

# Jack in a Box

**'It travels well...', you might say. GEOFFREY SPRAWSON designed this two function, 44 inch span sports soarer for transporting in the smallest practical space.**



We all know the frustration of finding a perfect flying site in perfect weather conditions and not having a model to fly. Perhaps you have no model to fly because the wife, kids, and all their clobber fill the car right up, or your favourite model won't fit the suitcase, or your boss objects to the company car being full of toy aeroplanes. Here is the answer! A fun-to-fly sports slope soarer that will slip in under the luggage, fit into a large suitcase, or even look like a case full of memos from head office. Jack-in-a-Box is designed to be a good sports model, not too difficult to fly, to fit, with transmitter, charger and a repair kit, in a box small enough to slip into an odd corner of the car. It is simple and quick to rig on the field, cheap to build and big enough to carry full size radio gear, (the prototype flies happily with 500mAH nicads, a seven function Futaba receiver, and two standard servos).

### Construction

To keep the airframe as light as possible, select the lightest wood available, avoiding any of the really cheesy brittle pieces, for all of the structure except the wing leading edge and main spars, which need to be hard.

Start with the wings (they are needed to line up F3). Cut out the ribs and drill, the

inner three for the main joiner tube, lining them up at their top and back edges. Plane the lower bevel on the leading edge, glue the ribs and spars together over the plan. Lay the halves of the wing sheeting together, tape them on one side, hinge the joint open on the tape, glue the edges and weigh them down flat on the board. Mark the rib positions on the lower skin, squaring from the trailing edge. Glue the frame onto the lower skin, pin down flat with the leading edge over the edge of the board and hold the sheeting on the leading edge with clothes pegs. When both wings are dry lay them both out on the board with joining tubes and wires in position, support them at the dihedral angle and epoxy the tubes in place. Add the filling and webs around the tubes and epoxy the hooks for the retaining bands in place. Razor plane the leading and trailing edges to section, fix the top skin, the tips, torque tubes, trailing edge pieces and the ply root rib.

Before starting work on the fuselage check that your radio gear will fit, if it won't adjust the size of the nose to suit.

Epoxy the main wing joiner tube accurately across F3, assemble the aileron bellcranks on their mounting plates, and fit over the rear wing joiner tube.

