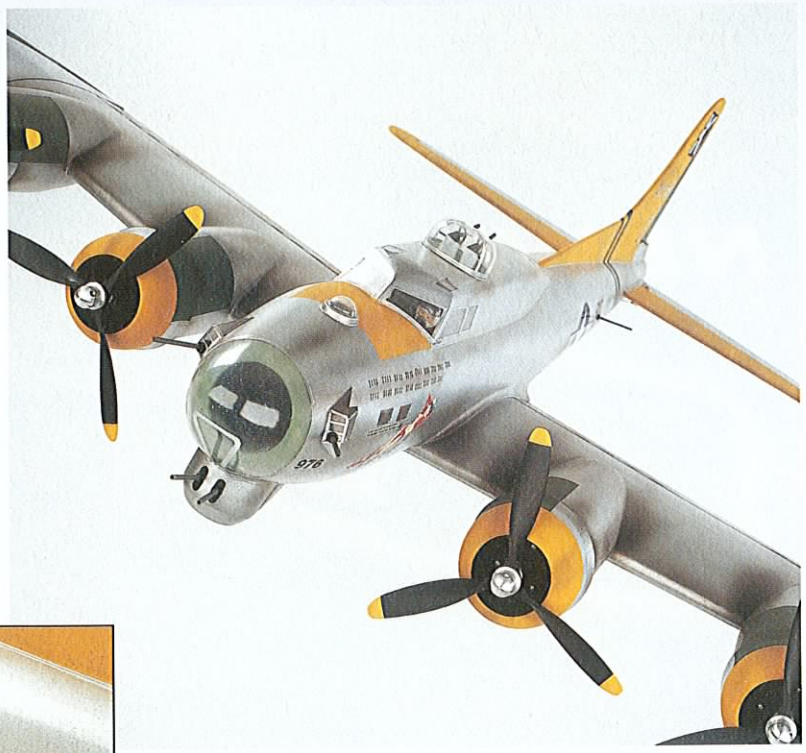
B-17 Flying Fortress

A QUARTET OF BRUSHED MOTORS BY HIS SIDE, TONY NIJHUIS RETURNS WITH ANOTHER MULTI-ENGINE ELECTRIC CLASSIC

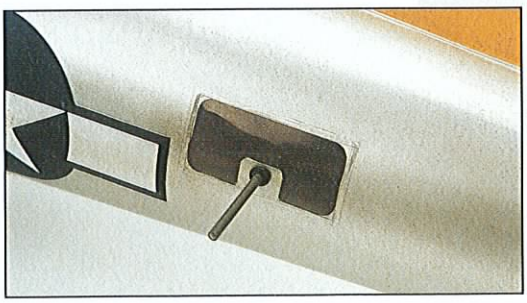


Computer Aided Design played a major part in producing this superbly accurate profile.

Since introducing the incredibly popular 72" span Avro Lancaster some six years ago, the design of a follow-up has always been on the agenda - and there was never any doubt that the Boeing B-17 Flying Fortress was going to be that model.

On the whole, I think, the great success of the Lancaster plan can be attributed to the following:

- At 72" span it's a comfortable size for most club flyers to transport in their car.
- Electric powered and designed to operate on a simple, inexpensive set-up, it inspires confidence as a first-time multi-engine subject.
- It's a Lancaster! An aeroplane that captures the heart and imagination, epitomising the spirit of wartime Britain to produce the very best under extreme adversity.



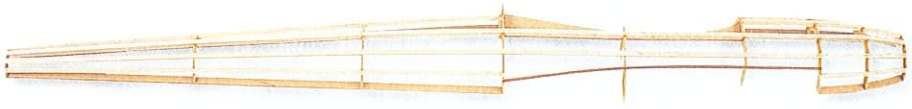
Hitting an enemy fighter from the waist gun position was extremely difficult in a B-17. A quick burst at a passing fighter was about the most a gunner could hope for. Conditions inside were cramped, too.

Another key factor that proved popular with modellers was the CNC-cut wood pack and vac-formed canopies, domes, blisters and turrets, available via the Encanta plans service. Indeed the Lanc' was one of the first *RCM&E's* plans to feature CNC cut parts, made possible thanks to the original plan being designed and drawn using CAD (Computer Aided Design).

So, if the formula works for the Lancaster, in theory the B-17 should be equally as successful. So why has it taken six years to materialise? Well, in truth the 72" Lancaster was a steppingstone to proving the design concept of the 11' (3.35m) version, which at the time was my ultimate goal. But it didn't stop at 11'... five years later it finally ended up at 17'! I promise you... no bigger versions are on the cards - enough's enough! Indeed, with the Lancaster out of my system, it was time to return to some sort of normality.

IMPROVER

Electric flight technology has moved on apace over recent times; it was somewhat of a different story at the time of the first Lancaster. Sanyo 2000SCR NiCads and brushed motors were at our disposal, and although NiMH cells and brushless motors were available they were too expensive, and so ruled out. As a result the



Building commences with the fuselage, which is assembled in two halves.

Lancaster, though they're now wired up differently and the batteries that drive them are also different. I'll explain more about the motor and battery set up in due course, but don't fret... it's too important not to discuss!

At 72" span, the Fort' is one of Tony's smaller offerings yet it's eminently practical for general Sunday flying.

available power to weight ratio using the simple 8-cell pack and all those motors wired in series gave the model a challenging weight target of around 5.5 - 6 lb. This was achievable with careful wood selection, but I've heard that builders generally struggled to achieve the weight mainly because their high standards of finish and detailing saw the model finish up at between 7 - 8 lb. The net result was a very underpowered model.

So, what are the improvements that go to make the B-17 a real winner? Well, as with most of my recent designs (especially when they're scale in nature) the basic outline was digitally scanned from an original three-view drawing to give the finished article a perfect scale profile. For the wing and tail section I used 'Compufoil', a computer-based programme for designing aerofoil profiles and ribs to give good lift and low drag characteristics, coupled with stability in turbulent conditions. The use of thinner liteply in the B-17's CNC pack (predominantly 2mm as opposed to the Lanc's 3mm) provides a very useful weight saving.

Given the recent leap in electric flight technology you may be surprised to hear that the B-17 uses the same type of motor as the

POWER & WEIGHT

When the prototype was complete, covered, finished and detailed to the level seen here, the AUW, including 1 lb 10oz of flight batteries, was 6.5 lb - a very realistic target weight.

Now, the rule of thumb concerning power to weight to fly a model such as the B-17 is around 45W / lb, therefore at 6.5 lb this would equate to just under 300W. With the power set-up as suggested (see next issue) I was able to produce 600W at only 32A. Not quite prop-hanging power, but the i.c. boys among you wouldn't scoff at that! And here's the clincher... Assuming 300W will fly the model, we have a current draw of around 15A; with 6.5mAh Li-Pos gently shoe-horned into the fuselage, it doesn't take much to work out that the possible duration would be around 25minutes!

