Here's HEINR

Dave Chinery's fun-style sportster is ideal for electric buggy motors

HEINRICH WAS the result of burgeoning interest in model flying on the part of my eldest son Paul. Then about eleven years old, he had accumulated enough stick time on my old Super Sprite (an Argus plan) thermal soarer to go solo. Having overcome this hurdle, he was keen to fly electric, like Dad, so he asked me to make him a trainer.

To ensure that his involvement was more than just as a flying pupil and to give him a closer insight into the skill and effort needed to build a model, I resolved to design one suitable for him to do most of the building, with just a little help from Dad on the tricky bits!

The original sketch was done on the proverbial back of an envelope, adopting the successful four feet span, buggy motor-powered shoulder-wing layout. To stimulate interest, the basic shape was 'styled' to simulate an early WW1 scout. This artwork having received the approval of the 'customer', the plan was drawn up keeping in mind construction mostly by an eleven-year-old.

Construction progressed slowly, with Paul doing a lot of the work, including cutting the wing cores (under supervision). With the model about half-finished and Paul a year older, he discovered girls and cast away childish things like model aeroplanes! Having more than enough electric models already, I stored the unfinished model away.

Number two son, Mark, is four years younger than Paul and asked me to teach him to fly when he was eight! He soon became quite a good pilot on the old 'Super Sprite', gaining his 'Silver' at age nine and occasionally beating me in thermal comps – but that's another story!

The inevitable request for an electric model reminded me of the unfinished 'Heinrich', which was duly dug out. After negotiations with the 'previous owner' and money changing hands(!), construction was resumed by Mark, who did the covering almost unaided. Who says it's hard to Solarfilm onto bare foam? It's easy! For simplicity, a 'Red Baron' colour scheme was chosen and the Teutonic-looking model was originally named 'MagnEtilla' – geddit?

Although *we* thought it was a fairly witty name, it was a bit subtle for some observers, who thought it was a misprint. To avoid confusion with the well-known kit model, the humble electrical unit of inductance was invoked and the model renamed 'Heinrich'.

To add a little more choice, the plan shows alternative wingtip, elevator and rudder shape variations for British (Henry) and French (Henri) versions. Decorated in suitable colour schemes, you can get together with your friends and have a real 'vintage airshow'.

Design points

Although there will always be some tricky bits, these were kept to the bare minimum and things like the parallel fuselage planform and flat plane undercart wire were introduced to make things as simple as possible. The design also incorporates several of my most proven design features, such as sitting the main Ni-Cad directly on the undercart, which forms the removable hatch. This allows landing forces to be directly taken from the heaviest part of the model, the battery. Since a trainer must expect to be landed 'unsympathetically' from time to time, it was decided to mount the motor on a frangible breakaway plate, as shown on the plan. 3mm Perspex (not Lexan) is ideal, as it will usually break before the motor shaft bends, saving the latter from possible replacement.

