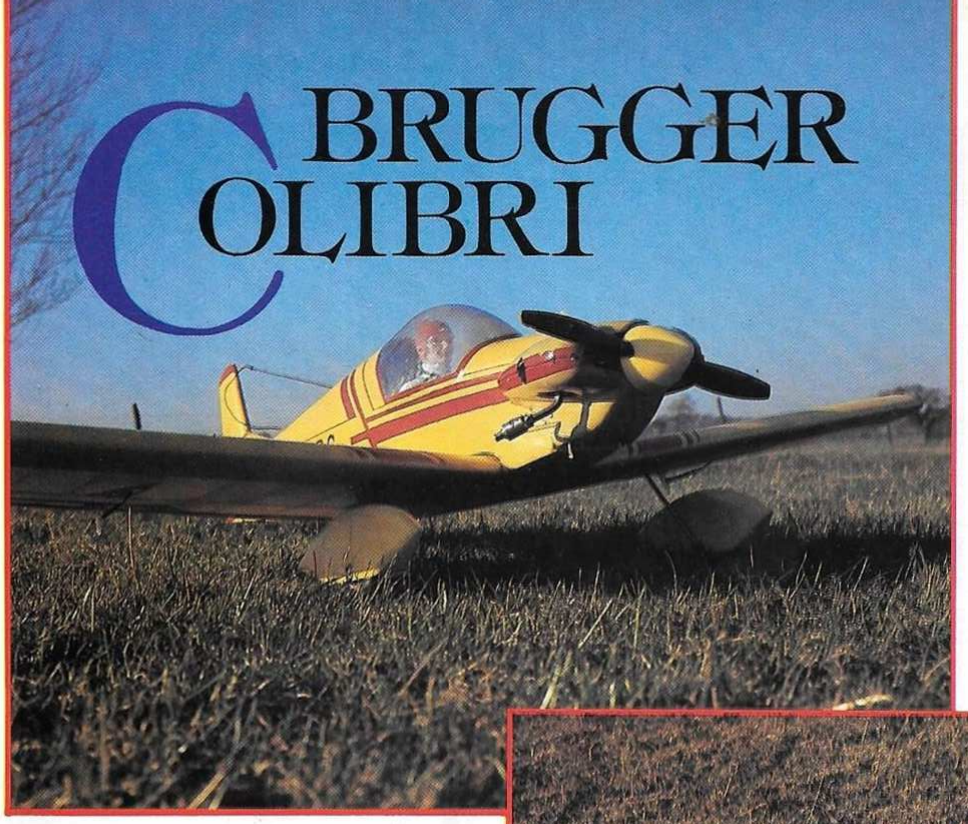
BRUGGER COLIBRI

Peter Miller describes his plan for this very neat Swiss homebuilt aircraft



The Brugger Colibri is a Swiss designed homebuilt, the first aircraft flew in 1970 and by early 1976 about 65 were under construction in Europe, and at least three others had been completed. Today there are many more around.

Like most homebuilts Colibris vary, some do not have spats, other do not have cowled engines and there is at least one which has an angular turtle deck and the canopy is made up from flat panels. quarter lights behind the main canopy while others do not.
other do not.

The Colibri has rather short couple lines and a stubby wing, yet still manages to look sleek and attractive, it also has very good proportions for aerobatics.

The model is built to ⅕ scale which gives a perfect size for 40 four-strokes, an O.S. FS-40 will make her perform most normal manoeuvres and certainly far beyond scale performance, I am sure no Colibri has ever performed vertical rolls.

Construction is very similar to my Turbulent but the ailerons and tail surfaces are much simpler. Although the wings may look weak, they have withstood the odd cartwheel landing and the model has been dived at full power from a great height with no trace of flutter, in the end the cowling popped open like a clamshell which slowed the model down and stopped the engine.

Construction

The construction is so simple that these notes will tend to be a little on the brief side and will tend to concentrate on the more involved bits and the reasons behind the structural design.

The model is light, it only weighs 5lb 4ozs and it doesn't have the wing area to carry much more. A good .25 cu.in. engine would fly it but any more powerful engine would be too far from scale.

Fuselage

The fuselage is a box, the sides are 1/16in. sheet with doublers from ply and ⅛ x ¼in. longerons and uprights. Chamfer the rear ends of the doubler to allow a smooth transition for the longerons.

