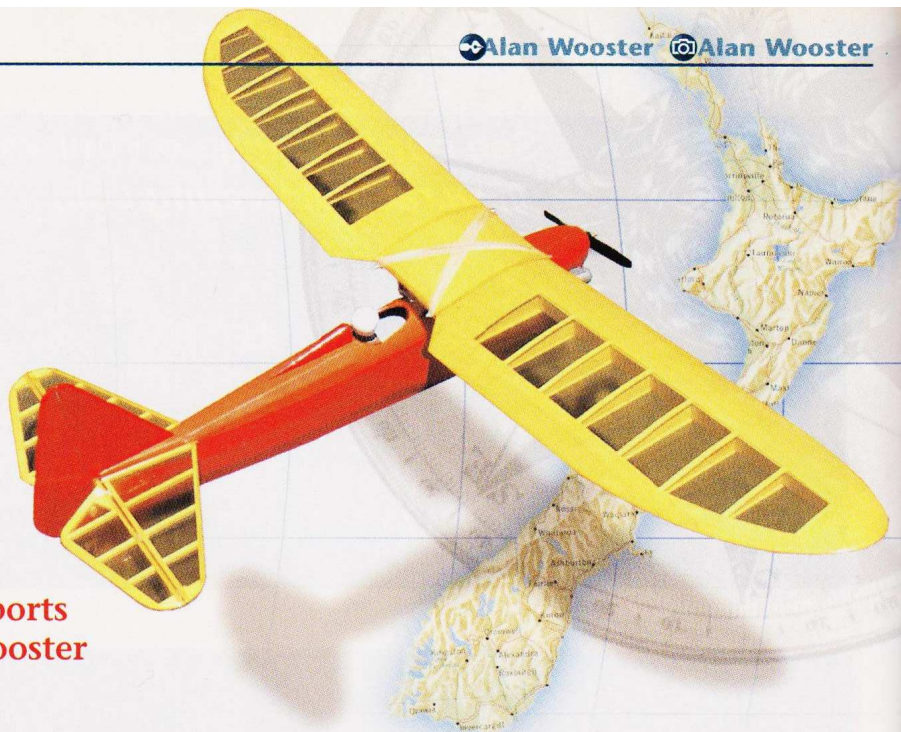


Kiwi Cavu



A 60" span vintage-style 3-function sports or trainer model designed by Alan Wooster for around .25-size 2-stroke engines

After playing around with a series of low wing fairly hot sport aerobatic models, a couple of club mates suggested that maybe it was time to produce another docile sport model. I was a fan to produce something with vintage connotations and this one was influenced by a small profile sketch of a little rubber-powered model from way back originally designed by Ken Willard.

I originally sketched it up with an OS26FS four-stroke motor in mind, but eventually fitted an old unemployed OS25FSR instead. In light of the rather hot performance of the prototype, I would suggest a little four-stroke or maybe a .20 two-stroke may be a more appropriate choice. The model is lightly loaded and has plenty of wing area and the fuselage space, so another feasible consideration would be to maybe load it up with batteries and an electric motor.

I wondered whether the vintage style forward located undercarriage may produce a few surprises on the take-off run, but it has been no trouble at all. I did use rather lightweight wheels here, and the final balance came out spot-on with no extra weight required. I did install the 4-cell 600 mAh NiCad pack as far forward as I could, behind the firewall and above the 4 oz fuel tank.

The model is a straightforward and simple build so let's get on with it. Again, I started with the tailplane. This results in something tangible to play with in short time and seems to kindle the enthusiasm. I use Sig-Bond aliphatic glue for most of my assembly work, with some 30-minute epoxy in high-strength areas, and a little thin cyano where a quick fix is wanted.

Tailplane

The fin, rudder, stabiliser and elevators are all fabricated from medium/soft 1/4" balsa built over the plan. Don't forget the wax paper or film covering backing to prevent these items from sticking to the drawing and do ensure your building board is flat. Note that the fin bottom rail is 1/2" wide to provide an anchor surface for the later film covering and the stabiliser centre-section is in two pieces each side of the centre-line to accept the fin to plug in later. The fin sternpost can be of harder material and runs full height to provide a modicum of strength should you manage to turn the model over on landing! I generally run the elevators LE right through in one piece and then cut out and insert the hardwood dowel as the centre joiner as a secondary operation.

