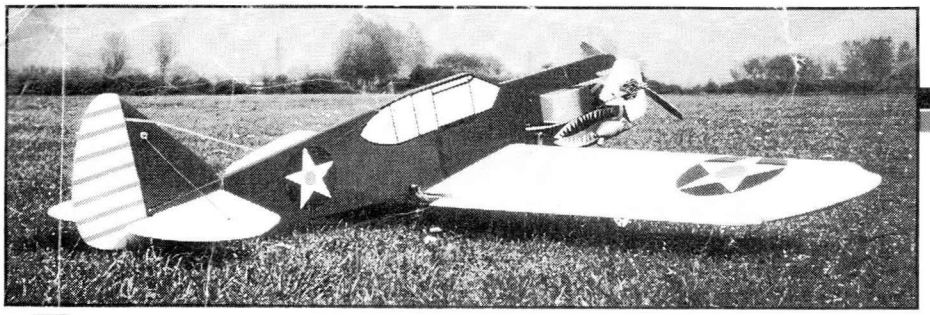
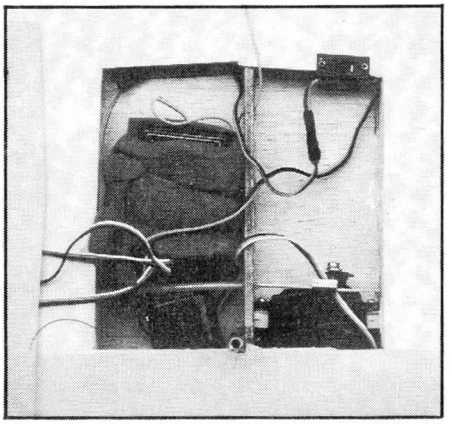


PROFILE WARH



Short of time and cash? Try this quickie by Stuart Lunney

Are you one of those people who is tired of the box fuselages, stringers, twisted formers, banana fuselages, and expensive building? Fancy something that looks like a fighter plane but has simple building with an affordable price, and a performance to meet any sports aerobatic flyer's repertoire? Then, you will find it difficult to go wrong with this one as far as the construction goes as the fuselage is made from 1/2in sheet balsa and a few bits of ply. I dare you to make this one bend!

Why choose the P40 Warhawk? Well, I have always fancied the fierce looking teeth and the American training colour scheme of blue and yellow, with the American Star insignia on the wings. Having chosen the actual model shape I then wanted the wings altered in order to house the nicad, receiver and one servo. This then required a thick wing section which is fully symmetrical with no tip washout and zero incidence.

General construction

The total cost of the completed model, ready to fly, was less than £30.00. The wing is attached to the fuselage using a locating tube attached to the centre rib in the wing. This then slots into a housing tube of slightly larger diameter in the fuselage. The original tube was of aluminium. This helps to provide the vertical stability as well as the 1/16in sheet ply which is located at 90° on the fuselage and acts as the radio compartment cover as well. The other three remaining servos recess into the fuselage which then only needs to be covered on one side.

Fuselage

The fuselage is made from 1/2in sheet, depending on stock available. You will need to join the pieces together unless you can find a sheet wider than 4in – I could not. Having cut the fuselage to shape, you then cut the engine area to suit your particular motor size. Spruce engine bearers are then added using epoxy to hold them in place. 1/16in ply sheet doublers are placed on both sides, with one inch cut out to allow the engine to fit. I glued these using contact adhesive. Next, the servos must be positioned on the fuselage; carefully draw around them as these will require a good tight fit. The servo arm will then stick out on one side of the fuselage only. Once all three servos are positioned you may now attach the bowden cables for the rudder and elevator in place.

The throttle servo cable runs from one side of the fuselage diagonally through the sheet and out the other side to the engine. I did it this way so as to prevent fuel contamination in the servo area. A miniature servo was used for throttle on the original and was kept on the surface so as not to interfere with the aluminium locating tubes. If an ordinary servo is used, then this must be positioned accordingly so as not to affect the tubing. Next comes the locating tube. Drill a hole down the edge of the sheet making sure the hole is straight and true. Into this will slide the aluminium tube. Epoxy this in place. You may use any tubing that is available as long as one section slides firmly into the other.

Wings

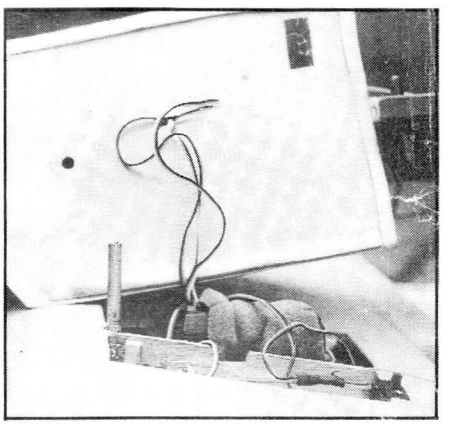
The wings are straightforward to make and should cause no difficulty; build one half at a time. All the ribs apart from W1, W2 and W4, which are 1/8in balsa are made from 1/16in sheet with 1/4in square leading edge. 1/4in square to form upper and lower spars. The trailing edge is made from 1/16in sheet top and bottom with 3/16in and 3/8in square to form the outer trailing edge.