The formers are from plywood at the front and built up at the rear. Cross braces are ¼in. sq. Join the sides with F1 and F2 taking great care that all is square, any mistake at this point will be impossible to correct later. Add the built up formers, join at the tailpost and add cross braces.

This method of construction is light but adequately strong, the thin cross sections used for the longerons allow the fuselage sides to be bent at the cockpit easily.

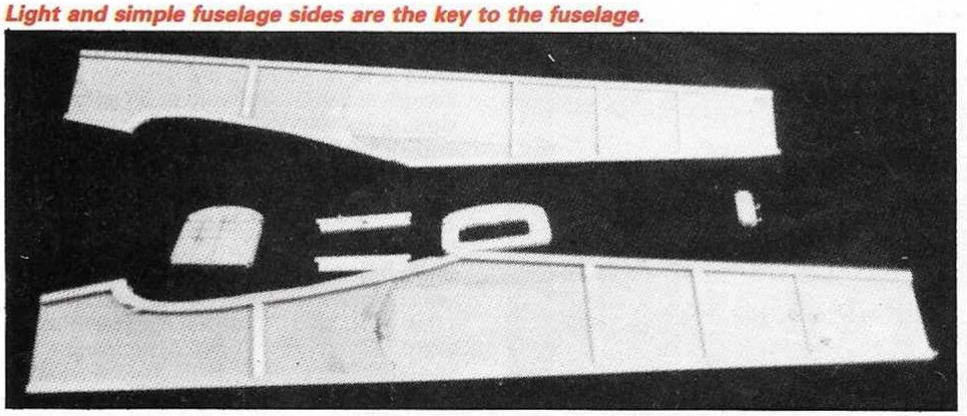
The top formers and rear turtledeck can be fitted along with the rear cockpit floor. On the underside fit the piece of ply to take the tailskid and the bottom sheeting. Some people may prefer to leave the bottom sheet off until the radio equipment has been installed.

Apply fuelproofer on the firewall and fit the engine mounts, it is almost impossible to fit them later. I used Sig aluminium mounts intended for engines up to .90, these are light and slim Tee mounts. However, the new Micro-Mold Tee mounts will do just as well and are easier to drill when fitting engine bolts.

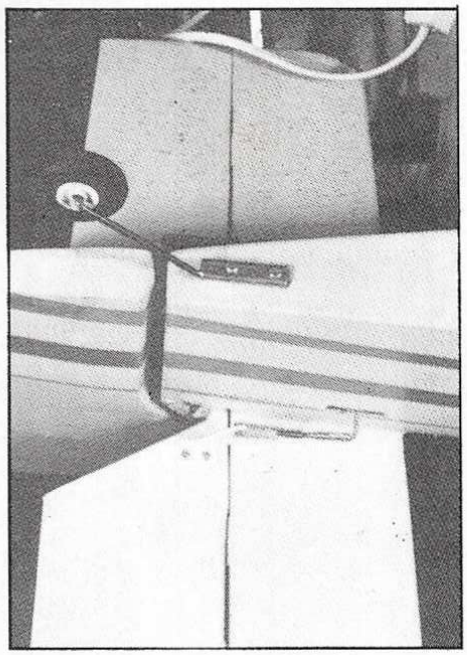
Tank installation must also be done at this stage, although the tank can be removed temporarily when everything has been set up. The front Turtledeck can now be added.

The cowl on the original was made in fib-

Light and simple fuselage sides are the key to the fuselage.



reglass, this meant making a male mould, and a female mould and then the cowl. The male mould was made from balsa and quite honestly if it had been hollowed out it would have made a good cowl itself. Build up the central portion of the cowl with ½in. sheet and then make the applecheeks from block hollowed out, cover with glass cloth and resin. The cowl can be split along the horizontal centre line or the vertical centreline, the latter will be less liable to distort on the balsa version. A vacuum formed plastic cowl is available from R/C Model World Plans Service, price £4.50.



The base of the rudder is thick, hinges must be very strong. Note simple tailwheel bracket which allows quick replacement and could be made steerable.

