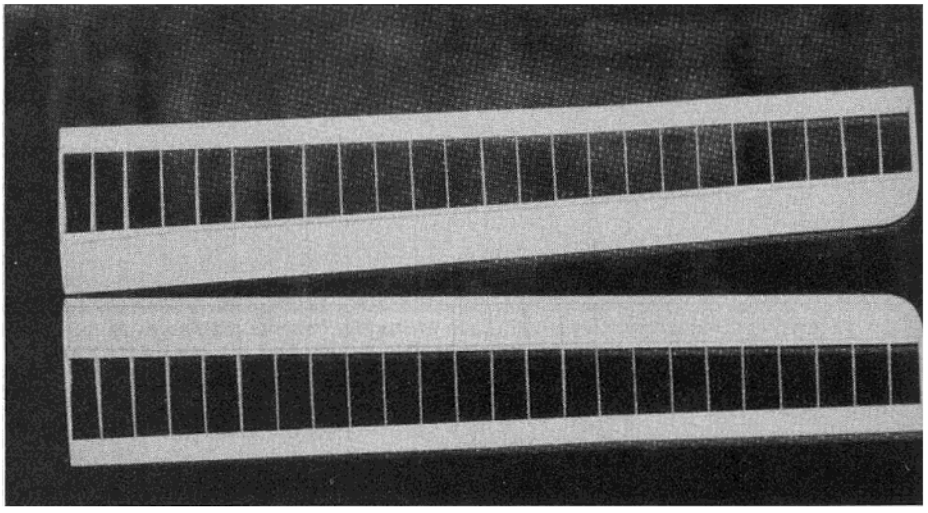
Flying:

Adjust the position of the receiver and batteries to get the balance point 5½" from the wing trailing edge. Set the tailplane to 0 degrees incidence. The model is relatively noncritical and a couple of hand launches should establish proper trim. The prototype's first flight was on a slope in a 25 mile per hour wind which it handled without trouble.

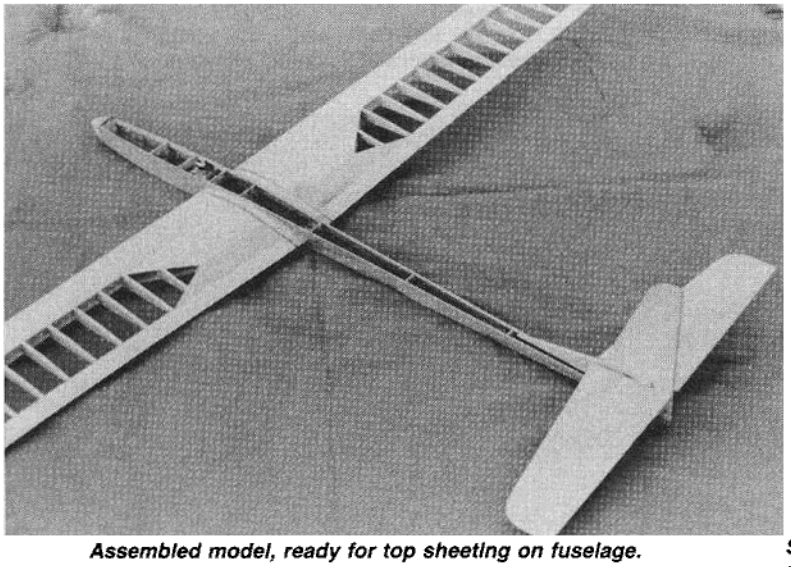
I have flown this design using straight dihedral and polyhedral. The polyhedral versions seem to hold the circle during thermaling better than the straight dihedral versions and seem to be less susceptible to tip stalling.

The Center of Gravity shown is at 35% chord and is probably a bit further back than most people use. This gives a more pitch sensitive model which responds well to thermals and gives a positive feel in flying fast out of areas of downdraughts. Do not put the Center of Gravity any further back than shown and, if preferred, the Center of Gravity may be moved forward to 6" from the wing trailing edge until you get the feel of the model.

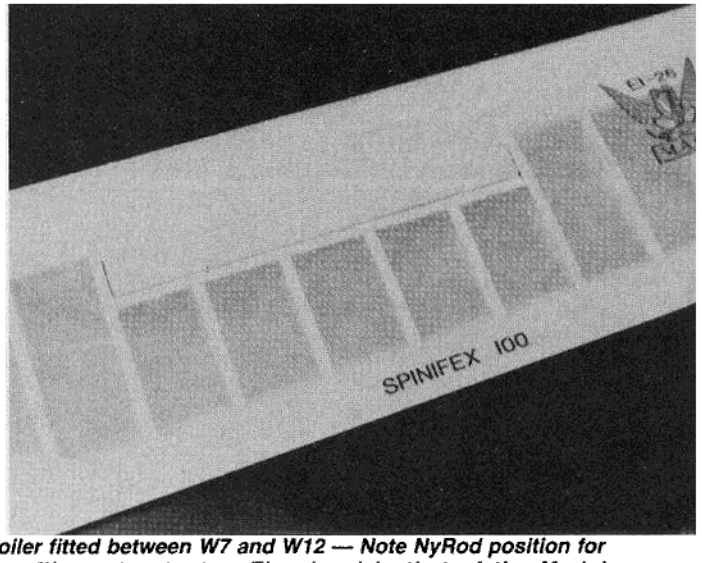
The prototype weighed 36 ounces giving a 6.2 oz./sq. ft. loading. Other versions have been flown with wing loadings ranging from 5.5 oz./sq. ft. to 15 oz./sq. ft. The model handles ballast well so do not be afraid to load it up for slope flying. □



Wings, before adding top sheeting and capstrips.



Assembled model, ready for top sheeting on fuselage.



Spoiler fitted between W7 and W12 — Note NyRod position for monofilament actuator. The decal is that of the Model Aeronautics Council of Ireland which like the AMA celebrates its 50th anniversary this year.

From RCModeler Sep. 1986