The ribs that support the undercarriage are from 1/8in balsa with 1/16in sheet ply doublers. To the doublers attach the brass tube which locate the undercarriage in position and drill 1/32 in holes on either side and use the old-fashioned method of binding with fuse wire or similar. Finally, epoxy well and this should provide more than ample strength. 1/8in sheet was used to make the wing tip, with the tip fillets from 1/16in sheet. Build the second wing half before attaching the leading edge sheeting top and bottom.

The centre rib is made from 1/8in ply or by laminating 1/16in sheet, and must fit between the two wing halves securely, but do not attach just yet. You should now be ready to join the two halves together.

Place both wings on a flat surface, but remember that one wing will require a slight tip dihedral of 1/2in; glue these two panels plus ply spars and then slide the centre rib into position. You are now ready to attach the wing locating tube.

Place the wing into position and mark on the rib the centre point where the tubing will be located. Remove the rib and drill 1/32in holes either side of this. Now bind the tube in place, but do not glue yet and place back into wing centre section and position fuselage to wing. The reason for not gluing this yet is that you may need a degree or two of movement in locating things correctly. If all is O.K. so far then you may now glue the rib in place. Once dry, place the fuselage back in position again and check that things fit O.K. and the fuselage



is at 90°. Still keeping things in place, epoxy the area around the wing locating tube and leave to dry. The wing should now slide away from the fuselage easily.

You are now ready to apply the leading edge sheeting and the bottom centre section of the wing as well as the trailing edge sheets. Next fit the aileron servo into position and you are ready to fit the bowden cables. I used a bicycle inner brake cable which slides nicely and smoothly through the inner piece of the commercially available bowden cable. You may, of course, have your own ideas. These are then attached to the ailerons which are made from trailing edge sheet balsa.

Tailplane

The tailplane is made from 3/16in sheet. Simply cut and sand to shape. The elevator halves are joined using piano wire. I reinforced the tailplane using guide wires made from piano wire as this adds

Your Full-Size SPORTSTER PLAN

considerable strength which I have found quite essential and should not be missed out.

Undercarriage

I made two types - you choose the one you prefer. The first type is made from conventional piano wire which is located into place and clamped down.

The second type is very crude and simple but works well and helps to absorb energy from bumpy landing surfaces; 6mm diameter aluminium tubing forms the lower sections. Ten gauge piano wire forms the upper section of the leg which is shaped to fit into the wing. The spring action is achieved by soldering an 'elbow'-shaped piece of thinner gauge piano wire at the top of the upper section. This is then attached to a thicker piece of 10 gauge piano wire which is bent at right-angles and located in a hole at the base of the aluminium tubing. This is to hold the wheels in place. The other end of the 'elbow'-shaped piano wire is now attached to this. Sounds complicated but is best seen from the plan. The 'elbow' section acts in two ways; one is to provide the spring action and two to hold the whole wheel assembly straight in line. Commercial items are available but I leave that to you.

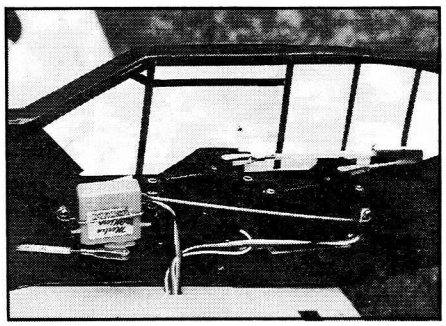
Servo cover

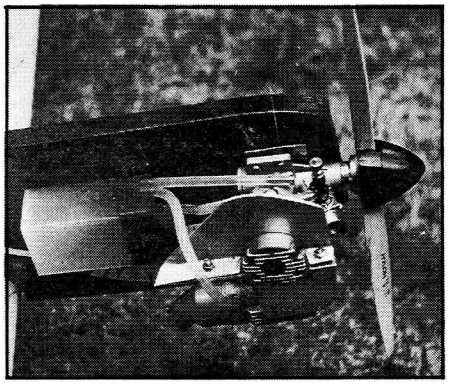
The servo cover is best left until last. Fit all the servos in place and check the measurements to ensure the cover allows free movement of the servos with the measurements on the plan; this may depend on the size and shape of the servos used.

