FIAT CR32

Left: Roy's Fiat sports a Luftwaffe training scheme. Below, from top to bottom: Large tail surfaces are coupled via push-rods; there's plenty of room for the radio gear. The sturdy cowling is made from balsa sheet carved to shape and the wire u/c is simply mounted by saddle clamps.

THE Fiat CR32 only took my interest when I read 'Combat Over Spain' by Captain Jose Larios. The book is his account as a Nationalist fighter pilot, fighting against the Republican forces in the Spanish Civil War between 1936 and 1939. His Commander was the well known Joaquin Garcia Morato, who shot down 40 enemy aircraft, most of them whilst flying CR32s. The Fiat CR32 aircraft were supplied to the Nationalist forces by Italy.

From Captain Larios' words, one gets the impression that the CR32 was an aeroplane well liked by its pilots. It was reputedly a dogfighter *par excellence*, highly manoeuvrable and strong in construction. It was capable of taking on the Republican Polikarpov I-15 Chato and I-16 Rata fighters supplied by Russia. It built up an impressive loss-to-kill ratio against these enemy fighters. Another advantage was that it had longer range machine guns than most opposing fighters.

The CR32, with its distinctive Warren girder interplane struts, might be thought unattractive from some angles. It certainly looks menacing when diving into the attack!

I decided to attempt it first as a semi-scale model with a simplified construction, but sufficiently close to scale in general appearance as a basis for a later, improved scale version. I had been flying a Super 60 with a Webra T4 .40 four-stroke engine and thought that I might be able to create a biplane of similar proportions to the Super 60 and still be able to use the Webra T4. It was a bit of a trade off in power-to-weight against some advantage in wing loading. Really it meant that there was not much spare power and I had to build light.

Alterations from scale included increased dihedral, and slightly enlarged tail surfaces. The fuselage was made slimmer and the u/c and cabane struts were simplified. Despite all the alterations, it was still a CR32 (from a distance!)

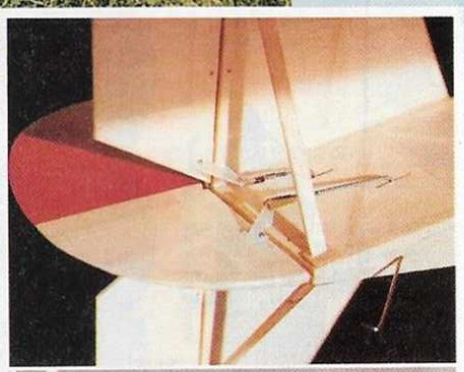
Fuselage

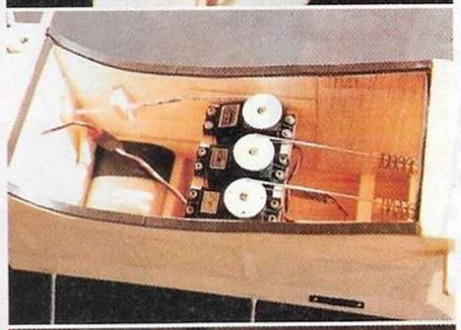
I apologise for the mixed units used in the construction description. You can convert them all to decimal if you wish!

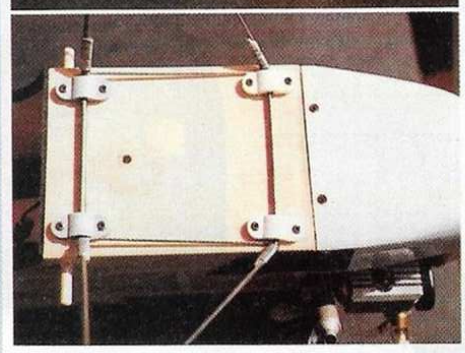
Roy Bowron presents a 63 inch semi-scale version of this lesser known fighter for .40 four strokes

Construction is conventional. It comprises of a framework made from 1/4in square balsa strip for the rear fuselage. The forward fuselage is mainly 1/4in sheet balsa with 1mm ply doublers. The upper forward fuselage and turtle-deck are 1/16in sheet balsa. The main formers are 1/8in ply and the u/c mounting plate is made up from 1/8in ply parts. The cowling is made from 3/8in sheet balsa.