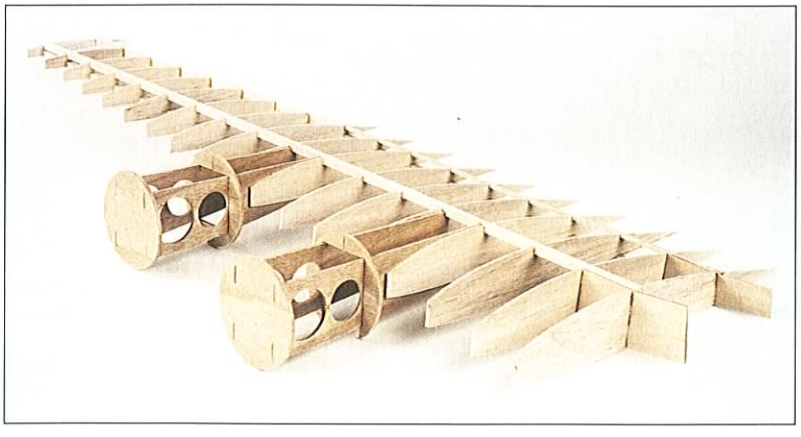
To recap on the benefits, you can now build and own a 4-engine bomber and not worry about performance, duration or an engine stopping. Just charge the night before and have a great days flying. Oh, and I left the best till last! I'm sure the true scale enthusiasts out there can't help but notice the scale-size props - and they're not just for show. Don't they look fabulous? More details on these next month.

Hopefully, all of this is convincing enough to make you want to build one. If it is, then great, read on and I'll explain how she goes together.

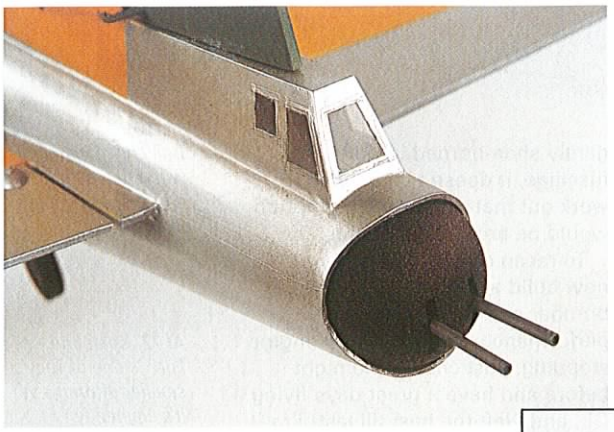
Classic lines of the B-17 are thoroughly evocative. Note the level of detail in the tail gun position - ideal for a model of this size.

GAME OF TWO HALVES

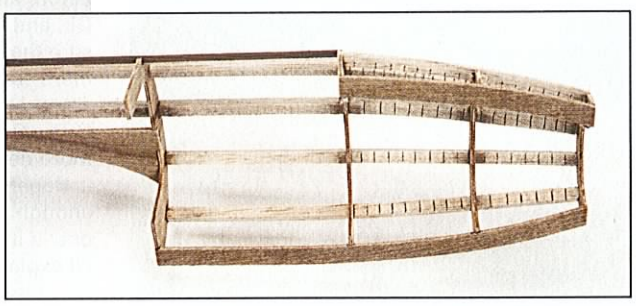
If you're familiar with my previous designs, particularly the DC3 and the Airbus A400M, then you'll notice a certain similarity in construction. The B-17's fuselage is built in two halves (left and right) over the plan, one at



Wing construction is a typically traditional built-up structure, skinned in 1.5mm balsa.



No frills with the rear turret, it's made from a 2" polystyrene ball, cut in half.



Front end of a fuselage half-section showing the CNC spine, CNC formers and notched stringers.

a time. First, pin the spine pieces for one half over the plan and then fit all the fuselage formers and the wing seat, except F4A. Now add the 6mm and 3mm spruce longerons, making saw cuts on the inside faces at their nose sections to achieve the correct fuselage profile. When all the longerons are attached, remove the fuselage half and build the other side in similar fashion.

Now glue the two halves together ready for skinning. The structure is fairly rigid but care needs to be taken to avoid inducing any warps during the sheeting process (there's a sheeting diagram on the plan that should help you here). Begin by sheeting the centre-section of each side and continue to alternate from one side to the other, piece by piece. Use the softest balsa you can find and wet the outer surface to aid bending, especially at the tail end. You could, if you wanted, sheet the fuselage in 1.5mm as opposed to 2.5mm balsa, the benefit being that 1.5mm is lighter and easier to bend around the tighter radii. That said, the longerons will be noticeable as the skin bends over them, giving a 'stepped' profile rather than a smooth curve. The choice is yours, but I would suggest using 2.5mm, which also allows a little more depth for sanding out any imperfections.

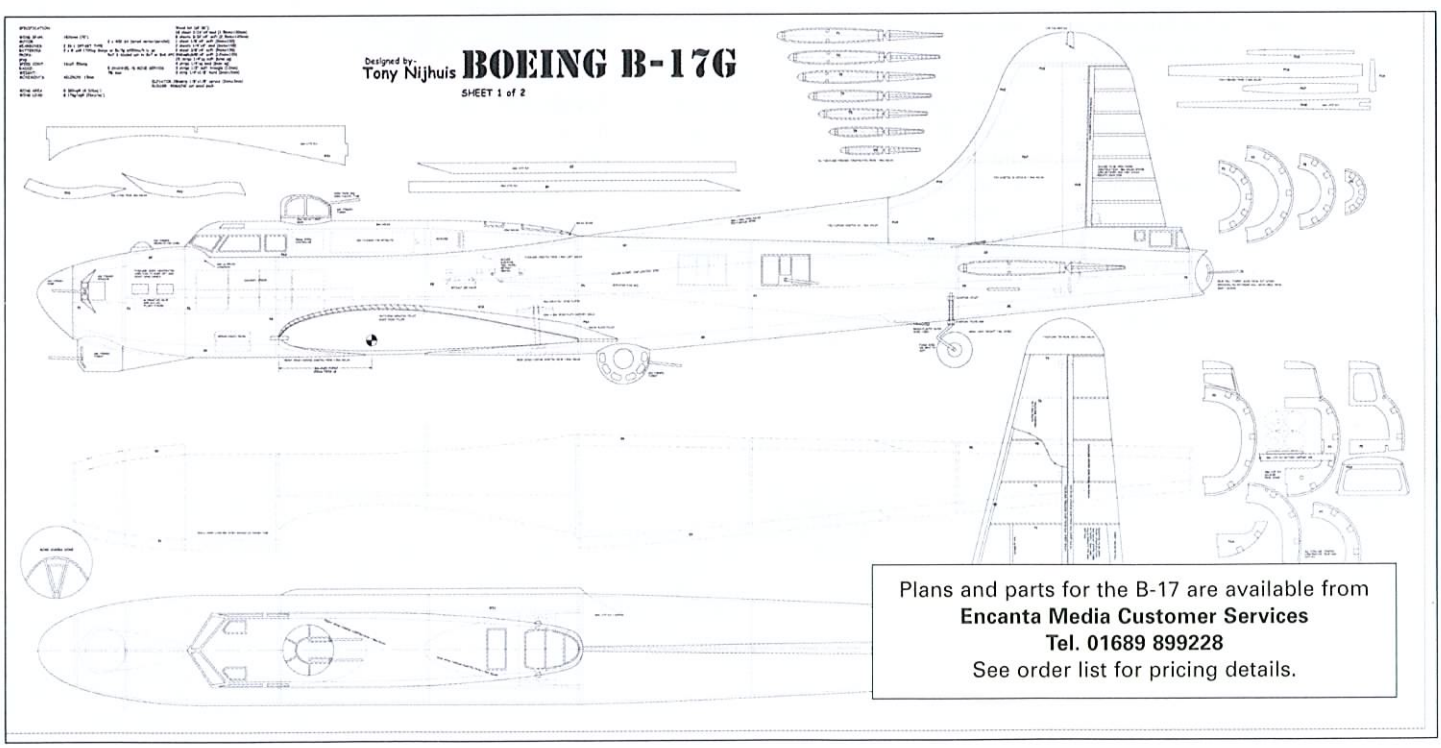
When the sheeting's complete, trim the cabin opening back to the spruce edging before moving on to constructing the fuselage / cabin top. Fit F4a, cut out a pair of cabin sides and fit these into position, following the contour of the spruce edging. The balsa cabin windscreen should also be fitted at this stage, and the top edge trimmed level ready to fit the 12mm balsa top decking. You and now start shaping the cabin / fuselage top ready for final sanding and finishing.