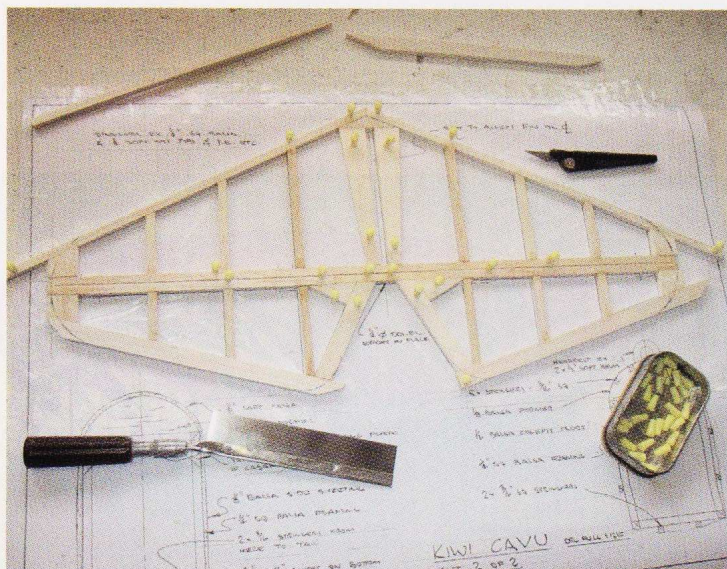
I use 'Sig Easy-hinges' to hinge both rudder and elevator. I cut each full size hinge in two before fitting to provide a practical size and also make them go twice as far! Cut the slots and fit the hinges before film covering but DO NOT glue the hinges in place yet. All tailplane items can be film covered before fitting to the fuselage.

Wings

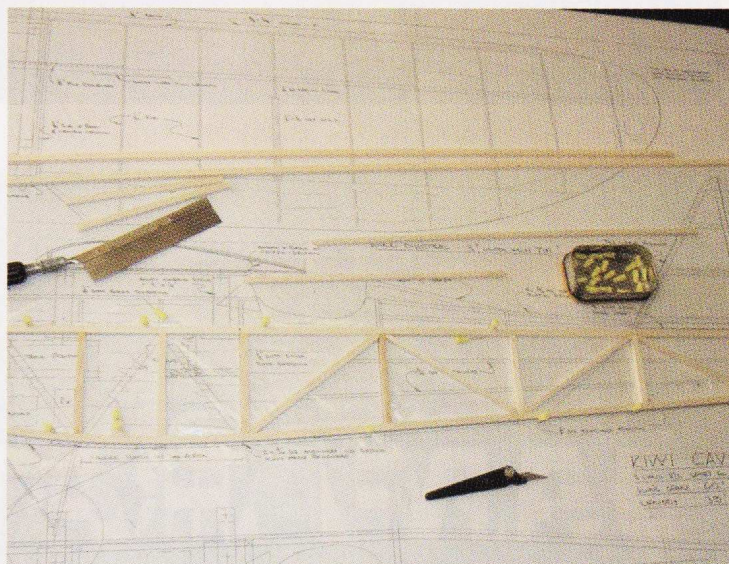
These are built in three pieces; left, right and centre-section.

TOP TIP: Where only one wing panel is shown on a plan, my favourite fix is to tape the plan to an appropriate clear glass window or door with daylight behind and pencil the opposite hand panel onto the obverse of the plan using a soft pencil, mostly freehand, and ruler where necessary for straight lines.