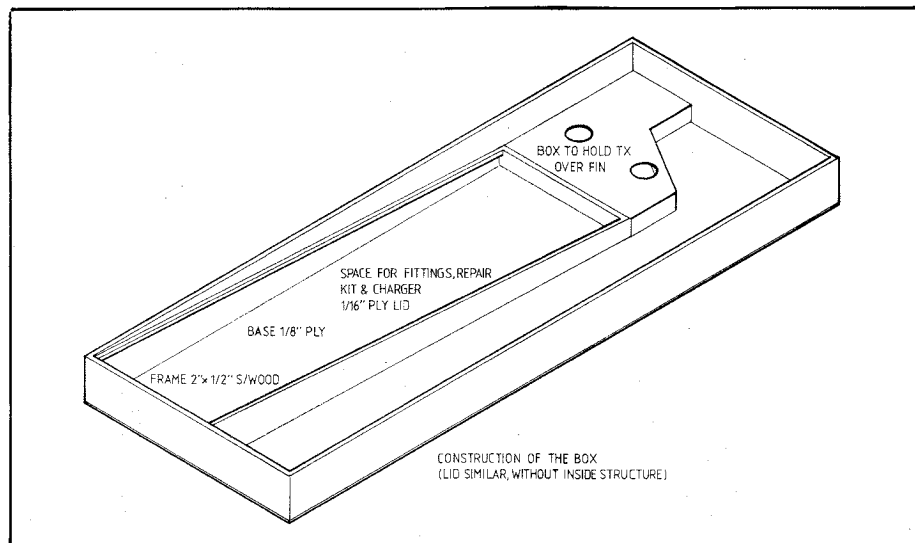
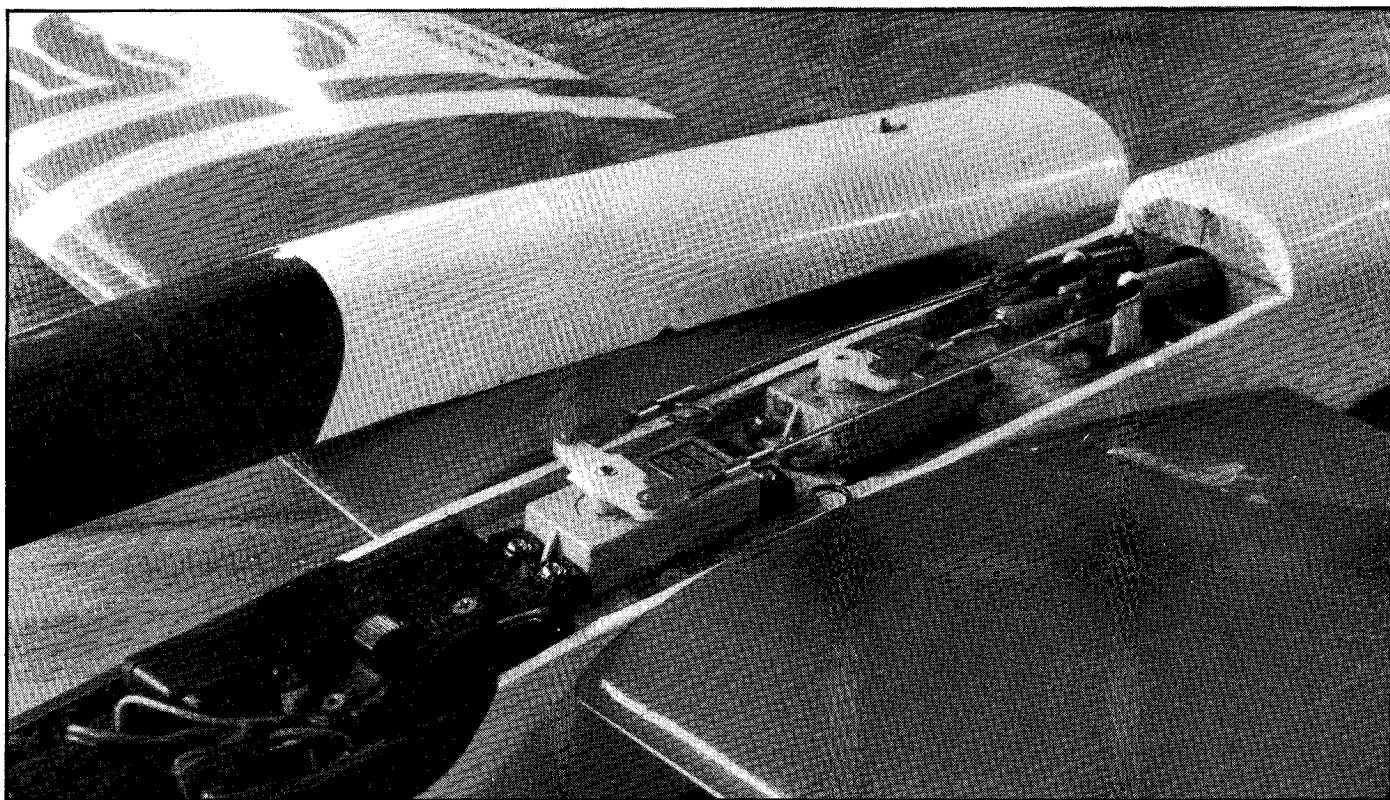
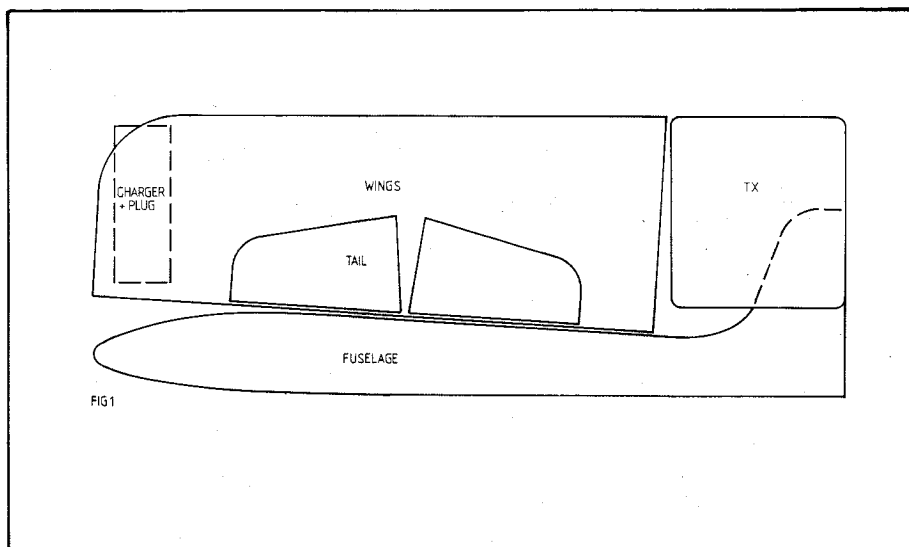
Slip the whole assembly onto the wing joiner wires with the wings in position and