The fuselage wing fairings should be left until the wings have been made; fitting the wing to the fuselage and then sliding the ply fairings into place will give them the perfect profile before gluing. Best we make the wings, then!

WINGS

These are constructed over the plan, making left and right panels. Begin by pinning down the lower spar, then fit the ribs into position. Note that ribs W4 / W5 and W8 / W9 are angled where the nacelle sides fit. Now add the top spar, ply braces and rear top spar.

Using 6mm sheet balsa, make up the inner l.e. and the aileron t.e. Glue these into position, and when dry the wing panel can be removed and the lower rear wing spar fitted. The other wing panel can now be made in the same way. To give the panel more rigidity I suggest you skin the top of each using medium soft balsa, 1.5 x 100mm wide. The best way to skin each wing panel is to butt-glue



Plans and parts for the B-17 are available from
Encanta Media Customer Services
Tel. 01689 899228
See order list for pricing details.

all the sheets together on a flat building board, trim off any excess and then sand the whole smooth and flat. The entire panel sheet can then be glued in position, starting at the l.e. and working back. Trim any excess sheeting flush and then install the power and servo wiring, and the retract air tubing. At the position where the nacelles are located, remove the wing skin between W4 / W5 and W8 / W9 from the l.e. back to the main spar. At this point make up the servo wing boxes (I used J. Perkins mini wing servo boxes on the prototype).

Three 8-minute flights and capacity to spare, all from one charge. Looking as good as this, who could resist rolling her out to the strip just one more time?

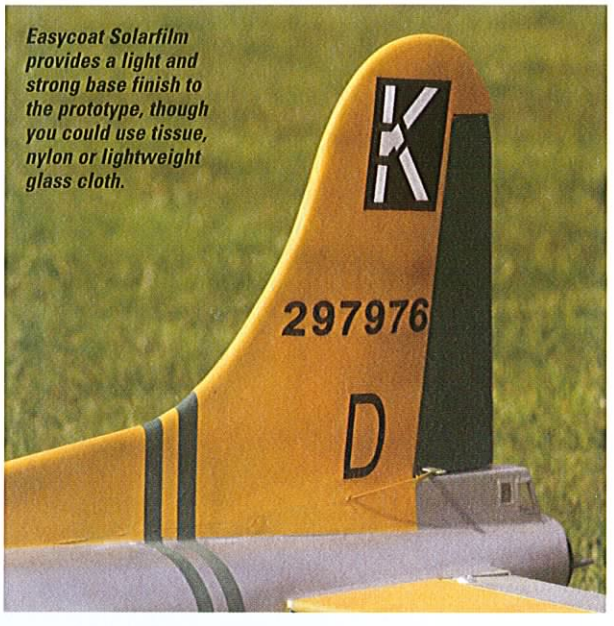
The inner nacelle sides and formers lock together fairly quickly.

Construct and apply the bottom sheeting in the same way as for the top, trimming the edges flush and removing the excess where the nacelles fit. Make up the outer l.e. from 9mm balsa, glue it into position and shape it to the profile shown on the plan. The sections between ribs W4 / W5 and W8 / W9 can then be removed. To complete the wing, build up the tips using a sandwich of 9 and 12mm balsa and then shape as required.

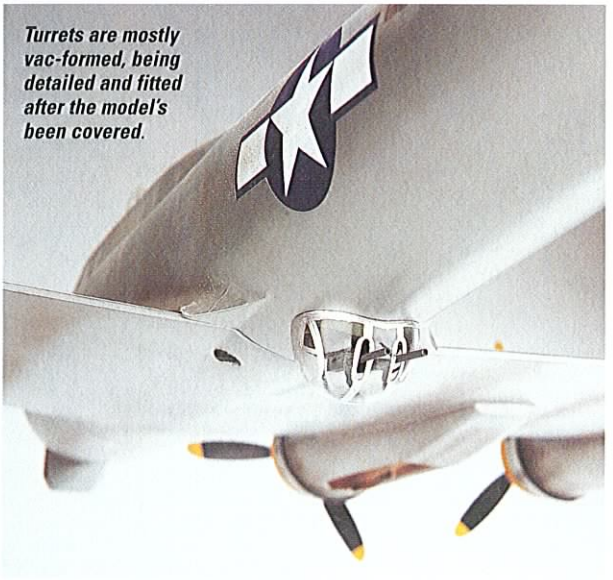
NACELLES

These are fairly time-consuming, but at least you don't have to make the cowls (that's assuming you've bought the vac-formed goodie pack, of course!) The inner nacelle sides and formers lock together fairly quickly, so it shouldn't take too long to see each nacelle structure appear ready for skinning. Before fitting the motor bulkhead you'll need to decide which type of gearbox you're going to use. The plan shows the MP Jet 2.33:1 gearbox, which is available from Puffin Models along with the 6V, 400-size motors. If you plan to use these gearboxes and haven't yet ordered the bits, just cut a hole to the size and position shown on the plan in readiness.

With all the formers in place, cut and fit the retract mounts in the position shown. You'll need to have your chosen retracts to hand so you can set out the mount spacing correctly. I would recommend you only use air retracts for the B-17, and if you have no specific preference then the Eurokit spring air undercarriage (available from Motors & Rotors) is quite suitable. The reason for choosing 'air only' is



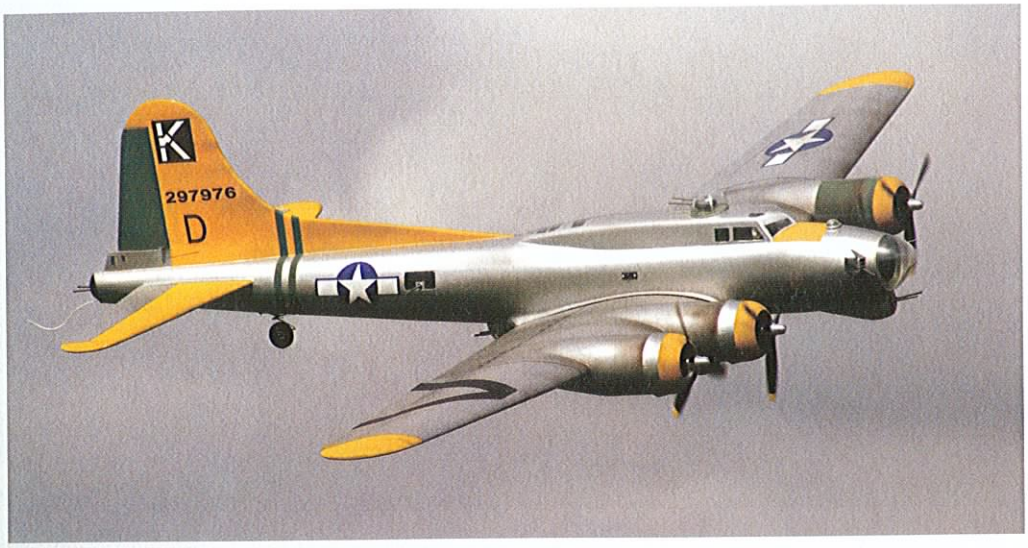
Easycoat Solarfilm provides a light and strong base finish to the prototype, though you could use tissue, nylon or lightweight glass cloth.