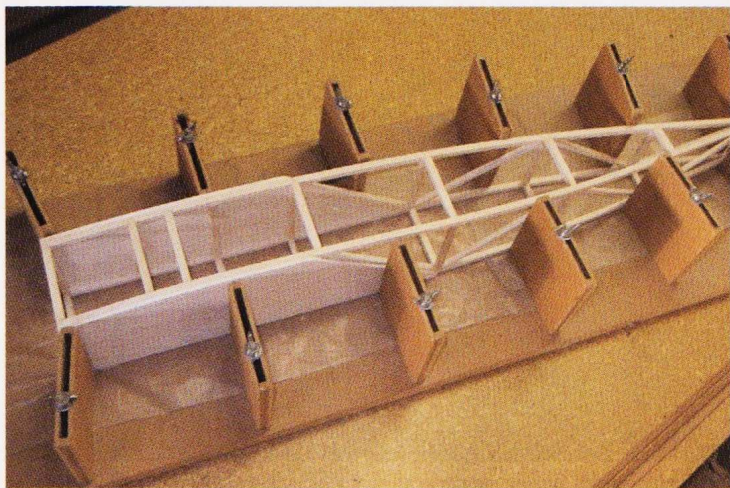
Cut out the wing rib blanks. I usually cut a thin card pattern of the basic shape, excluding spar notches, and draw around this direct onto the balsa using a ball-point pen, Stack the similar size ribs into a block



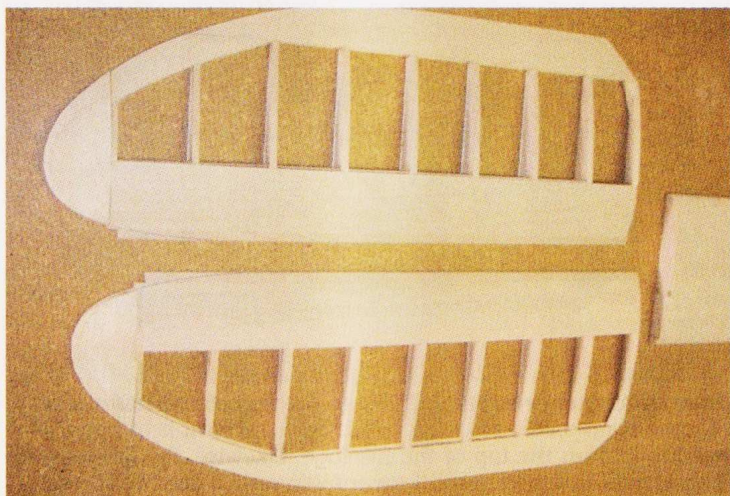
Layout of stabiliser over the plan; don't forget wax paper or similar under



Layout of fuselage side



Basic fuselage box in assembly jig



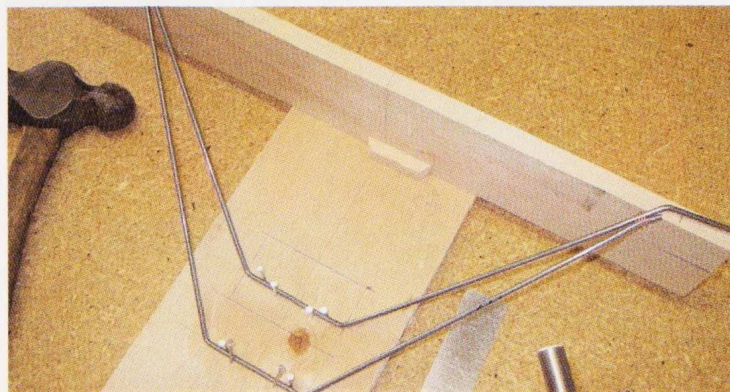
Wing panels assembled prior to final shaping

using either masking tape, or preferably a pair of 1/8" bolts. Sand and finally shape all ribs as a block and cut the spar slots in this block using a fine razor saw. The smaller tip ribs are cut separately.

Pin the lower 1/16" balsa LE and TE sections over the plan. Now glue the lower 3/8" square spruce or pine spar along the rear edge of the LE sheet. Glue all ribs except the 1/8" balsa root rib in place having first checked for good alignment. The root rib is the same profile as the other common ribs but is cut short towards the rear to align with the centre-section TE and is canted over to provide the 3" dihedral required under each wingtip when the wing panels are eventually joined. The upper hardwood spar is now glued in place and the 1/8" balsa 'dummy' LE is now glued across the front of each wing. A small filler piece is required out towards the tip to cater for the curve here. Another scrap filler, ex 1/2" sq. soft balsa, is glued across the angled root end of the lower TE sheeting and tapered from the root rib to TE proper to accept the top TE sheeting. Plane the top edge of the 1/8" LE to align with the top of the wing profile and glue the soft 1/16" LE and TE sheeting in place.