Fuselage

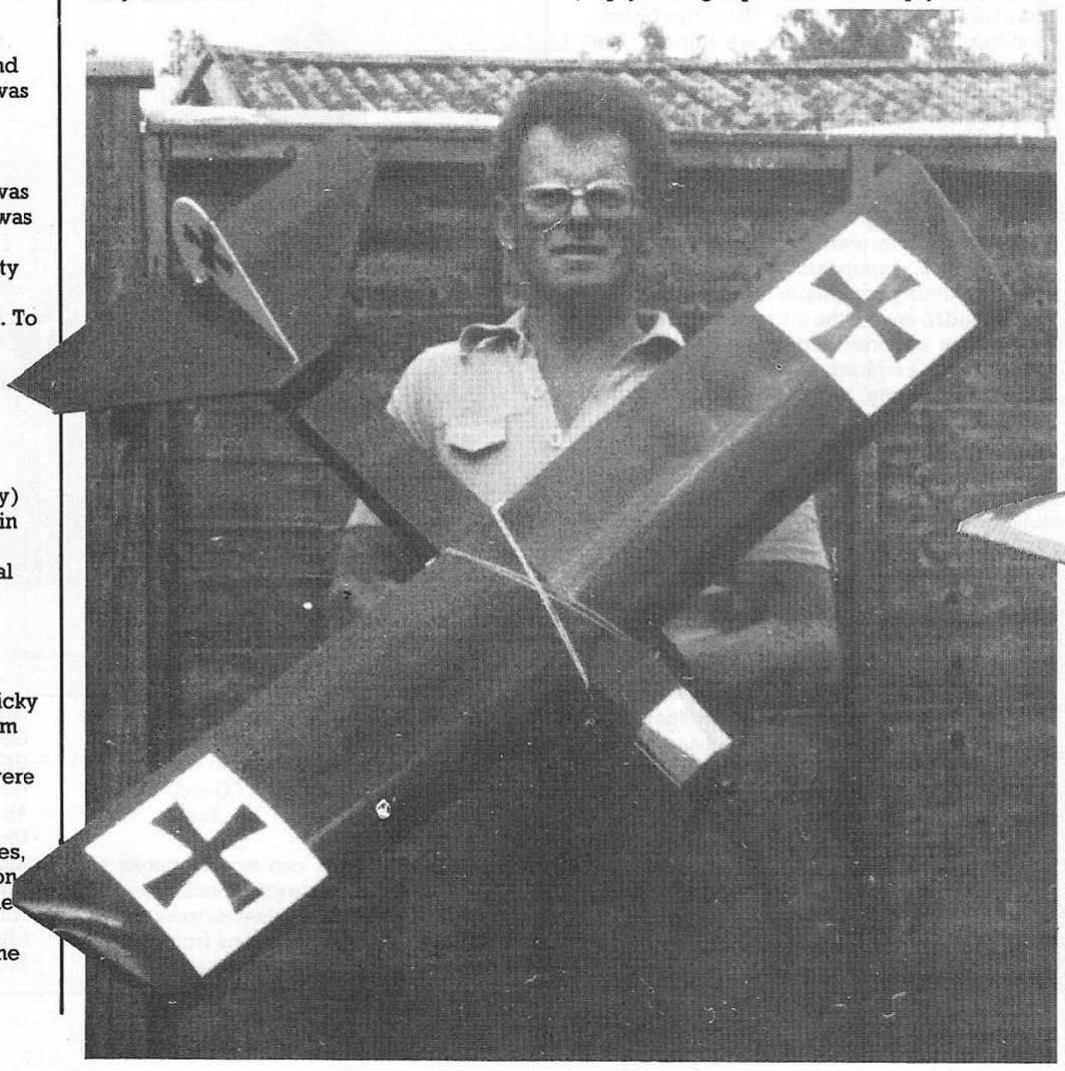
This, as you might expect, is mostly very simple. The fuselage structure is a simple ply-doublered balsa box. After cutting out the sides and adding the doublers, sandwich them together and sand the outlines exactly equal, with the exception of the front edges where the left side should be longer than the right to give side-thrust. Whilst together, drill the dowel holes through both sides. I used 4mm alloy tube for the dowels, but 6.5mm birch dowel will do just as well.

Knowing which size of Ni-Cad pack you intend to use, mark the position of the Rx floor to allow sufficient height for insertion/removal of the pack through the hatch. Next, glue on the Rx floor fillet strips to suit and cut and glue the hardwood screw blocks for the motor plate, with the front surfaces angled slightly down for downthrust.