Turrets are mostly vac-formed, being detailed and fitted after the model's been covered.

ORDER LIST

Item	Code	Price
Plan	RC2029	£17.50 plus post and packing
Mouldings	COWRC2029	£20.00 plus post and packing
CNC selection	CNCRC2029	£70.00 plus post and packing
B-17 plan pack inc all of the above	SETRC2029	£99.00 plus post and packing

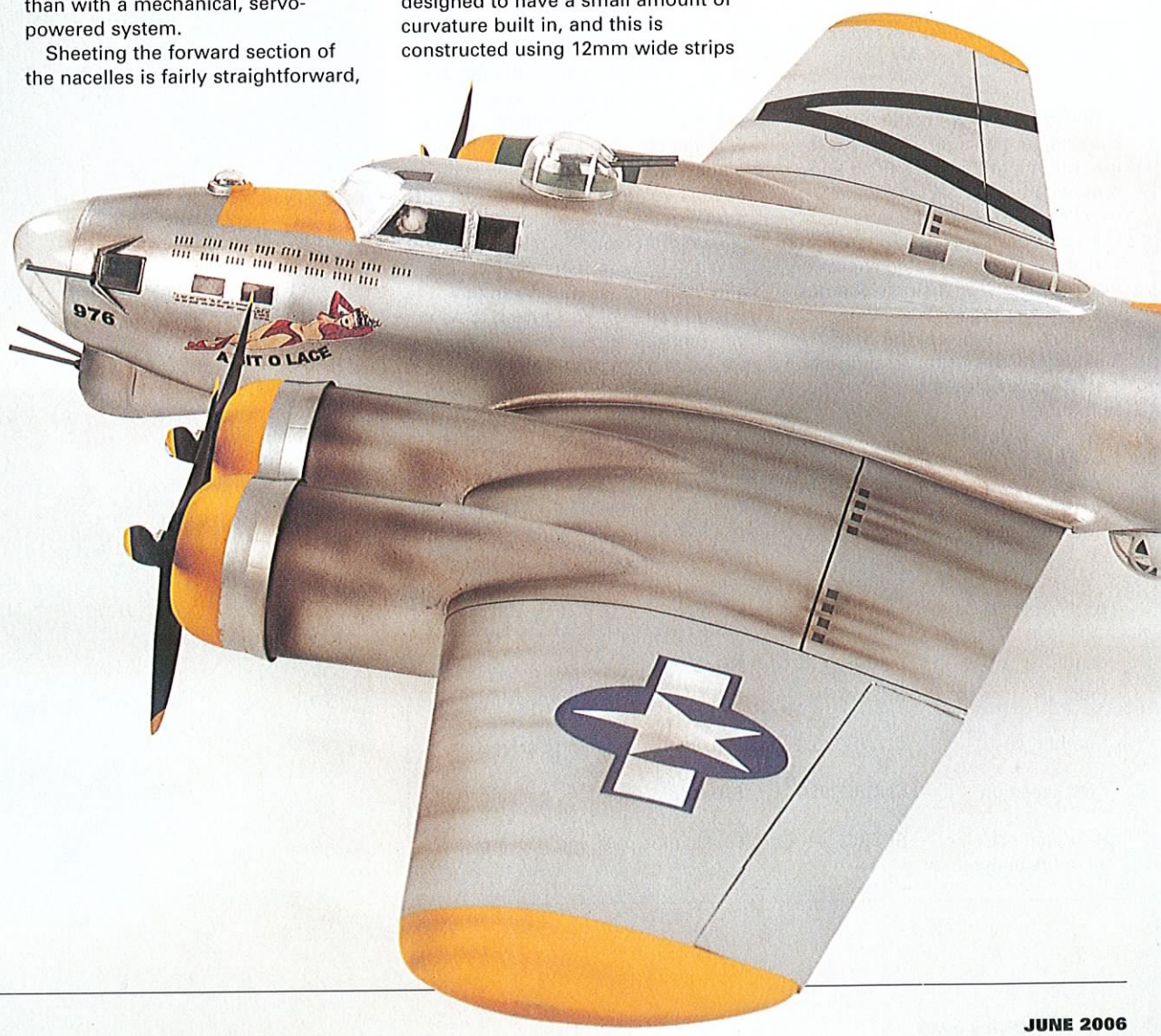


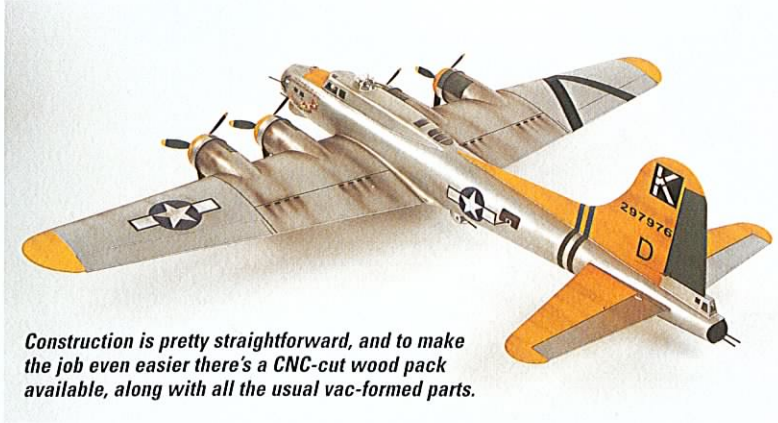
Straight, level and comfortable on two-thirds throttle, any fears were soon laid to rest. She's a peach!

apparent on the plan; the undercarriage is cranked forward at a slight angle, and the wheels retract only 45° or so before the tyre hits the motor. Holding an undercarriage leg up under pressure at an odd angle is far easier with an air system than with a mechanical, servo-powered system.

Sheeting the forward section of the nacelles is fairly straightforward, as it simply involves rolling a straight piece of 1.5mm sheet balsa around the (equal size) formers 3 and 4. At this point check there's sufficient slack in the power cables to pull them through former 3. The middle section of the nacelle is designed to have a small amount of curvature built in, and this is constructed using 12mm wide strips of soft 2.5mm balsa, planked between the middle formers 4 and 7 / 8. The reason behind using a thicker grade of balsa here is so you can blend the edge abutting the 1.5mm balsa, using sandpaper to achieve a smooth and flowing curve. To make the rear section of the nacelle, roughly shape a piece of balsa block, glue it into position on the wing skin and blend it in by sanding. On the inner nacelles, cut out the wheel wells to expose the retract mounts. It's a good idea at this point to form the undercarriage legs, fit the retracts and check that it all works okay.