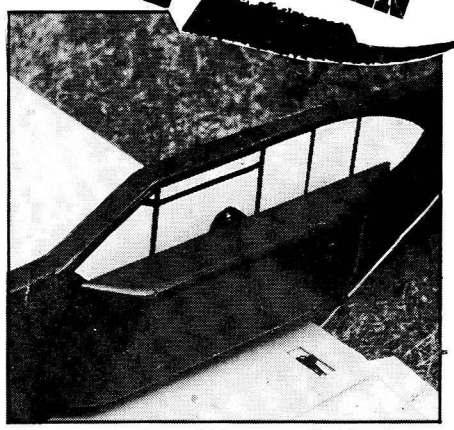
If all is O.K. make all the sides and the top from 1/8in sheet balsa and sand the corners to give a better streamline shape. 1/16in ply locating brackets are glued top and bottom to hold the cover in place on the fuselage with two wood screws. Don't forget to make sure there is plenty of room for free servo movement.

Finishing

Everyone has their own method but I will tell you mine. The wings, tailplane and servo cover are covered with Solarfilm, mainly for ease and convenience. The rear half of the fuselage from the ply onwards was covered with Solarfilm. The front section was given two coats of sanding sealer rubbed down between each coat using the sanding sealer to act as a good sealing edge to the Solarfilm. I then masked off the Solarfilm and gave the front section a coat of grey cellulose primer followed by three coats of blue cellulose car spray paint. The teeth and roundels were made from Solartrim which proved very tedious as all the teeth had to be individually cut and stuck on. The cabin area was done in the same way. Tufcote fuel proofer was used to protect the front section of the fuselage.

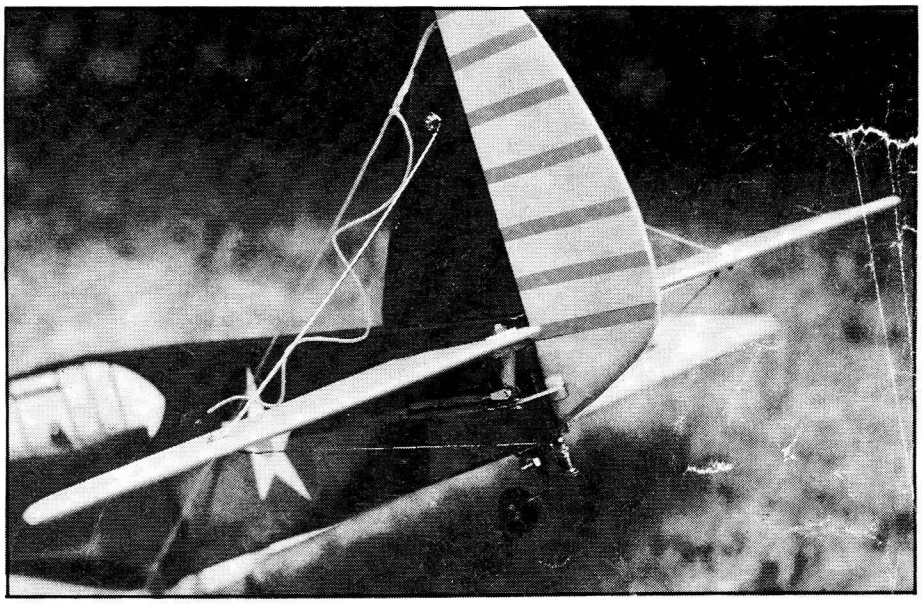






to some extent, could be controlled by the ailerons.

Rolls are fairly smooth and axial, as are loops. Inverted requires a bit of down initially but soon settles. The one manoeuvre which this model performs well is knife-edge, only requiring a small amount of rudder; I have done inside and outside tight circuits in knife-edge position with ease. This is where the profile fuselage comes into its own in providing the lift required to maintain knife-edge. Landing



Choose the colour scheme of your choice but remember to keep it light.

Flying.

If you're like me you may tend to read this part first! Do check the centre of gravity and make sure all the servos are secured into the fuselage and nothing is binding. Obvious, I know, but it is often best said. The day chosen was calm and so I had no excuses not to go!

My OS 25 was started, all the usual vibration pre-flight checks, etc., done and away she went. Take-off with this is the same as any tail dragger; hold full up initially to gain speed then ease off with a touch of right rudder and away you go. Once in the air I found the ailerons very effective, with a nice response from the elevator and rudder. Height was gained to try a stall which was fairly predictable and, should provide no problems, just approach as you would with any low winger and ease the nose up at the last minute.

Just think of the possibilities of a whole range of World War II profile fighers... good flying and keep a look out for those Japanese fighters!

Takes you back to your control-line days, doesn't it! (What, you can't remember control-line!!) Simple basic idea could be easily transferred to any number of World War Two fighter subjects as Stuart suggests. Why not try a Zero or an Me 109 and indulge in a spot of R/C dogfighting? Specially for people who hate building fuselages, the profile Warhawk is quick and cheap to make and rugged, too. You'll find it highly aerobatic and straightforward to fly and it will withstand any amount of rough treatment. Power in the prototype is an O.S. 25 but you could go a bit bigger if you're feeling adventurous...

HAWK