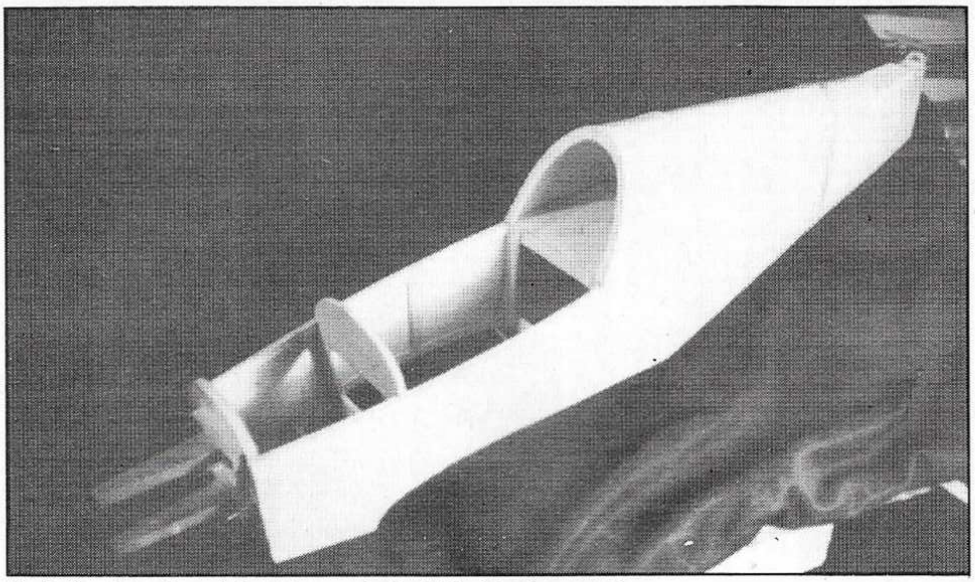
Tail Unit

The tailplane is ¼in. sheet, what more can be said about it? The fin is merely a small fairing and should not be fitted until the elevators have been attached.

The rudder is built up on a central core which is very thick but quite light. It is hinged with two Robart Giant Hingepoints. The hinges are both near the bottom of the rudder and take all the shock of any nose over. There is no fin, if you do not use the Robart Hingepoints find something equally as strong and rigid because if the rudder comes adrift in flight you have a terminal problem.

Wing

The wing is totally conventional in structure, it is also light and slightly flexible. It will withstand a cartwheel type of crash landing and has even withstood a crash that tore it from its mounting.



Basic fuselage is quick and easy to build but looks smart.

The ailerons are top hinged with the covering material and are very effective.

The wing is mounted using a single bolt at the rear and a dowel at the front but the dowl is unusual on this model. I drill a hole in in the central rib, smear a ¼in. wing bolt with oil, fill the hole with epoxy and insert the bolt. When the epoxy has set the bolt can be unscrewed and the head cut off. This arrangement will often allow the bolt to bend and come out of the front plate but if it does snap the remains can be unscrewed and a new one fitted. This has saved many a flying session with a model so fitted.

Installation

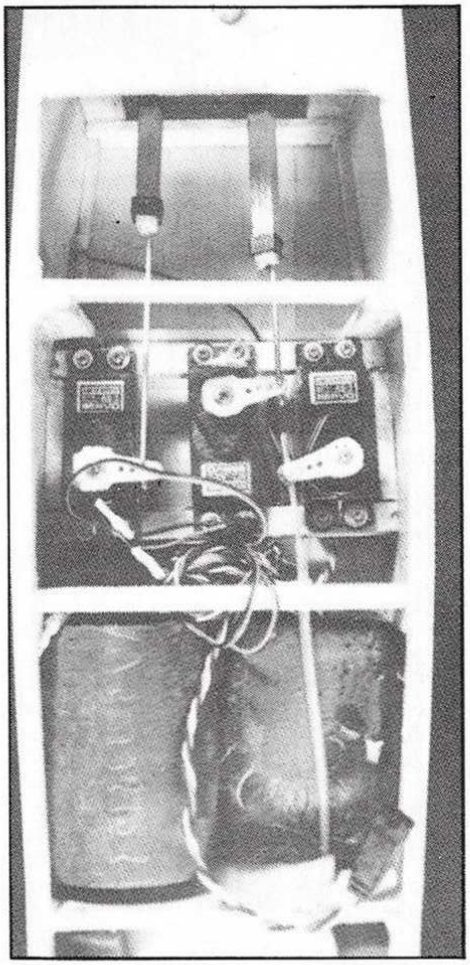
There is plenty of room for any type of radio equipment, the servos fit three abreast at the rear of the equipment-bay with the receiver in front and the battery up against F-2 as there just isn't enough room under the tank.

