PRO PLAN

pirouette

Build Stephen Galea's 48in aerobatic biplane for .40 to .50 motors and four-function gear

THE aim was to produce a scale-looking biplane with good aerobatic performance. In fact the model does look a bit like a Pitts Special (hence the registration) although no effort was made to produce a scale model.

The model spans 48 inches so it can be easily transported to the flying field fully assembled with no hassle. Aerobatic performance is very good but stooging around at quarter-throttle is very nice too.

Construction should pose no problem to modellers who have previously built a couple of models. On the prototype I used foam to produce the curved top decking and fuselage sides. Wings are veneer covered foam. An all-built-up construction is shown on the plans. Foam construction may be a bit more heavy than conventional balsa; in fact, my bipe tips the scales at seven pounds, which I would put as a maximum for the design. However, lots of wing area helps to absorb a few more ounces and still gives a reasonable wing loading.

Heading and photo above shows Pirouette's sporty lines. Go to town on the colour scheme! Simple, steerable tailwheel, shown at left, is detailed on plan.

Begin here

Fuselage construction is based on a horizontal crutch which is built flat on the plan. The forward part is 1/4in square hardwood; the ply attachment points for top wing aluminium struts will

fit under these. The rear part is 1/4in sq balsa which is spliced to fit the hardwood part. All formers are then attached to the crutch; bottom longerons are then added thus producing a box-like fuselage structure. When adding the formers pin the crutch in such a way that the firewall, which has a rounded top, hangs free at the edge of the building board; in other words, build the fuselage inverted on the board.

Modellers who prefer to use an all-balsa construction should glue formers to the fuselage sides and top, attach 1/8in sq longerons and finally cover with 1/16in balsa sheets. The tank hatch is constructed in the same manner, providing for reinforcement at locating pins and bolting points.

If you prefer to go the easy way and use foam all you have to do is prepare templates for the decking. The fuselage sides are made in three separate sections. The front section is from the firewall to the wing LE; middle section runs from wing LE to TE while the aft section is from the wing TE to the fin post. The top decking is made from in two parts as shown on the plan. All foam is glued to the fuselage and finally covered with 1/16in balsa sheet. White glue would be fine for this job as it will allow you time to move the sheeting around, while holding in place with rubber bands. When covered in this manner the fuselage is extremely strong; it also absorbs engine noise.

The engine cowling is made from balsa and ply. Here is an easy method. 1/8in ply formers are made for the front and rear sections of the cowling. These formers are held the right distance apart by scrap balsa strips glued at the middle of the formers thus forming a jig. 1/2x 1/8in balsa strips are used to plank the cowl. The centre of the ply formers should then be removed leaving enough ply in the rear former to place screws with which to attach the cowl to the bulkhead. After sanding and filling the interior of the cowl is covered by glass cloth and resin thus fuelproofing and adding considerable strength.

Wings next

On my biplane I used veneer covered foam wings for quick building although built-up wings would weigh less, both wings having the centre section covered with glass cloth and resin. Built up construction is conventional with 3/32in

Perky Pirouette ready to go – all sorts of aerobatic antics await...

ribs and 1/4in sq balsa spars. The only point that is somewhat different is the centre section for the swept back top wing. A glance at the plan will explain this quite clearly and better than a thousand words could. Provision for the lugs for interplane struts should be made early during wing construction. A short note on this. Although the model can be flown without the struts quite safely, their addition adds considerably to airframe rigidity. Recommended.

The top wing is attached to the fuselage by means of 3mm aluminium struts. These are bolted to ply plates glued to the fuselage as shown. If you are using foam wings, 1/8in thick ply 3/4in wide, is placed between the dihedral braces on the bottom of the top wing. This, obviously has to be done before glass fibre is applied to the centre section.The top wing is held in place by means of 3mm steel bolts. These go into 4mm thick aluminium strips on the top of the wing which are tapped to accept the bolts. In the case of built-up wings the only difference is that instead of the tapped aluminium strips, captive nuts are used. These are attached to ply plates glued between front and rear spars, taking care to obtain good alignment. A spot of epoxy should be applied to the captive nuts so that the nuts are not pulled out of their place when screwing in the wing bolts. The ailerons are interconnected by means of 2mm diameter piano wire rods threaded at each end to accept clevises. The horns should be at the extreme end of the trailing edge of the aileron, as shown, so as to obtain slop-free ailerons.

Care should be taken when installing the aileron servo so that this does not interfere with the other servos in the fuselage. As regards radio installation in the model, this should pose no problem as there is ample room within the fuselage.

Tailfeathers

Tailplane and fin are all made from sheet balsa. Select your balsa carefully here, aiming for a medium grade of balsa which is light but of adequate strength. The elevators are interconnected with 2mm piano wire.

Finishing

Obviously you all have your preferred method and choice of materials, however I will outline my The model is given a coat of dope. After sanding. Tissue is applied and given a couple of coats of dope and sanding sealer. Cellulose undercoat is applied after which the finish sprayed on. Finally fuelproofer is applied. This sounds a lengthy procedure, but it does not really take that long to complete, and the result should be excellent.

Flying!

Although the model is not a beginners' model it is not all that difficult to fly. I would recommend it to the modeller who has bit of low wing experience. As with all aircraft (model and full size) correct centre of gravity position is paramount. With the CG as shown on the plan the model performs flick manoeuvres very well while maintaining a docile stall. A manoeuvre I like involves climbing vertically and simultaneously closing the throttle and applying full rudder and elevator thus producing a sort of vertical spin in which the bipe tumbles in space quite spectacularly. Flick rolls are a delight.

Control movements measured at the trailing edge of the flying surface are as follows. Elevator: 3/4in up and down ailerons; 5/6in up and down while rudder is 1./4in left and right. My bipe is powered by an O.S. 45 FSR with which the model has a very sprightly performance and a very good turn of speed. A schneurle .40 would also be adequate for the model.

Flying an aerobatic biplane is quite different from the usual pattern ship. I am sure you will enjoy it. Go Pirouetting!

Pirouette rests in Malta's evening sunshine. Who'll be first to fly one in the UK? Send us a photo!