Make up the fuselage sides and add the ply doublers. Join the sides with the three main formers and add the hard-wood cabane mounting blocks. Do not attempt to pull in the rear fuselage until the cabane bearer joints have had time to set. After pulling together and gluing







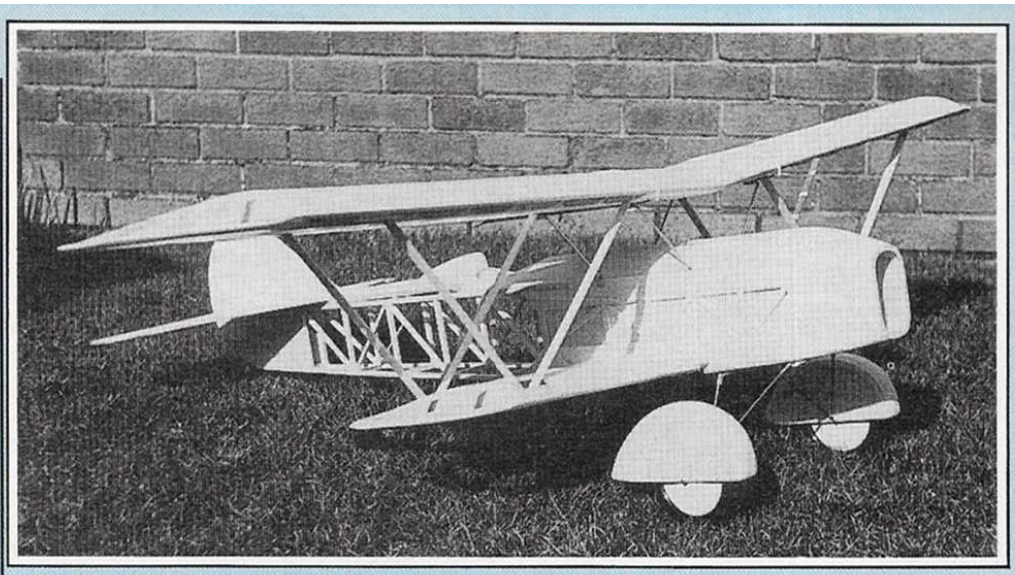
the rear fuselage, add the 1/4in square cross pieces. Have the 10g cabane wirework ready, made up with all joints wrapped with 30A fuse wire and soldered, similarly with the u/c. Fit the cabane wirework to the bearers either by lashing in place with strong thread (such as Dorcas 2oz thread), or with nylon saddle clamps and nuts/bolts. If using the thread method, coat with lashings of quick-set epoxy. Add the upper fuselage formers and sheet the upper fuselage. Cut out the cockpit access after marking out the position with a card template. Fuel proof the tank bay if you wish before adding the u/c play plate. Make up the cowl from laminations of 3/8in balsa sheet and tack-glue in place before sanding to match the fuselage. Later, when the cowl is removed for fitting mounting blocks, a 1mm ply facing can be added to the forward bulkhead. Fit the u/c after covering the fuselage. Some thought should be given to the engine mounting position before gluing the cowl mounting, spruce or hardwood, blocks in place on the forward bulkhead and the blocks let into the cowl. Drill holes for the lower wing mounting dowels and glue the dowels in place.

Tailplane, fin and rudder

These are each made up with a 1/16in sheet balsa core. A framework of 3/32in thickness strip balsa is glued on each side of the core. The rudder and elevator are formed by cutting along the hinge lines and chamfering either side of the hinge centre line. Join the elevators with a 12g wire link. The tail surfaces can be covered before or after fitting to the fuselage, but check alignment with wings in position when fitting the tail surfaces.

Undercarriage

This is made from 8g and 12g wire. Having seen very poor soldering on some folks' models, I would suggest that Baker's soldering fluid is a good investment towards improving the quality and strength of any such solder joints.



The Fiat CR 32 was designed with a lightweight built up structure for a Webra .40 four stroke, but a .35-.40 two stroke could be fitted for more power. Full size plans are available as RC1652, price £4.95 plus 85p p&p.

Assemble all wire parts together first by dry-wrapping joints with 30A fuse wire. That way you can twist the u/c square before final soldering. To save weight I left off the spats for early flights and they subsequently stayed off! It looks better with them on, though.

Wings

Upper and lower wing construction is very similar. Cut out the ribs from 1/16in balsa sheet, allowing for difference in rib depth for the centre-section ribs. There are three 1/4in square balsa spars, a 1/4in square balsa leading edge and 1/16in sheet trailing edges. Build each wing as two halves over the plan and allow for the root rib angle. Add the vertical grain main spar webbing and the trailing edge webbing. Cut slots in the centre section ribs and glue the dihedral braces in place to join the wing halves, packing one wing tip to ensure correct dihedral. Use clothes pegs to pull the dihedral braces against the spars where possible whilst the glue sets. Sheet infill only each centre-section under-surface and the wings are ready for the trail rigging process which follows.