Right then, the wings can now be joined using good quality white glue or epoxy, after which we can turn our attention to making the ailerons. This is done by first cutting the bottom sheet to size and then trimming / fitting the aileron l.e. to sit at the angle shown on the plan (this angle can be checked by test fitting one of the aileron ribs).





Construction is pretty straightforward, and to make the job even easier there's a CNC-cut wood pack available, along with all the usual vac-formed parts.

Datafile

Name:	B-17 Flying Fortress
Model type:	Electric W.W.II bomber
Designed by:	Tony Nijhuis
Wingspan:	72" (1826mm)
Wing area:	4.3sq. ft. (0.4sq. m)
All-up weight:	7 lb (3.2kg)
Wing loading:	26oz / sq. ft. (8kg / sq. m)
C of G:	105mm from root leading edge
Motors:	4 x 400
Gearboxes:	2.33:1 (offset type)
Battery:	Two 8-cell 1700CP Sanyo or 5s3p 6450mAh Li-Po
Speed controller:	16 cell, 50A
Propellers:	9 x 7" 3-blade cut to 8 x 7" or 8 x 6" APC thin electric prop
Radio:	5-channel, 6 mini servos
Control functions:	Aileron, elevator, rudder, throttle, retracts
Control deflections:	Aileron - 15mm; elevator - 20mm; rudder - 40mm

Now mark out and fit the ribs to the bottom sheet, and when this is done trim the top edge of the aileron l.e. flush with the ribs. Finally, enclose the structure with top sheeting and trim to the finished shape.

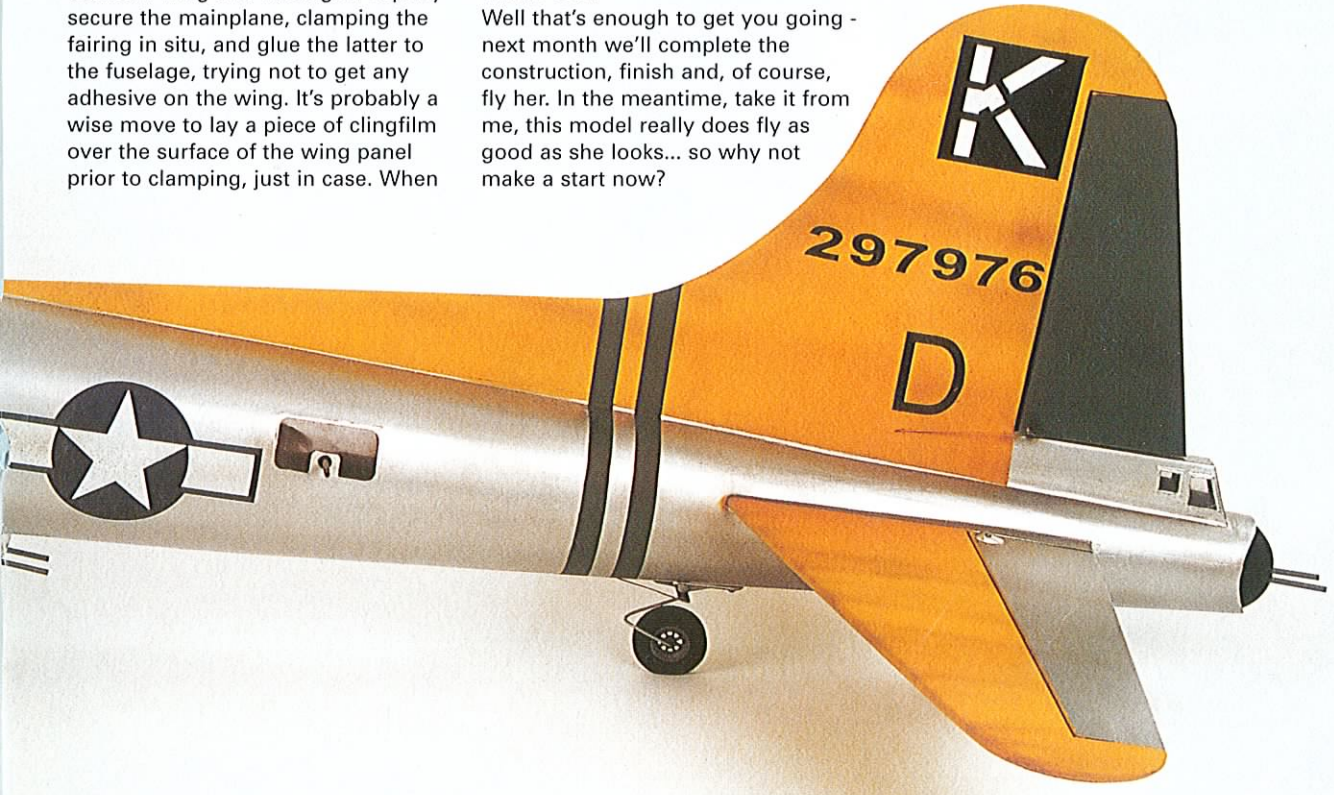
ROOTING AROUND

Add the locating dowels and mounting plates so that the wing can be fitted, then loosely position it and locate the ply fairing in the gap between wing and fuselage. Properly secure the mainplane, clamping the fairing in situ, and glue the latter to the fuselage, trying not to get any adhesive on the wing. It's probably a wise move to lay a piece of clingfilm over the surface of the wing panel prior to clamping, just in case. When the glue's dried, disassemble and sheet the wing root rear section, using block balsa infill for the remaining areas. Finally, sand the root to produce a smooth flowing curve, adding lightweight filler where necessary.

Flip the wing over and use scrap balsa to build up front and rear fillets around the underside centre section. Sand as required to create a smooth transition from fuselage to wing.

TIME OUT

Well that's enough to get you going - next month we'll complete the construction, finish and, of course, fly her. In the meantime, take it from me, this model really does fly as good as she looks... so why not make a start now?



B-17 Flying Fortress

TONY NIJHUIS CONCLUDES THE BUILD OF HIS LATEST TOP-CLASS ELECTRIC MULTI'

Like Tony's hugely popular Lancaster of the same wingspan, his B-17 has got 'build me' written all over it. There won't be many who aren't tempted. Fancy one?

Last month I left you in the lurch, having hopefully whetted your appetite to build this B-17 but taking the build no further than the wing and fuselage. This time we'll see the 'Fort to conclusion, I promise, so let's crack on without further ado.

TAIL & FIN

These are both built-up affairs, constructed over the plan. The stabiliser has a fully symmetrical section so it doesn't matter which is top or bottom. Only the left half of the tailplane is shown on the plan, so when building the first side make sure the top and bottom spars are cut so they span between T3 on the left and right panel. Cut and pin the t.e. to the plan from the fuselage centreline out, pin down the spar and then fit the ribs and inner l.e. Remove the panel and line it up on the right-hand side. Now build a second panel, and when complete join the two together. Constructing the tailplane flat on the building board allows dihedral to be included when the tailplane is remove and turned 'downside up' - this positive dihedral is noticeable, but you should nevertheless mark the top and bottom to avoid confusion. When the structure is complete, sheet it top and bottom with 1.5mm balsa. The l.e. can then be applied and the tips cut to size and fitted. Finally, shape the l.e. and tips to a smooth, flowing curve.