TOP TIP: Pre-sand this sheeting before gluing in place. This will minimise the scallop effect of later in-situ sanding.

Assembled undercarriage on basic jig



Laying up wing panels

The vertical grain 1/16" balsa shear webs can now be glued between all ribs EXCEPT the first bay where the 1/8" plywood spar doubler will eventually locate. The 1/4" x 1/16" balsa cap-strips can now be added; also the 1/16" balsa sheeting at the root bay.

The wing panel can now be lifted from the board and the lower cap-strips fitted. DO NOT glue the lower sheeting. Also glue on the 3/8" LE proper. I usually cut my own ex 3/8" sheet, glue it in place and then plane it to shape with a razor plane. Feel free to use pre-shaped material here if you can find it. The tips are fabricated from two laminations of soft 3/4" balsa. I hollowed mine out before gluing them together, but then I have a thing about lightness! These can be glued in place after the LE has been basically shaped.

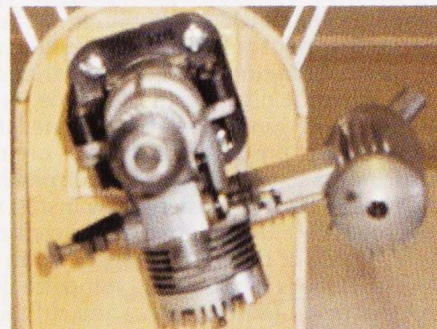
The centre-section panel is fabricated over the plan using similar methods. Ensure both root ribs are glued in place vertically. When dry, plane and sand the top to shape and apply the top 1/16" sheeting.

Next operation is to join the wings. Sand the end of each panel to provide a neat butt joint. Pin the centre-section down to the building board and offer up each wing panel. Sand as necessary to properly align the wings in all planes and butt-join the panels with 30-minute epoxy having jugged up each tip to provide 3" dihedral. Lift the assembled wing from the board after the glue has dried and prepare to fit the 1/8" spar doubler. This is done from the underside. In the cause of simplicity and neatness, the spar doubler is cut to fit the glued root joints. Using a piece of thin card (an old folder is ideal), cut a full size template of the doubler. This will be approximately 12" wide. Cut the doubler from 1/8" birch ply or similar, NOT poplar litleply, and epoxy this in place. This is a good place to not skimp on the glue! When this lot is dry, add the lower cap-strips and centre-section sheeting and the job is as good as done. Do spend some effort to sand everything to a good finish prior to film covering.

Fuselage

Make up a pair of fuselage sides ex 1/4" sq balsa sticks. Lay up the first one over the plan and then the second one over the top of that - separated by a greaseproof membrane of course. The two halves are then joined to form the basic fuselage box. I use a traditional old fuselage jig for this. The 1/8" plywood cabane strut seals and U/C mounting plates can now be epoxied into place; also the cockpit floor and plywood servo mounting plate. The aluminium cabane struts can now be bent up ex 1/2" x 1/8" flat bar. These are bolted into place with 1/8" bolts. Do use a broad flat washer under the nuts, and when properly aligned give the bolt fixings a liberal coat of epoxy.

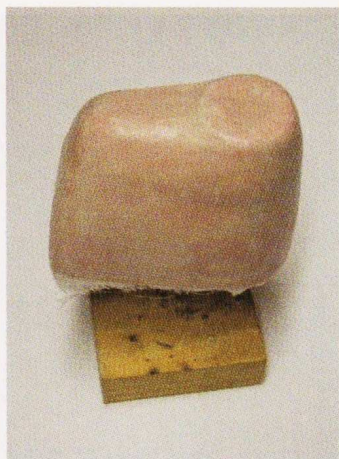
Note: The aluminium wing seating and the stabiliser are aligned 0-0.