Make up eight inter-wing struts slightly overlength as a balsa-ply-balsa sandwich from 1/16in balsa and 1/32in ply. Make up 16 strut retaining blocks as shown on the plan and also the 1/8in balsa inter-rib supports for the blocks. Trial rig the wings and tack-glue the strut-blocks in place with cyano glue. Trim each strut length so that there is some free play within the slots, but ensure that each strut engages at least 3/8in in each of its slots. Run some more glue around the strut-block mountings after removing the wings. Make sure that you do not glue the struts in the blocks in the rigging process!

Rigging, by first lightly banding the wings in place, inserting the struts in their slots (inner struts first) and then adding more bands, does not take more than two or three minutes on the flying

field and is speeded up if you mark each strut with its location. You can check the accuracy of your building by comparing strut lengths from one side to the other!

The upper surface sheeting can now be done on each wing. Make a card template to assist marking-out the sheeting for the best fit around the lower wing strut slots.

Finishing

I covered my model with Solartex, painted on the decals with enamel paint and then brushed a coat of Tufkote fuel proofer over all. If you let the enamel paint dry well and 'flow' the fuel proofer on quickly it does not affect the enamel.

The model as shown was based on Luftwaffe fighter-trainer CR32's, ex Austrian Air Force. It was not intended to be an accurate scale finish, just characteristic (cheap and cheerful!)

The engine was side mounted because of the Webra carburettor position, but there is plenty of room for choice. The engine mount can be offset about 3/16in to port of the centre line to compensate for approx. two degrees of right-thrust. Allow also approx. 1.5 degrees down-thrust.

There is plenty of space for mounting radio gear etc. with access via the lower wing position.

I used a 4oz fuel tank and installed the receiver battery underneath it.

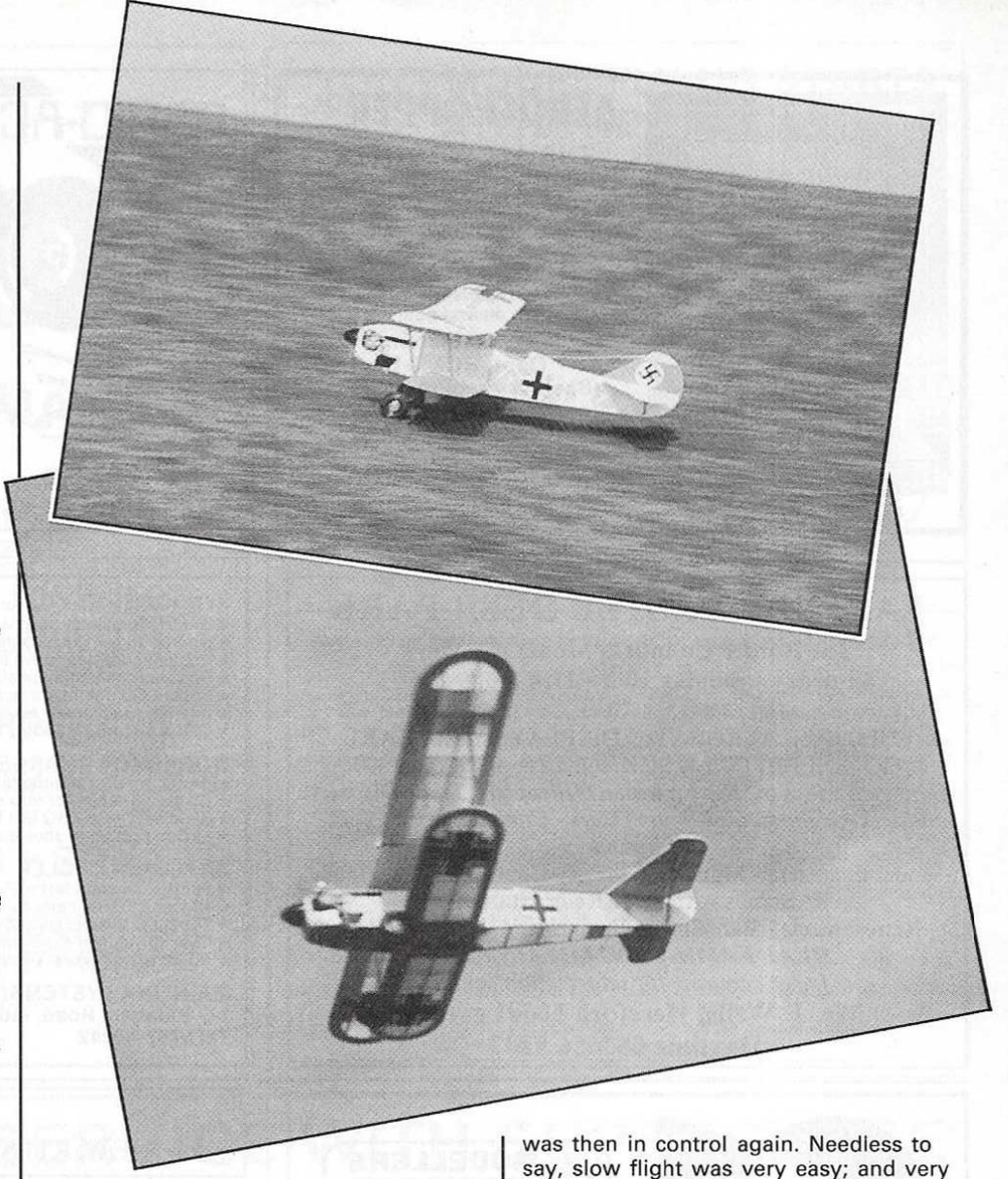
Set the elevator for 1/2in max deflection either way and set the rudder for 1.5in max deflection either way. Adjust the CG position to that shown on the plan and check that the lateral balance is correct.