Put on a pedestal before it had even flown, expectations were very high prior to the first flight.

The elevator is made around a centre core of 3mm balsa, which is edge-fixed to a 6mm balsa sheet l.e. the whole having riblets applied top and bottom as detailed on the plan. This gives a very convincing 'open framework' scale appearance.

Construct the fin, remove it from the plan and sheet it both sides with 1.5mm balsa. The rudder, you'll note, is constructed in similar fashion to the elevator.

FEATHER FITTING

Moving back to the fuselage, mark and cut out both the tailplane slot and the slot for the fin post. Fit the wing and trim the tailplane slot so the tailplane sits parallel with the wing, then trim and glue the fin into position. Don't glue the tailplane in yet. When the fin's firmly fixed, construct the fin fillet as detailed on the plan. The rear gunner enclosure should also be built at this point.

Since the suggested rudder control will be via closed loop cable, you'll need to install the cable outer tubes and the tailplane slot makes for easier access when doing this. With the cable outers installed the

Whilst mouldings are available for all the turrets, nacelles etc., the tail defence position is made from a 2" diameter polystyrene ball - see text.

tailplane can then be fitted and glued into position. Be sure to bend and fit the elevator torque rod at the same time you fit the tailplane! The elevator fairings that fit against the fuselage can now be cut out, shaped and fitted, and remember to lightly coat the torque rod with grease to avoid the fairing from sticking to it.

Incidentally, you'll note that the plan features a design for a steerable tail wheel. This uses a closed loop system similar to the rudder and is connected to the rudder servo.

TURRETS

The plan is based on the B-17G, which had nose chin and rear 'ball' type turrets The rear turret is made from a 2" polystyrene ball (available from craft shops) and cut in half... it's as simple as that. The

remaining turrets, however, are mostly vacuum formed and can be detailed and fitted after covering. Talking of which...

COVERING

I used silver Solarfilm Easycoat for covering the prototype and keyed the surface with 800 grade wet 'n' dry, ready for the paint to be applied. The only problem I've found with this stuff is that it wrinkles in the heat. Mind you, on the plus side it does at least provide a strong, lightweight finish. The alternative is to use either tissue / nylon and dope, or lightweight glass cloth (17g/m^2) and acrylic vanish (available through Falcon Aviation). For what it's worth, I reckon the latter system offers the best alternative to Solarfilm.

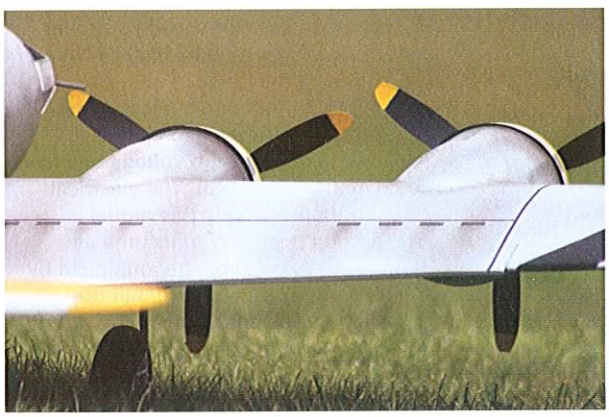
If you don't fancy painting then silver Solarfilm forms a good base, and with a variety of Solarfilm colours available you should be able to get a pretty close likeness to a good selection of full-size colour schemes.

FINISHING

The main 'stars 'n' bars' decals applied to the prototype were supplied by Pyramid Models, I made the remaining ID numbering on the computer using AutoCAD, printing onto a clear, self-adhesive A4 label (Avery). Clear is best used for dark colours, but if a white background is needed then use white self-adhesive labels instead. It's a good idea to seal these home-made stickers with a spray acrylic varnish before cutting out, to protect against water / rain damage. The nose art (Bit 'o' Lace) was found on the internet in the form of a .jpeg file that was printed onto white paper and cut out using a scalpel.

Okay so far? Great. Now then, fitting the radio gear is quite straightforward, and is generally all contained in the wing section of the fuselage. To access to the flight packs you'll need to remove the wing as the cells fit just forward of the centre of gravity.

At 72" span Tony's model is just the right size to capture the very special spirit and aura of the full-size.

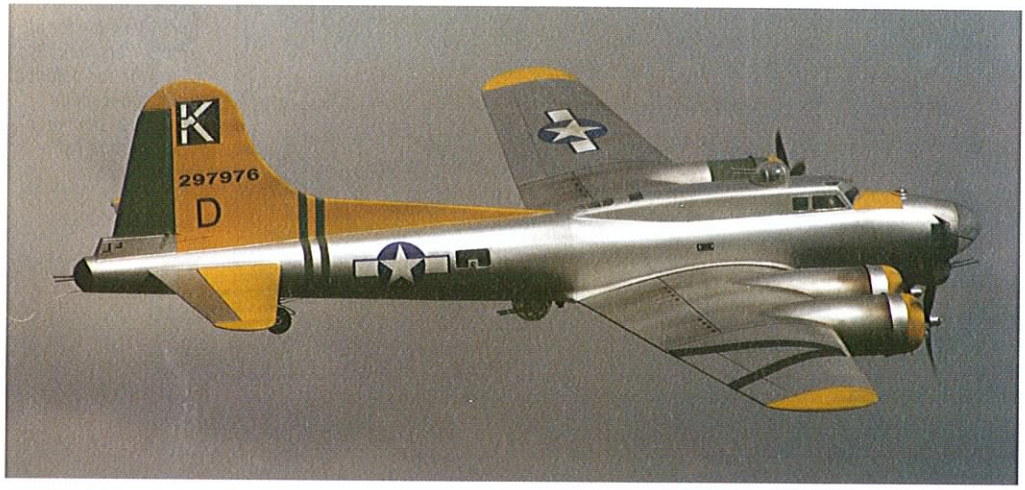


Go Li-Po and you'll enjoy three, 8-minute flights from one charge, with capacity to spare.

POWERING UP

On the plan you'll see the recommended specification for the motors and the cells - a brushless-free zone. Following the great success of my Airbus A400M I was convinced that standard brushed motors and gearboxes with a single speed controller was still the most sensible and economic way to power this model.

Pondering how to wire up the four motors, I decided to connect them in a series / parallel loop. What this means is that the two motors in each wing panel are first 'daisy chain' wired together, then the positive wire from each panel is joined together, as are the negative wires.



Don't be surprised if your clubmates stop what they're doing to watch. After all, who wouldn't?

A simple wiring diagram is shown on the plan to help your understanding. This type of electrical connection requires 16 cells or two packs of eight cells to operate, so your speed controller must be rated up to 16 cells NiCad / NiMH or 5-series Li-Po.

The benefit of connecting the motors this way is to enable operation at a high voltage of 19.2V (16 x 1.2V per cell). The electrical input power to fly this model is around the 300W mark, and as power equals voltage multiplied by current it's easy to see that the higher the voltage, the less current is needed to maintain the same power. The lower the current being drawn, the longer the battery pack will last.

Yes folks, it's a brushless-free zone. Four geared 400s is all you'll need for scale flying, plus a bit in reserve.