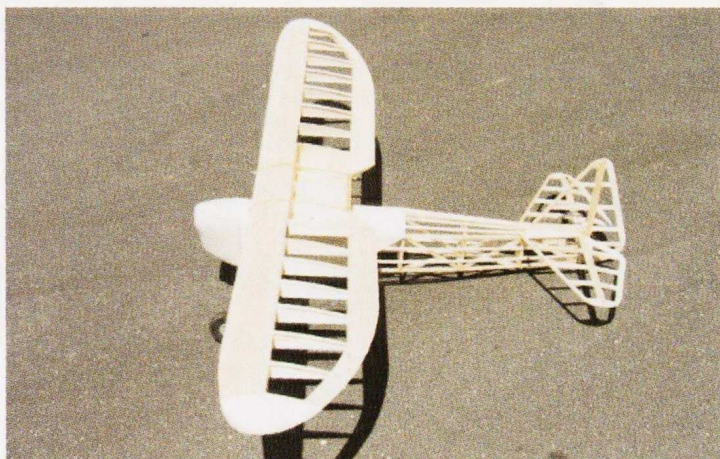
Inverted 2-stroke engine is canted off vertical to provide fuselage clearance for muffler



Covering cowling plug with tissue to smooth the finish



Resin curing on glassed plug



Assembled bare bones model

Engine mount former F1 may now be epoxied into place, followed by the other 4 half round formers back to the rear of the cockpit. It was at this stage that I temporarily fitted the tailplane and installed the servos and made up the push rod assemblies for the rudder and elevator.

The engine mount can now be fitted in place. It is fitted onto a wedge piece to provide the required down-thrust as shown on the plan. I made this wedge piece by gluing up a small 'bath' out of scrap balsa, sitting it on the building board with a packer under one end, and then filling the 'bath' with resin. Once dry I sanded the top edges of the bath away and hey-presto, an 'instant down-thrust wedge'. This wedge is epoxied to the front of F1. The 2-stroke engine is fitted into the moulded mount and the assembly canted over as necessary so that the muffler clears the fuselage side.

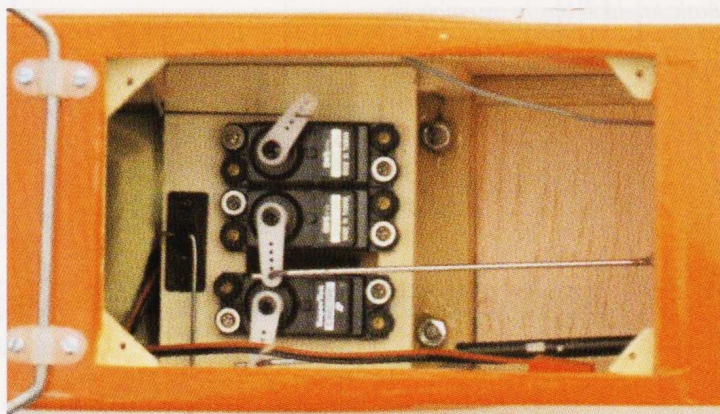
The soft 1/8" balsa sides and bottom sheeting can now be applied. Note the bottom sheeting is cross-grain. The turtle-deck formers are installed next and the stringers added. Apply the fuselage top planking from the cockpit forward. (You may consider painting inside the cockpit area before this step.) I applied this in two separate pieces joined at the top on a central stringer. I massaged each sheet with a brew of well watered down ammonia and the curve was easily obtained. (Use ammonia with caution.) You may want to avoid ammonia and use more narrower planks - your choice. Add the two stringers each side and also the fairing strips at the rear end of the solid side and bottom sheeting and the woodwork is near finished. Mark the cockpit aperture via suitable card pattern and cut that out. The headrest was fabricated from two laminations of soft 1/2" balsa, shaped and covered with plastic film before being glued in place after the rest of the fuselage had been covered. Likewise, the small fillets each side of the fin were fabricated, film covered, and then glued in place before the rest of the fuselage was covered.

The undercarriage is bent up from two pieces of 14 SWG piano wire and soldered at the axle location. It is fixed in place with two pairs of small plastic saddles screwed to the ply mounting plates after the fuselage is covered. Likewise, the tail skid is bent up from 16 SWG wire and epoxied into a slot cut into the fuselage after covering.

