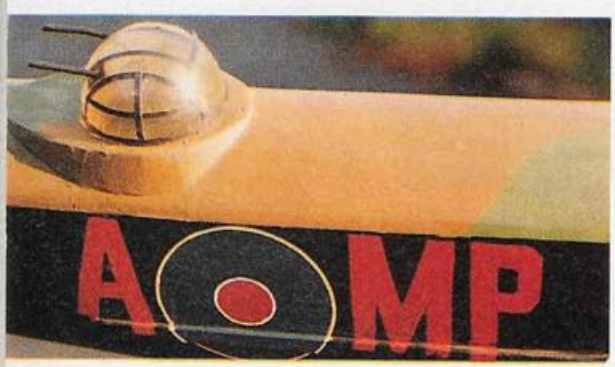
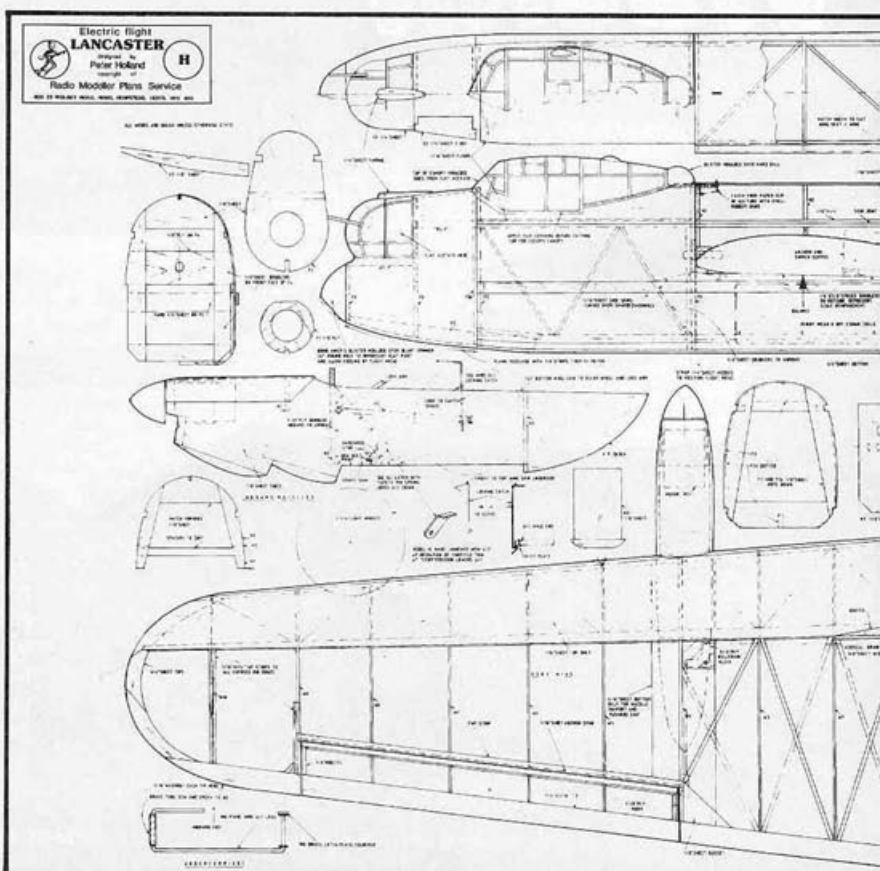
'LECTRIC LANC



A winter building project with a difference! Peter Holland's challenging sport scale Lanc is 74in. span for three-function R/C including retracts. Full-size copies of the plan are available as RM 333, price £6.05 inc. post and packing, from Radio Modeller Plans Service, 9 Hall Road, Mayland s Wood Estate, Hemel Hempstead, Herts HP2 7BH.



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Feeling adventurous? Peter Holland's magnificent multi takes standard 540 motors

Electric powered flight is just one of the advantages when considering a multi-engined aircraft as the subject to be modelled... Who hasn't dreamed of flying a Lancaster, yet been put off by thoughts of engine starting and r.p.m. matching, the weight and cost of such a project in terms of an i.c. powered machine?