Incorporating a 2.33:1 MP-Jet gearbox and an 8 x 6" APC thin electric prop, the maximum current draw was measured at only 24A. With 8" being the scale prop diameter, this low current draw lead me to purchase a set of 3-bladed 9 x 7" props, the tips of which I cut down to achieve a scale 3-bladed 8 x 7" prop. Using 16 cells, trimmed down 3-bladed props and connecting through a watt meter, the input power at full throttle was 600W with a current draw of around 32A; still low, but now with bags of power.

LIPO CONVERT

When the prototype was test flown I initially used two 8-cell packs of Sanyo 1700mAh CP cells - these proved to be a very good, with flight times in excess of 7 minutes being achieved. However, since I'm now hooked on Lithium Polymer I decided to fit the 5-Series 6500mAh pack I'd been using in my Airbus A400M. Supplied by Julian Cox of FlightPower, this pack gives a voltage equivalent to a 16-cell NiCad / NiMH pack, around 18.5V nominal and 21V when fully charged. With 6500mAh capacity and the pack weighing only one ounce (28g) more than 16 x 1700 Sanyo cells, these Li-Pos may be four times the price but you do at least get four times the capacity (duration) at almost no extra weight. If you're not a Li-Po convert yet then you should be seriously thinking about it!

FIRST OUTING

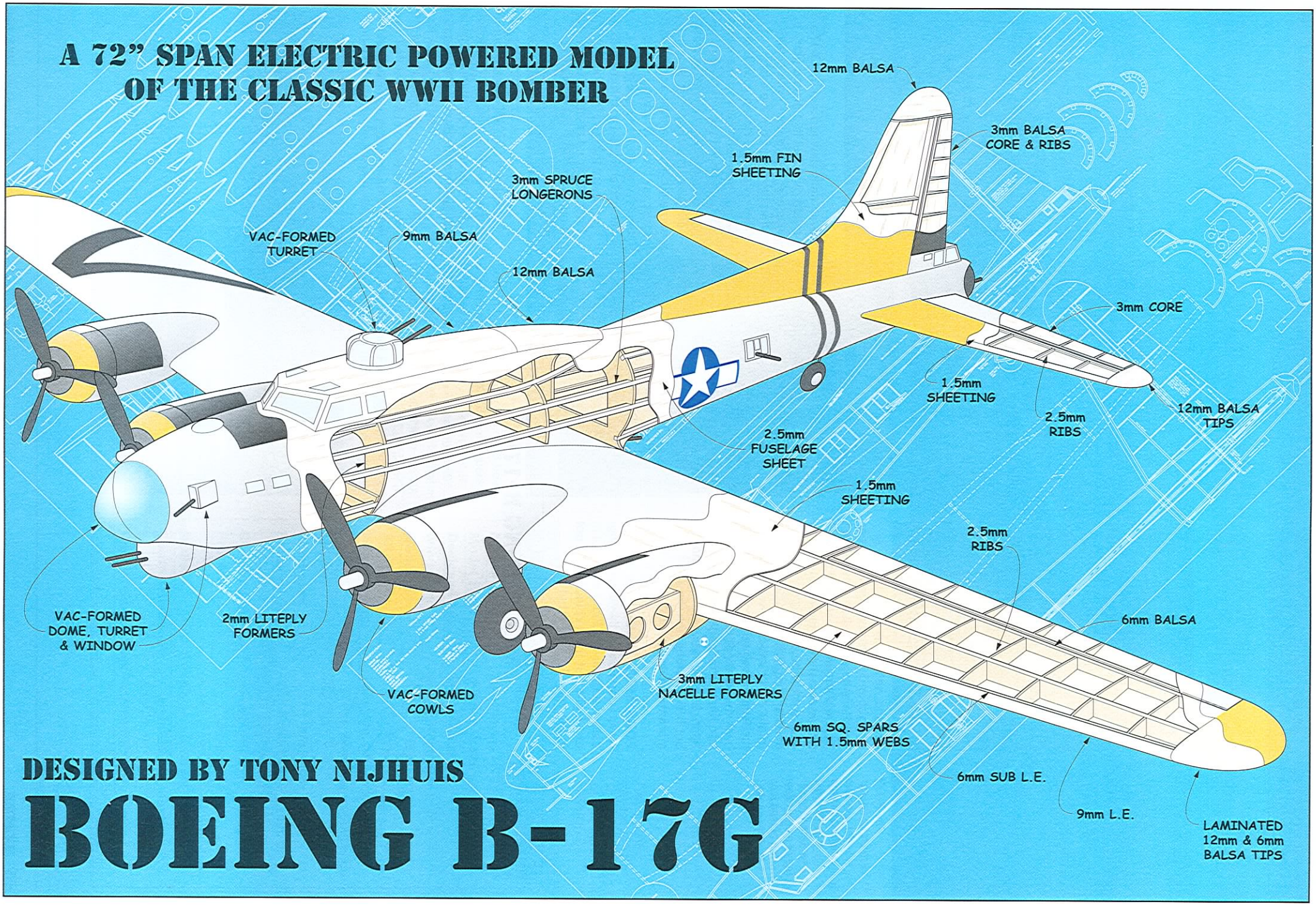
Put on a pedestal before it had even flown, my expectations of the B-17 were very high prior to the first flight. As always with my electric designs, the 'maiden' took place with the model uncovered. The current draw at full power was known to be around 24A using the 8 x 6" APC props, so I had no concerns as to whether the power would be sufficient. In fact I was pretty confident all round. So, without further ado she was lined up into wind and the throttle opened progressively. There was no appreciable swing and speed was quickly achieved, but some up elevator was required to hold the nose from tipping forward. This was partly due to the long grass, but the B-17 is naturally a little pitch sensitive and the tail will come up very soon after the motors are engaged.

After some 50' and application of more up elevator the model leapt into the air and climbed like an elevator. A few clicks of down trim

ORDER LIST

Item	Code	Price
Plan	RC2029	£17.50 plus post and packing
Mouldings	COWRC2029	£20.00 plus post and packing
CNC selection	CNCRC2029	£70.00 plus post and packing
B-17 plan pack inc all of the above	SETRC2029	£99.00 plus post and packing

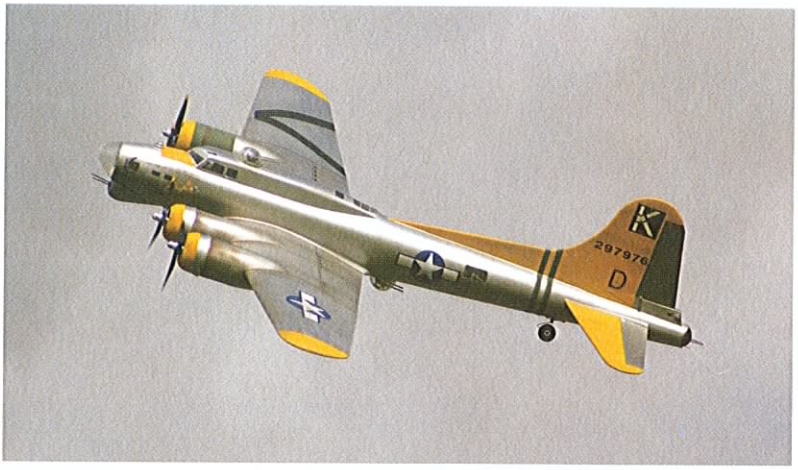
A 72" SPAN ELECTRIC POWERED MODEL OF THE CLASSIC WWII BOMBER



DESIGNED BY TONY NIJHUIS

BOEING B-17G

Get her in the air and, trust us, you'll want to fly her just like a big, heavy bomber - slow, graceful and hugely impressive.