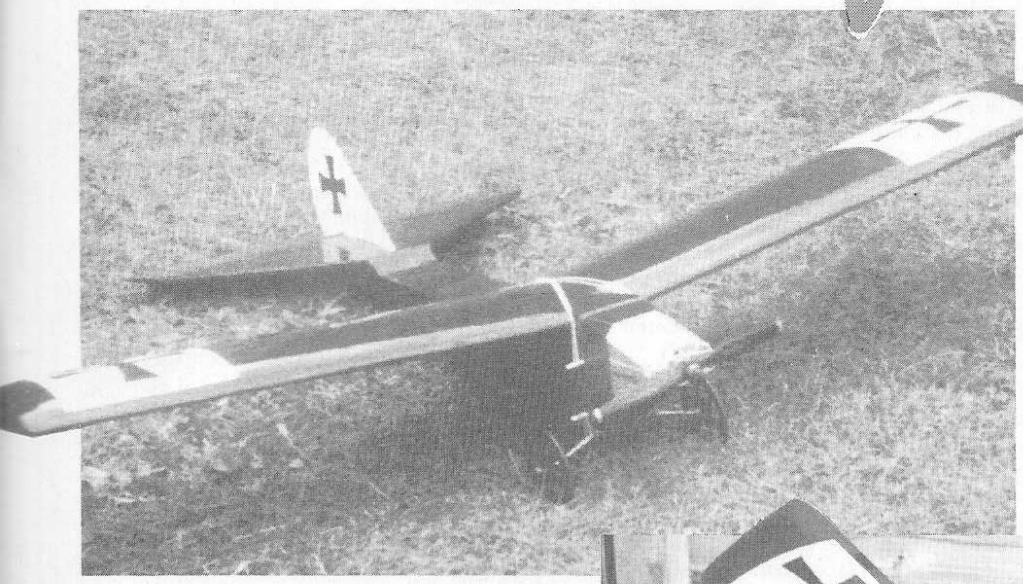
On a dead flat surface, assemble the sides and formers and glue together, making sure all is square. Also add the cross-braces in the tail section. When set, add the Rx floor and ply nose bottom sheet. Cut the battery hatch in the main bottom ply sheet and offer the latter up to the fuselage, making sure you can get the Ni-Cad in and out easily. If OK, glue on the ply sheet and complete sheeting the tail section with 1.5mm balsa (grain crosswise). After it's all dry, sand off all the edge overlaps and smooth off all the surfaces. Cover the fuselage lower half back to the trailing edge location with either doped-on nylon or glass/epoxy to make it stronger and resist abrasion. That about completes the basic fuselage.

Undercart

This assembly starts with making the hatch, which is laminated from two pieces of ply. A larger piece of 1.5mm ply is cut to



ICH—and friends



Wing

The wing could hardly be simpler, especially if you have access to a cutting bow. If not, don't despair, Styrofoam wings are easy to make using little more than a breadknife and sanding block! (For details, see my articles on foam techniques in the back issues of *RCM&E* and the new Argus foam handbook).

Cut the cores to the root and tip sections shown, making sure you wash out the latter as shown – this *is* intended to be a trainer, remember! The cutting templates are shown separately and are about 1mm thicker to allow for sanding the foam to 'lose' any cutting ridges.

After adding the leading and trailing edge overlap the hole in the fuselage bottom and a smaller piece of 3mm ply should be made to fit into the hole. For battery cooling and lightness I cut two large round holes after the layers were glued together.

Whilst the glue was drying, the 8swg wire was bent up to a simple top hat shape. Using the edges of the cooling holes in the ply hatch and some more 1.5mm ones specially drilled, the wire was sewn onto the hatch with strong woven thread and the latter was locked and tightened by soaking with dope and allowing to dry. Being next-to-impossible to Solarfilm by virtue of its shape, the u/c hatch unit was primed and painted to match the intended covering.

The wheels used on the prototype were home-made from discs of 3mm Lexan sheet, but any 60 to 75mm diameter vintage style wheels will do.

Far left: Dave holds his Heinrich before a trip to the local flying field. Leading this page: completed model weighs only 2.6lb. Above: proud pilot, Mark, with the trophy he won flying the Heinrich. Left: simple sport job requires only a buggy type motor for a sprightly performance.

strips (PVA glue is best), cut the tip shapes to the desired plan view leaving the foam at full depth. Add the 3mm edging strips, or if building the 'Henri' version, laminate the curved strips to suit. To avoid losing the benefit of the washout at the tips, ensure the edging strip runs at a downwards angle from t.e. to l.e. when the wing is viewed from end on.