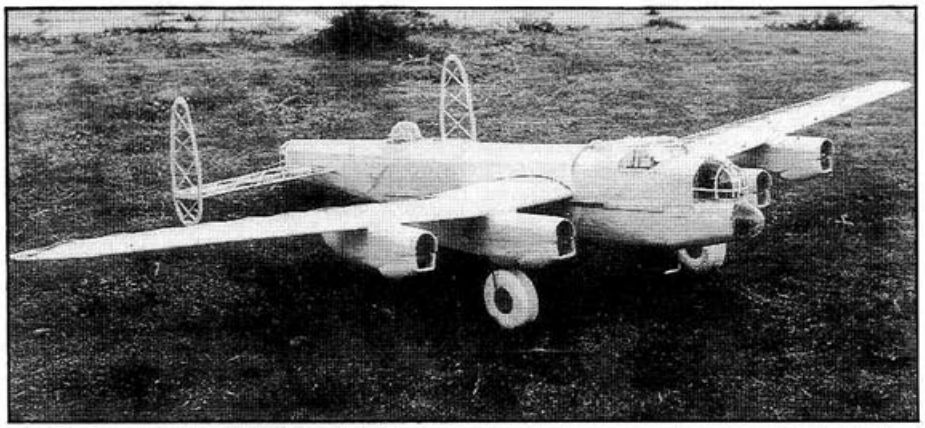
No, it just had to be electric. It had to be fitted with standard R/C equipment and it had to be fairly easy to make. A few calculations showed that a wingspan of 74in. would be about right for four standard 540 type electric motors switched parallel for climb out and in two pairs of series for cruise. The weight should be under 6 lbs and, in order to clean up the drag department, the undercarriage should be dispensed with or made retractable.

Now six pounds of lightly built airframe/battery payload seemed to be an unwilling candidate for "belly flopping", so the wheels had to be manually retracted, the model hand launched and the wheels allowed to lower by gravity when released via R/C, to lock "down" when on finals. This system was proven on an earlier aerobatic electric model with large motor and 16 cell nicad. I never did like to see a scale subject dangling the wheels when they should be up, so that's the choice. Hand launching is not difficult unless the weather is dead calm or a helper is not available... I would not recommend hurling and taking control oneself for the *first* flight of such a model.