How well did it fly?

Well, it looked really good in the air. It did not tear around the sky on the power that the Webra was capable of producing! It was really very sedate and relaxing to fly. Bearing in mind the relatively light wing loading, it was best flown in no more than light winds.

The take-off run with no wind was about 20 yards. It was easy to keep straight on take-off, raising its tail early in the take-off run and lifted off smoothly after application of a touch of up-elevator. With its large wheels and slow take-off speed, it coped well with quite rough ground as flying fields go.

On the initial flight it needed a bit of down-trim, but it was remarkably forgiving and could fly round in a slightly tail-down attitude without causing any panic. The stall was very gentle. I knew that it had got there when waggling the sticks had no effect! I let it drop its nose and pick up speed and was then in control again. Needless to say, slow flight was very easy; and very low, very slow fly-pasts looked really good.



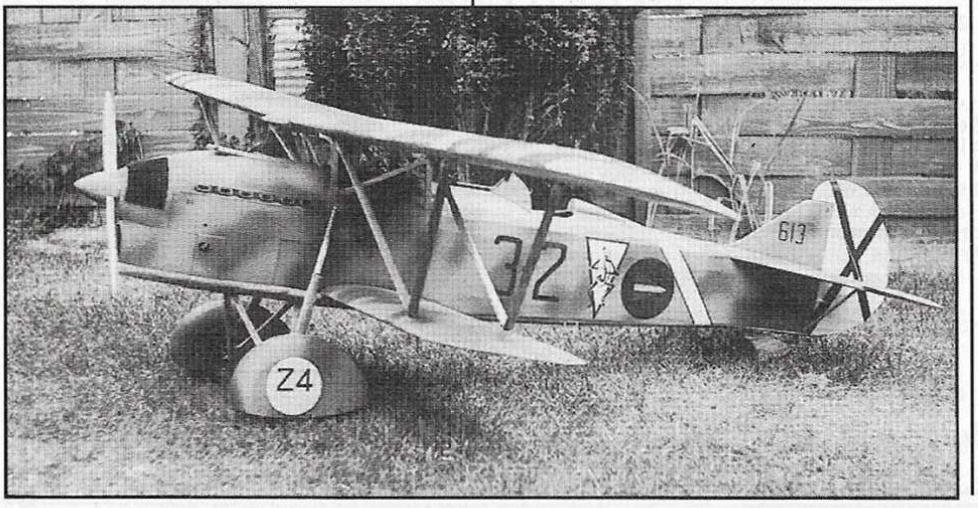
Airborne! The Fiat's unusual shape looks good. The prototype was tested over a two year period before being passed on to a new owner. The model has survived several prangs, proving that the banded-on wings really do work!

It looped best (with Webra) when entered from a slight dive.

Stall turns were quite realistic. So long as full rudder was applied at the correct moment approaching the stall, the swing to nose-down was quite graceful.

This type of flying has a lot to offer in the way of relaxed fun. The Webra, although a .40 four-stroke, does not have much more power than a .25 two-stroke. Put a slightly more powerful engine in it and you would have a better reserve of power.

I sold my model after flying it regularly during a two-year period and its new owner was equally pleased with its performance. He fitted a .35 two-stroke and could do some impressive power-on stalled approaches with confidence. He tested the structural integrity more than I did, but the banded-on wings and strut mounting method minimised damage! It lived to fly another day.



Roy went on to build an improved scale version with the same wingspan. A .60 four stroke was used to cope with the increased weight of the scale detail.

Postscript

I went on to make an improved scale version with the same wingspan. It has a .60 four-stroke engine and four-function control. The weight went up to 8.5 lbs. It took very much longer to construct though! Was it worth it? I began to wonder when I saw Pete McDermott's models! Still, it looks and sounds very good in the air and there are not many CR32s around!

Good luck with your flying.