There are no complications in any of the control runs. The rudder and elevator are operated by pushrods, do not use snakes. The throttle is operated by bowden cable.

If the cowl has been split horizontally engine access is superb, most work can be done by removing the top of the cowl only, vertically split cowls will only be a little more obstructed assuming that the left side cowl has been glued on.

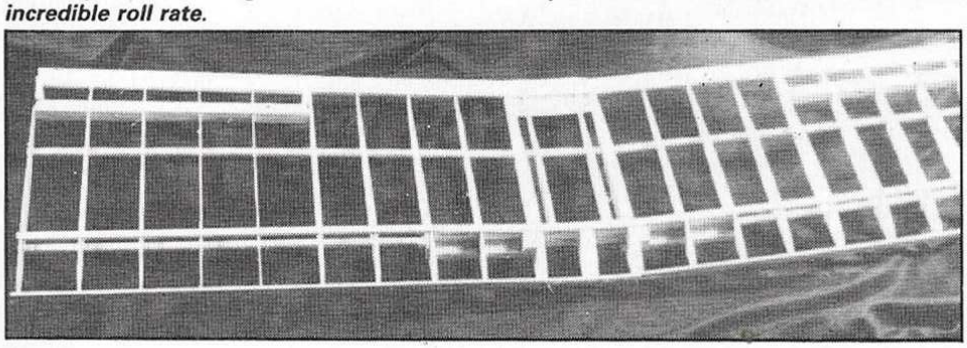
Finishing

The model is designed to be covered in Solartex, the strength and rigidity of Solartex is essential on the wing and recommended strongly for the rest of the model. The only alternative is nylon and dope, heavy, smelly and liable to produce warps in the wing.



Radio bay is full but not overcrowded and everything is accessible.

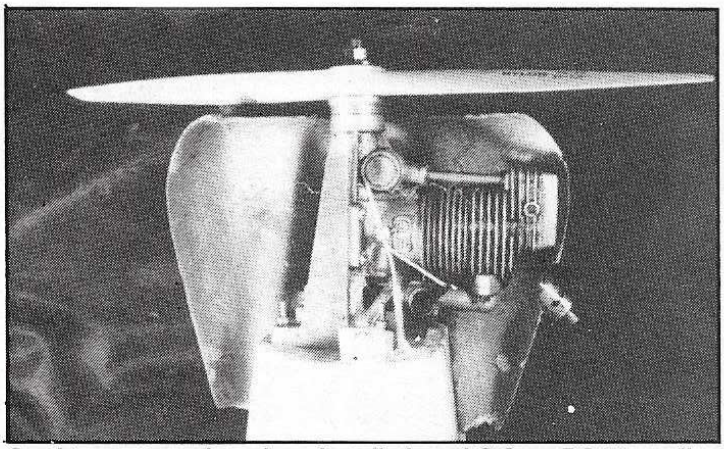
Low aspect ratio wing can be built in a small space and contributes to this model's incredible roll rate.



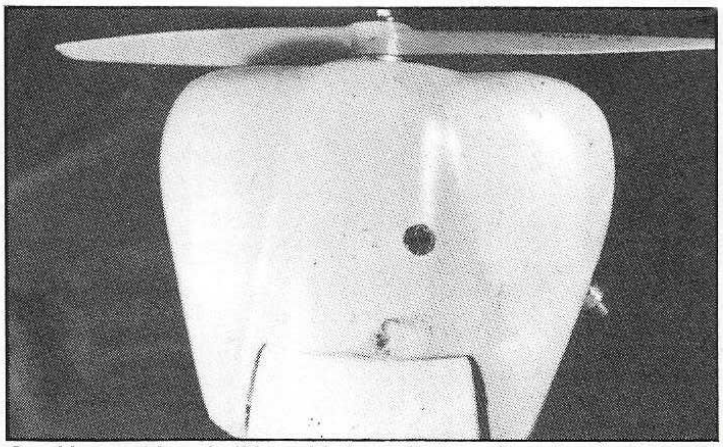
There are many colour schemes to choose from, I selected a fairly simple two colour scheme seen on a Swedish built Colibri, but there are many others of course, each one will also involve differences to the airframe such cowling shape, spat shape, canopy rear windows and so on.