Covering and Assembly

The entire model is plastic film covered. I used opaque 'Easycoat' on the fuselage, fin and rudder, and translucent 'Solarfilm Polyester' on the wings and horizontal tailplane. Because of the way the model evolved, the fuselage covering sequence needs some thought. The fin, rudder, stabilizer, and elevators were all covered prior to the model assembly. I covered each stabiliser surface with one piece of film and then carefully removed a wedge piece at the centre where it glues to the fuselage. Now glue the covered stabiliser in place having carefully aligned it with the wing for square and level. The pre-covered elevators are now installed. (I fitted the plastic horns to both elevators and rudder on the bench before rigging them - it's a lot easier!) Now install the pre-covered fin ensuring it too is carefully aligned on the centre-line. The pre-covered fillets each side of the fin are now glued in place.

The fuselage is next covered using the normal sequence. The bottom goes first. I used one piece and cut the bottom access hatch out later. Each full side-piece went on in one piece. I then applied the turtle deck pieces. I applied these in two operations and made an



Servo installation viewed through access hatch in bottom of fuselage

overlap join on the top of the fuselage. Likewise, the fuselage top from the rear of the cockpit forward was applied in two pieces.

The rudder is fixed in place after the covering job is finished. The windscreen was folded from scrap of 1 mm vinyl sheet. In this instance I cut away a lot of film back to bare balsa, coloured the cut black with a felt-tip pen and glued the windscreen in place with 'Pacer Formula 560' canopy glue.

A 2" Williams Bros. plastic pilot finished the cockpit nicely.

Cowling

I swithered over the cowling for some time. I considered making up a plastic one pulled from a heated bottle pulled over a wooded former and also making up a paper-mache one. In the event, I carved a plug from a piece of polyurethane foam, sealed the coarse sandy surface with two layers of tissue paper applied with liberal quantities of watered-down aliphatic glue and made the cowling from one layer of 2 oz glass-cloth applied in two pieces. After the resin had cured and set I dug out most of the foam and then tossed the article into a bucket of water to soak overnight. That softened the aliphatic glue and the remaining mess was scraped out to pro-

Dihedral angle and cabane clearly show





Exciting low-level passes are great!

vide a very lightweight finished job. The necessary cooling and access holes were ground out with a Dremel hand tool and it was secured in place with four small PK screws into four small pine blocks epoxied around the perimeter of F1.

Flying

With the Rx and NiCads installed where shown on the plan the balance came out spot on. Dry weight of the finished model was 3 lb 5 oz. Rudder throw is 1½" each way and the elevator is 1¼" each way.

The first test-flight was made in cool conditions with the wind blowing about 20 knots and gusting higher as it tried to rain. Despite this, and after all the preliminary checks, I fired up and let it go. The Kiwi Cavu leapt into the air and zoomed away vertically under full power. Obviously more down-thrust could be used, but with full down trim and some down stick as well, it leveled out and was tossed around until the 4 oz tank ran out, and I managed to flop it back on the strip and pounce on it before it blew away.

A few days later the conditions were much better so I tried again. I hadn't changed any settings, but was ready for the horrendous climb. It didn't disappoint me, but this time with full down trim and the engine at less than full power it flew almost straight and level and was quite manageable. When the throttle was reduced to idle the glide was just right, and later when I shut it down completely it floated around perfectly comfortably to land right at my feet. Control response was good over the full range. The OS25FSR fitted provides lots more power than is necessary and really could

use more down-thrust, but it is comfortably manageable as is and I unlikely to change it now. A small four-stroke may well be a better choice – this type of model doesn't need all that power, besides which, the sound would probably be more appropriate too!

That aside, my model will tightly loop from straight and level and performs the most impressive barrel rolls I have seen in a long time. I was surprised at how easy it was to fly inverted circuits at a constant level and then consecutive outside loops using elevator only – the lateral trim must be good!

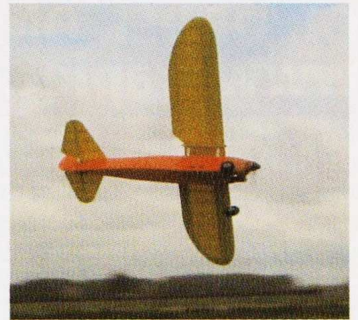
Now after about 2 dozen flights, still without any increased down-thrust, I enjoy hot-dogging it around in tight figure eights at relatively low level. Its semi-scale old-timer appearance is an attractive change from the everyday ARF and it really has proved to be an agile and fun little sport plane.