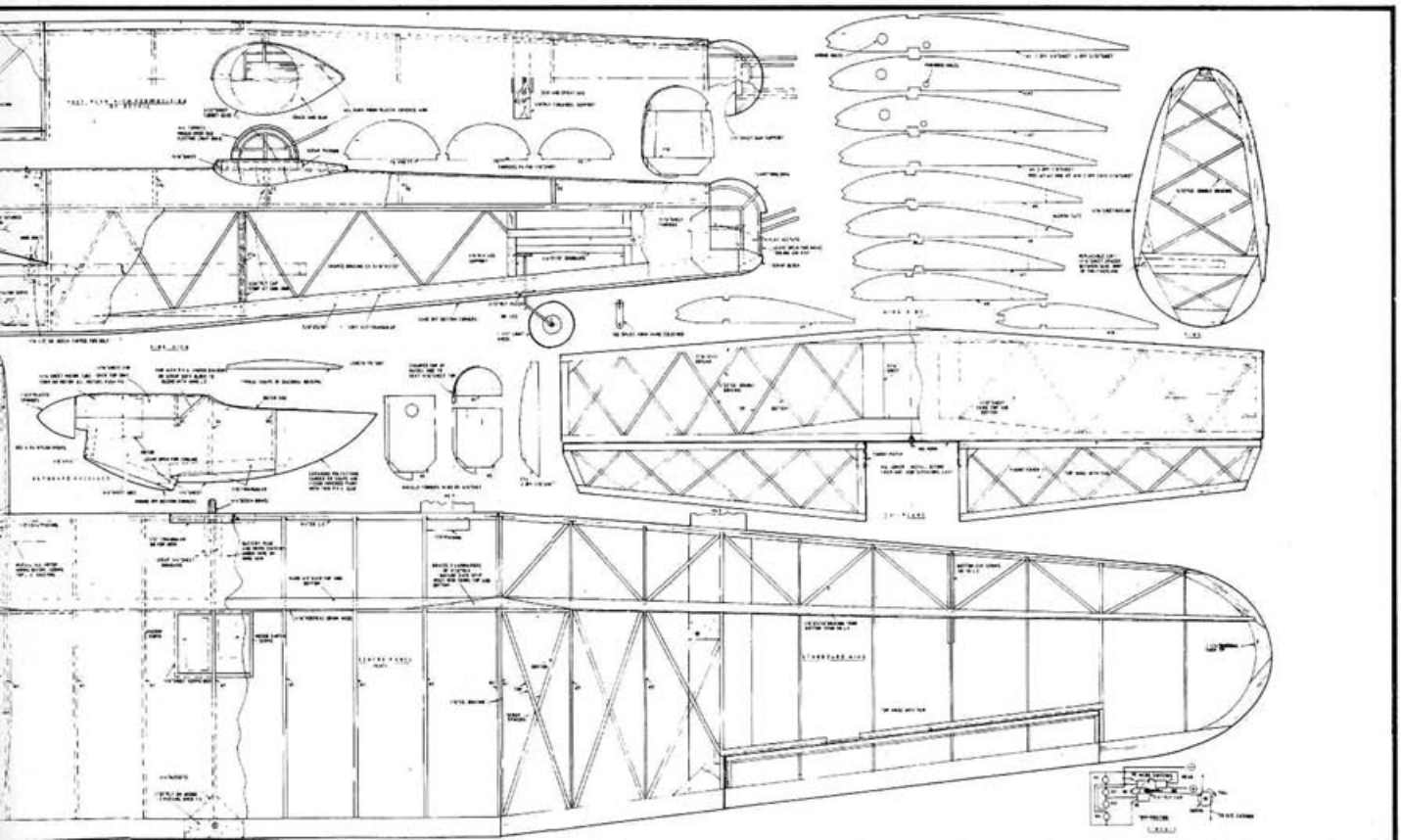
The fuselage

The lines have been slightly adjusted in the interests of construction, so the belly is a little less rounded; triangular fillets and deep lower longerons allow a sanded-off section below, whilst light top longerons, shaped Warren bracing and top formers provide a base for curved sheet skins. The nose section defeats such detailing, so is planked back to the cockpit area with 1/8in sheet over formers and keels. The nicad bay is reinforced with 1/8in sheet up to the wing seat, as this is all that holds the ends apart. Luckily, I spotted a scale feature that could add strength... those external stiffeners applied to later marks of Lanc. These, made from spruce, give much-needed strength when landing on less than smooth grass.

Where the fuselage starts to taper for the tail cone, butt-end joints are reinforced with cross grain 1/64in ply strips under the skins. Glue these to the former first at F7 and F7A. The tailplane doublers are stuck to the skin, so have to be applied whilst offering up the skins to the bare framework. Add the tailwheel mount and bottom patch before sheeting the top decking. The



Finished but uncovered; aim for all-up-weight of just shy of 6lbs.



hatch can be made integral with the side and top sheeting and cut free afterwards. (Slip some scrap 1/32in sheet spacers between F4 and H1 and H4 and F5 to allow separation without hacking bits out of the formers.)

Wings

The large, flat centre panel is fully skinned with 1/16in sheet but the outer panels have Warren bracing to provide rigidity and sheet on the top of the l.e. only. It looks busy but takes little time and is well worth doing. The outer panels of the original model weigh only 1½oz each before film covering. Sheet is provided as a seat for the outer nacelles and aileron pushrod exit trim.

The order of assembly (all panels) used was as follows: ribs/spars and outline, next prop up for dihedral and join at top with double ply flat braces over the top of the spars. Now install the aileron pushrods and bellcranks on pieces of sheet under ribs. There is no need to add more sheet until the wiring is installed in the l.e. That wire has to be separate for each motor and heavy enough to carry the full current (pairing the motors one each side is not recommended.) Lift the wing and add lower sheet (that is if you have not used it to build upon already). Do not add any top sheet until the lower dihedral braces are in place, the bottom sheeted and nacelles installed.