For those not familiar with the laminating process, cut three 7mm wide strips of 1.5mm balsa for each tip, long enough easily to cross the chord. Roll each strip on a hard surface with a cylindrical object, rolling-pin fashion and it will curl up. After experimenting with a couple of scrap strips you will soon be able to curve the tip laminations into nearly the final shape. The ready-curled strips are then all coated with PVA on their inner faces, assembled into a stack and pinned to the foam.

When all the edging is dry, sand the wing halves to remove cutting marks, shaping the l.e. and blending the depth of the wing core into the height of the tip strip. If desired, holes can be cut through the core as shown to give an 'open structure' appearance, but don't take them any nearer the l.e. than shown or the wing will be too weak. Otherwise, the wing is quite strong enough; no veneer is needed.

Sand the wing roots to give a tight butt join with one tip raised 10cm from the bench and the other flat on it. Join with PVA or epoxy (quicker) making sure both incidences match. When dry, cover the centre-section out to the dotted line either with nylon applied with thinned PVA or domestic wall emulsion, or glass cloth applied with epoxy resin. After final sanding the wing is ready to cover.

Tail

Tail surfaces are made from light quarter grain 3mm balsa sheet, with your choice of rudder and elevator shapes. The elevators are joined by a 'V'-shaped piece of 16swg wire attached by doped-on nylon patches to the elevator inner ends. Reinforce horn locations with small patches of 1mm ply each side.

Military decorations

The model was covered with Solarfilm, which was also used to hinge the rudder and elevator. Bare areas were left on top and bottom of the tailplane to allow it to stick to the fuselage and fin. Rudder horn forces were taken by a balsa block hinged to the bottom l.e. of the rudder (below the elevator joiner) with Solarfilm and stuck to the back of F4 after fitting the tail surfaces to the fuselage.

The military markings were added using white Solarfilm for the squares, with the Iron Crosses being cut from Solartrim. Although British roundel decals are widely available, French ones (colours inside out) can be made easily by superimposing different sized circles of Solartrim or film.

The model looks better with a pilot on board; either buy a suitable commercial one or carve one from a block of foam. After painting, stick the pilot to a dark-coloured piece of 1mm ply (to simulate the cockpit opening) which is held under the wing bands. If weight and drag allows, how about a rear gunner fixed to the fuselage top behind the t.e., facing backwards?

The heavy bits

The model was fitted out with an old polymer magnet motor and an old Futaba 3-channel 27MHz set and standard servos. No special lightweight gear was used, the only (slightly) lighter weight component used was a 225mAh Rx Ni-Cad. Motor switching was by a third servo and micro-switch as shown in my 'Flying Sparks' series in *RCM&E*. Using a five-cell pack of 1.2Ah SCR Ni-Cads, all-up weight was around 1200 grammes (2.6lb.).

Flighty bits

In view of the unstreamlined angular shape of the model, I was not expecting a rocket-like performance, but initial flights were quite reasonable with a decent charge in the cells.

With the (under-celled) motor swinging a 8 × 4 propeller, the combination gave a slow climb and a longish flight. Various other combinations were tried; a 7 × 6 being quite successful. As flights accumulated, the breakaway motor plate and knock-off undercart bore the brunt of the occasional untidy landings. Eventually, a minor repair session coincided with acquisition of a second-hand Astro .035 Cobalt motor, which is designed for 5 or 6 cells. This, driving a 7 × 4 propeller, gave a better climb and the model performed well enough for Mark to win a trophy with it at the 1988 Pillerton Hersey rally.

Options

From experience, the model in any of its versions should go well with a reasonable buggy motor and five SCR or six ordinary cells. There is room for a seven cell pack with a little internal re-arrangment, but c.g. location limits will require a 'three on four' two-layer pack to keep its weight far enough forward. Performance might not be 'vintage', though.

As it was intended to be a fairly forgiving model, it is only mildly aerobatic, but loops and barrel rolls can be achieved if you are determined enough. Combine the two and you have an Immelman turn, so persuade your friends to build one as well and enjoy some dogfighting!

Good hunting!