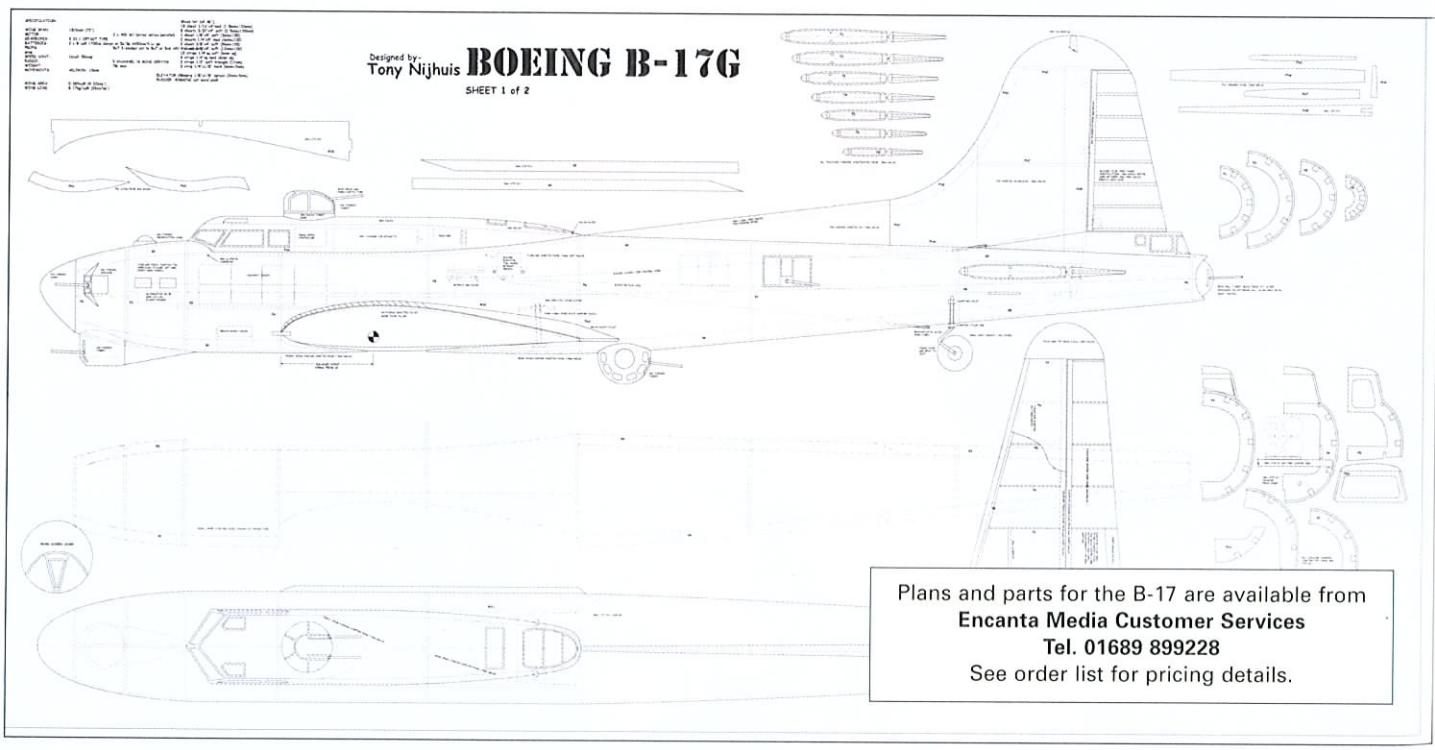
The B-17's distinctive fin and rudder plays no small part in the superb flying characteristics of Tony's model. Note the closed loop rudder control.

and she was flying hands-off, straight and level at around $^{2}/_{3}$ throttle. After some two minutes of leisurely circuits and mild, bomber-type manoeuvres the design appeared to be shaping up very well and handling just as I'd hoped it might. All I had to do was confirm the landing behaviour. Throttling back to quarter power and eased into finals, she landed without a hitch. Somewhat of an anticlimax, but firmly perched on the aforementioned pedestal!

FOUR MONTHS ON

Now, I don't normally wait this long between initial test flight and final test flight, but the Airbus A400M got in the way. So, when that day eventually dawned and the B-17 was rolled out in all its finished glory it was early November, with a cold wind blowing from the east. Fortunately the Hastings MFC strip had recently been cut so there was no problem with the her nosing over.

The throttle was opened and she accelerated quickly, rotating after some 40' and climbing away at 20°. I must say I was very surprised as the model was now another pound heavier, and I had to throttle back to slow every thing down a bit. The next 5 minutes were an absolute joy, even though the wind was gusting to



Plans and parts for the B-17 are available from
Encanta Media Customer Services
Tel. 01689 899228
See order list for pricing details.

If you've always wanted to build a B-17 but have never quite found one in a practical 'Sunday morning' size, we're pleased to tell you the wait is over!

Tony is rightly pleased with this little beauty - she handles like an aileron trainer.

15mph. Set to 6 minutes the timer bleeped all too soon, and I reluctantly called a landing... this was an absolute delight, and she came in as if on rails... fantastic!

Now, not wanting to break this baby before we had a chance to get some flying shots it was another 5 months before she flew again, this time in front of the camera. And boy, did she perform. With the Li-Po pack installed and the three-bladed props fitted the model was unleashed with 32A at its disposal - and wow! What a transformation. She raced into the air, climbed at an alarming 45° angle and kept on going! Reducing the throttle stick to a little under half, the B-17 settled nicely and was flying hands-free with trainer-like manners. Flicking the rates off I felt obliged to perform consecutive rolls and be a bit of a hooligan with it... this one could almost double as both Sunday hack and scale pride and joy!

Subsequent flights have proved just how much fun this model is, and how well the Li-Po cells are performing. Three, 8-minute flights were achieved during the photo-shoot, with reserve capacity for a fourth if desired - what a fantastic position to be in. Now, you may accuse me of being biased, but trust me - this is a truly great model that I know you'll enjoy!

Datafile

Name:	B-17 Flying Fortress
Model type:	Electric W.W.II bomber
Designed by:	Tony Nijhuis
Wingspan:	72" (1826mm)
Wing area:	4.3sq. ft. (0.4sq. m)
All-up weight:	7 lb (3.2kg)
Wing loading:	26oz / sq. ft. (8kg / sq. m)
C of G:	105mm from root leading edge
Motors:	4 x 400
Gearboxes:	2.33:1 (offset type)
Battery:	Two 8-cell 1700CP Sanyo or 5s3p 6450mAh Li-Po
Speed controller:	16 cell, 50A
Propellers:	9 x 7" 3-blade cut to 8 x 7" or 8 x 6" APC thin electric prop
Radio:	5-channel, 6 mini servos
Control functions:	Aileron, elevator, rudder, throttle, retracts
Control deflections:	Aileron - 15mm; elevator - 20mm; rudder - 40mm