Nacelles

These are simple boxes with rounded tops and sanded gussets below. The inner ones have to interlock with the l.e. to distribute the landing loads from N2 formers. When all the motors are ready to be installed in wrapped 1/16in sheet tubes, connect up to the previously threaded-in wiring and test on low voltage for continuity. Now finish the sheeting, cutting it around the braces which lie flush with the sheet surface. The rear fairings of the nacelles are sanded from expanded polystyrene and tissue covered, using p.v.a. glue to harden the surface.

Pic below with designer gives idea of size of model - quite a monster (the model, the model)! Fin structure at right is simple and light.

Undercarriage

This is the trickery; I chose the lightest airwheels, after an abortive try with expended polystyrene covered in bandage. The springing is by torsion bar in a pivot tube sewn to N2. The free end locks up against a catch and hardwood stop but the axle end has a plate in lieu of retaining washer, to catch on a wire release arm glued in the wing. Nylon cords lead from these arms to the throttle servo (or a fourth one if they are "minis"). On the prototype, the cords tighten only after "stop motors" is selected, using trim. Ply doublers spread the load from the "down" stop to the nacelle and wing.

Tail surfaces

Although the built-up structure with double geodetic bracing takes time, the resultant bits are warp resistant and very light. 1/32in sheet skins were needed over the tailplane, which has to be threaded through the fuselage before hinging the elevators. It is easier to hook up the linkage, if the elevator joiner is in place before the tailplane. Leave a bit of bottom sheeting off to aid this job.

The fins are glued on, but break away for a re-joining, thanks to a soft spacer which is replaceable. Such a detail is clean, but use p.v.a. glue, not cyano, or the *soft* spacers will become *hard*, resulting in breaks where they were not intended!

Covering

Black and olive green heat shrink film were used, then brown drab matt paint used to complete the scheme. I sanded the film lightly to make it matt, but such weight saving is marginal - a mere lick of matt varnish would have been better. Can't help thinking the sanding ruins the strength of film.

Turrets, etc.

Being born thrifty and not having any commercial items to hand, I assembled all the clear mouldings from flat sheet and a series of hemispherical domes made by pressing old electric light bulbs of suitable size into tin cans with heated acetate between. The cabin roof was moulded on a shallow plug of carved balsa and joined in the same way, disguising all joints with masking tape frames over the glue. It is important to leave the bomb aimer's flat window open, after moulding a shape on a blunt spinner. This allows air to pass around the flight nicad and out through a space in the rear turret glazing.

Force the air to pass under the wing to do its cooling, by film covering the top part of F4. The nicad is a 2.2 or 2.5 Ah. type with eight cells. It controls the c.g. and is packed fore and aft with scrap expanded polystyrene blocks, cut to allow air to reach the battery.

R/C

Most of the gear is on the wing, a connector serves the elevator servo in this three function set-up. Mount the three micro switches which control the motors under or on top of the wing where they are accessible for setting-up. Earlier flights of the original Lanc were nearly the last, when it was discovered that the switches were set up so that motors were paired in each wing, rather than as inner and outer as now shown on the plan. One stuck, so both motors went full throttle on one side and the others switched off. Not recommended six feet up!

Flying

It looks a lot of aeroplane, but on ailerons and elevator she handles in a very docile manner. Bung off at full bore and switch to cruise for most of the flight. Those little 6in x 4in nylon props sweep quite a bit of air and allow up to five minutes flight per charge. When landing, use the throttle trim or a spring gate to select "wheels down"; the motors cut momentarily but can be turned to low or full throttle again without affecting the lowered landing gear.

Charging

The high capacity nicads take longer to charge - say 40 minutes - but if two 12v. car batteries are available, the pack can be split into a couple of four cell blocks and charged at a recommended higher rate for less time than a 1.2 pack of eight. One timer can chop a pair of common charging leads, provided the other pair are kept separate. Each pair of leads will need a separate piece of nichrome fire element as a voltage dropper so that the rate of 1.4 volts per cell is not exceeded.