RCMW

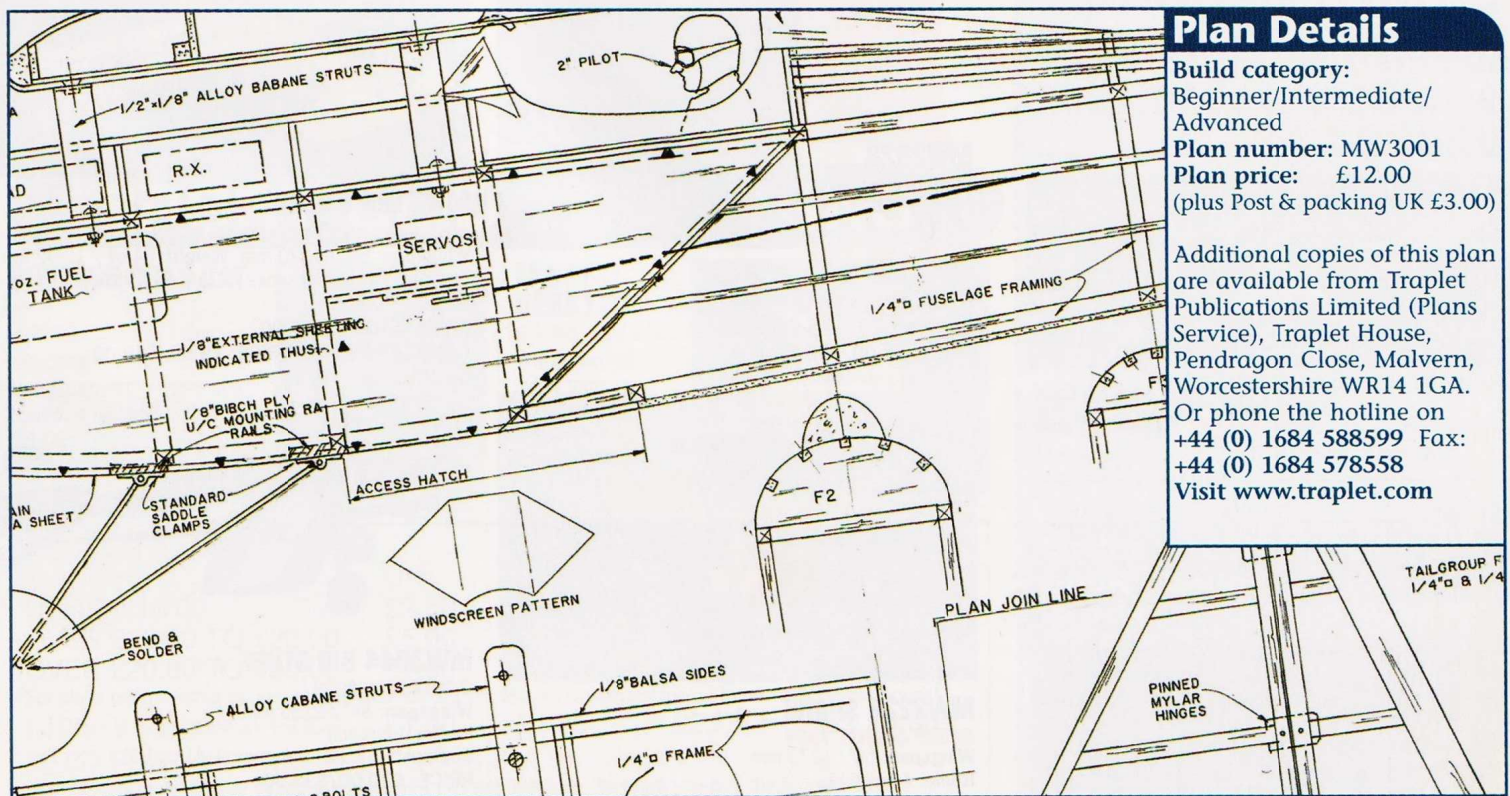
The Kiwi Cavu is small and an easy to transport



Below: Looking majestic and serene during a slow flypast



Above: Faster flying and turns are just so easy and stable



Plan Details

Build category:
Beginner/Intermediate/
Advanced
Plan number: MW3001
Plan price: £12.00
(plus Post & packing UK £3.00)

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