**When demounted, Jack-in-a-Box fits into a travelling case 29½ x 11¾ x 3¾ inches.**



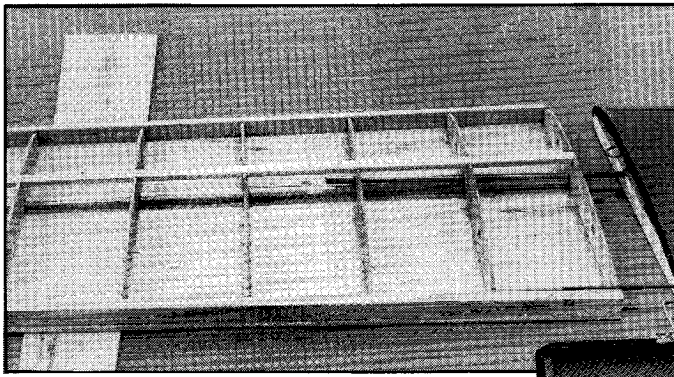
## Jack-in-a-Box

fit the torque rods into the bellcranks. Check that the pivot centres of the bellcranks and torque rods line up accurately and that they move freely without disturbing the mounting plates. When you are satisfied, epoxy the joiner tube and mounting plates in place on F3, secure the bellcrank mounting bolt with epoxy and replace the whole assembly between the wings to maintain alignment as the epoxy cures. Fix the doublers to the sides with impact adhesive, pin the sides accurately together and carefully drill them for the wing and tailplane tubes and the torque rod elevator bellcrank slots. Add the triangular pieces and the supports for F3, assemble the sides with F2, F3 and F4. Glue both ends of the fuselage together with F1 in place. Trim the tailplane bellcrank to the shape shown on the plan, and attach to the pushrod. Position the bellcrank and pushrod in the fuselage and check for free movement.

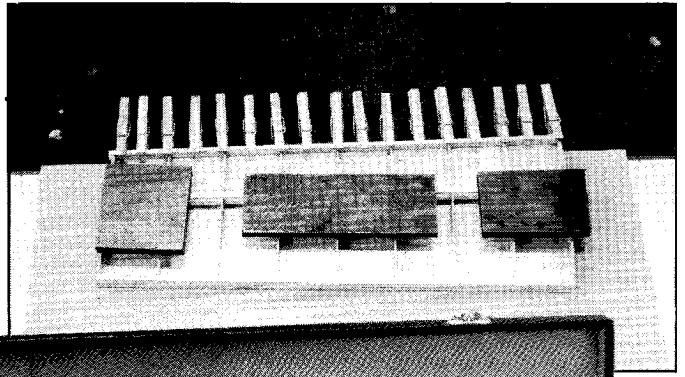


When you are satisfied epoxy the pivot in place using the wing wire to ensure correct alignment. Glue F5 in place, position F14, and F4A using short pieces of 14 gauge wire through the alignment holes and tack glue F2A to the top of F2. Fix the sides of the top sheeting without gluing it to the fuselage sides between F1 and F4, when it is dry remove the wires from F1 and F4 and fix the rest of the top sheeting, the bottom sheeting and the nose block. Leave till dry and then carve the sand to shape, before carefully separating the canopy. Epoxy the canopy locating pin in place, make the canopy latch and cut its slot, but don't fix it before the fuselage is covered. Fibreglass inside the nose and back to a point midway between F2 and F4.

Cut the tail feathers to shape, drill the tailplane for the joining wires and tubes razor plane and sand to section. Epoxy the wires and tubes in the tailplane, and glue the fin in its slot.



*The most accurate way to align the wings is to fit the tubes while the wings are being built. Above right, weights and pegs are used to hold the wing structure and sheeting together as the glue dries.*



**Finishing**

Cover the model in Solarfilm to keep the weight down. Fit the aileron servo and push rods, then position the elevator servo so that its pushrod clears the aileron bellcranks. Add the threaded rod and clevis to the elevator pushrod, set to the correct length and epoxy in place. Hinge the ailerons with magic tape. Set the ailerons to 1/2in. up and down (5/16in. if you don't have rates, or do have weak nerves), and set the elevator to 9/16in. up and down at the trailing edge. The receiver on/off switch can just be left inside as it is easy to remove the canopy for access.

**The Box**

No, not the evil eye in the corner of the living room, but the case that enables you to sneak to the flying field with your model discretely concealed! Start by laying out the model and its accessories as shown in fig. 1, check the size needed to accommodate them. My case measures 28 1/2 x 10 3/4 x 3 1/2in. inside. The outer frame is made from 1/2in. softwood, with 1/8in. plywood for the top and bottom skins. Inside, under the wings, fit a box with a 1/8in. ply lid to contain the charger, fittings and a repair kit, make a support for the transmitter to hold it clear of the tailfin. Finish the box to your own needs, mine was painted black and equipped with a folding handle, hinges and catches.

**Flying**

Now for the fun bit! Off to the slope, rig the model, check the radio, make sure the ailerons go the right way, and heave...

The prototype was first tested on a day when the weather conditions had caused a cross-country event to be cancelled. After a quick try-out and a return to earth for an increase in elevator movement, it was back aloft for a 2 1/2 hour first flight. Jack-in-a-Box demonstrated a considerable appetite for aerobatics and even, on the day, an ability to out soar a couple of 100in. models, it also produced a number of requests for copies of the plan!

Judging by the response to the model each time it has flown, this will be a very popular design. So if you like to be the first with the new designs you'd better get your order in fast.

The holidays will be with us soon, you've got no excuses, get building and you'll have the model ready to take with you!