There is a British one which is in blue and white and has a very simple cowling which is rather square with exposed engine, most unfitting on such a trim little aircraft.

A visit to the Popular Flying Association Rally at Cranfield at the beginning of July,



Cowl top removed to show installation of O.S. — F.S.40, cooling is good.



Cowl is very clean looking, this is made from fibreglass but a balsa cowl can be made, a vacformed cowl is now available.

will certainly provide lots of information, take plenty of film as you will want to stock up on documentation for many years ahead. Hundreds of homebuilt and vintage aircraft, plus many more modern types, normally a total of about one thousand aircraft are on show over the two days.

Flying

Flying the Colibri is an experience, it is fast and aerobatic and very sensitive. Those people with less sensitive thumbs may find that rates are useful with this model especially on landing.

The first thing to say is that rudder is not used in flight except for stall turns and in four point rolls and it must never be used near the ground, the reason is that rudder acts as full down elevator, I don't know why but it does, my Turbulent does the same.

With regard to aerobatics, if you can do it .. so can the Colibri, the roll rate is incredibly fast,' more like a flick roll at full aileron deflection and flick rolls are much faster than that. The model will happily do vertical flick rolls.

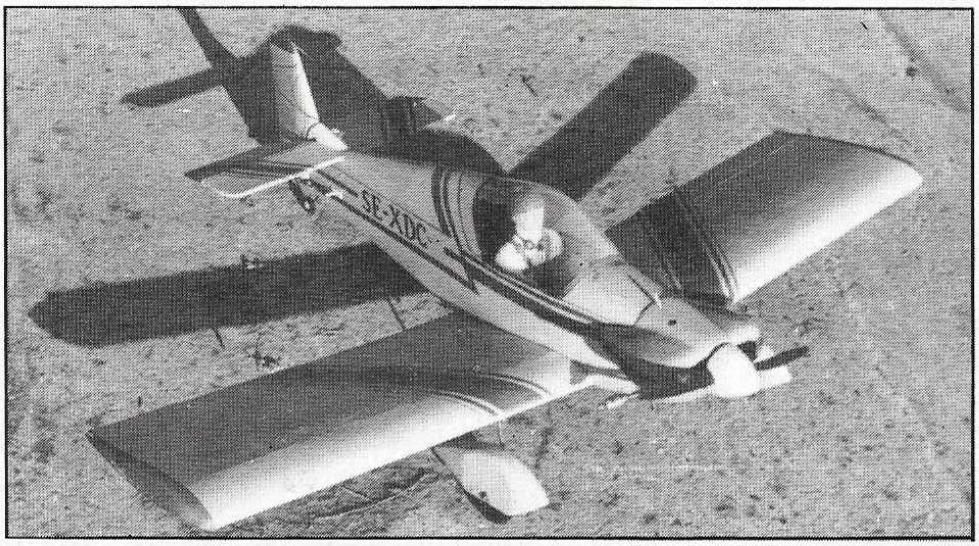
Loops, inverted, fourpoint rolls, knife edge, spins, vertical rolls are all within the models ability and even Lomcevacs but getting the speed exactly right is tricky.

The lowspeed handling is excellent with no tendancy to tip stall, the glide is fast and flat, even on a dead engine and there is a strong tendancy to over shoot by miles. The sensitive elevator can cause some problems on the approach and this is where delicate touch is needed, little up elevator to flare out can result in the model shooting up 10 or 20 feet, this can be embarassing.

The original model weighed 5lb 4oz and was powered by an O.S. FS-40, after a lot of testing the best propeller was found to be a Master 11X6 prop, no other prop gave the same positive climb or crisp performance.

Now, build the Colibri, go out and have fun.

Basic colour scheme uses vast amounts of masking tape, it could be done by using yellow Solartex and ironing on strips of red Solartex, cheaper, quicker, neater and less smelly.



Completed model is very compact but still attractive, registration is genuine Swedish as you might have guessed.