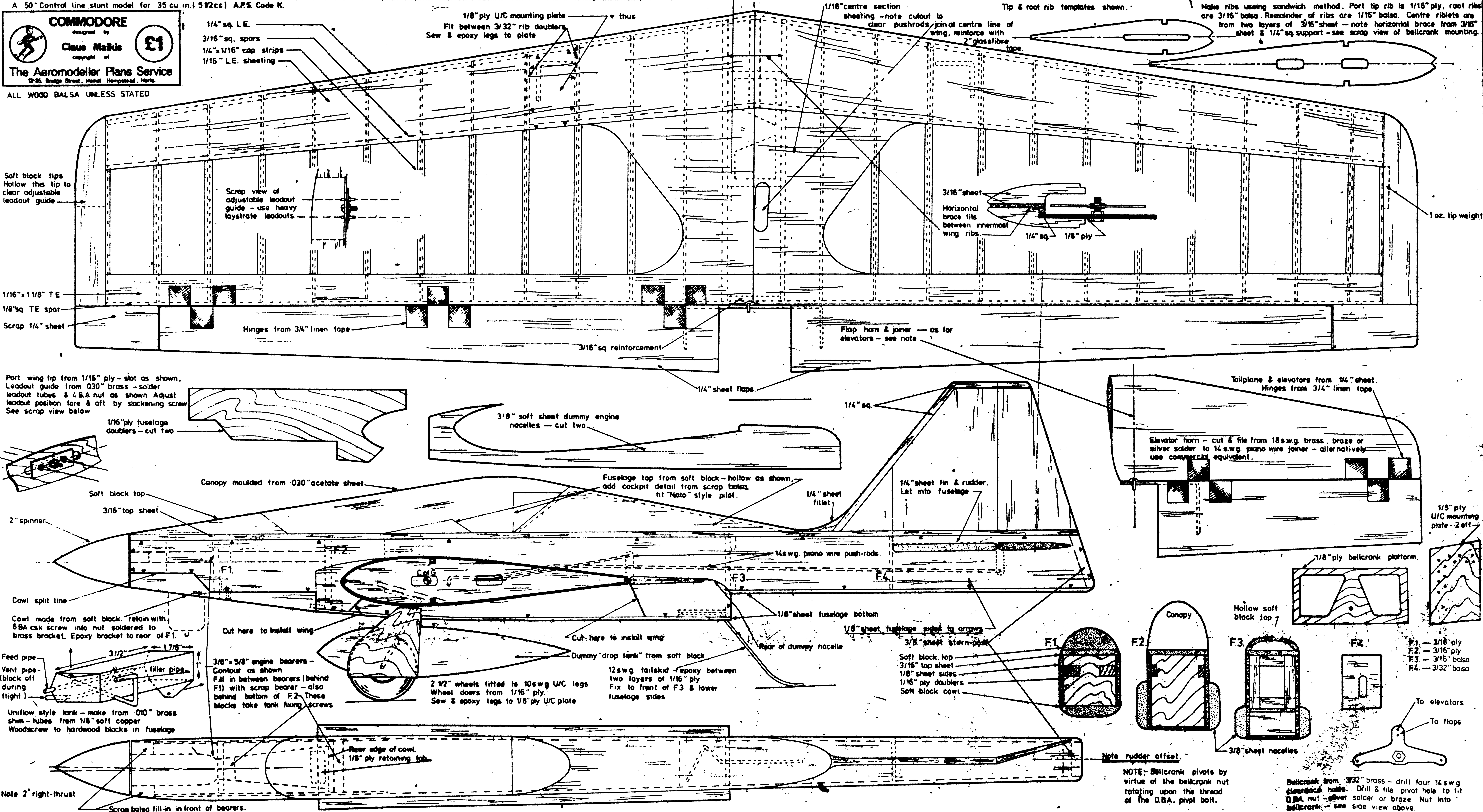




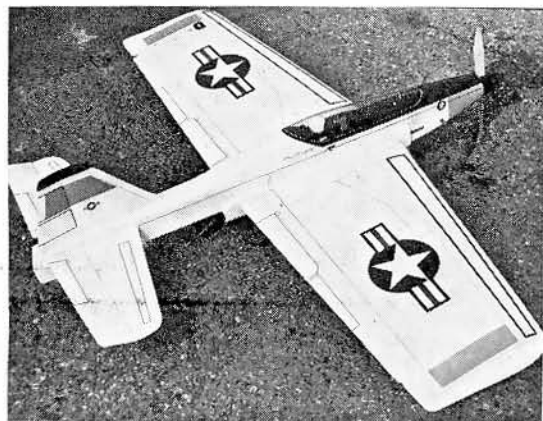


**Sleek, 50 in. span
control line
stunt model for
.35-.40 cu. in.
motors, designed by
CLAUS MAIKIS**

STUNT FLYING is a specialised, almost art of form model flying, and in common with ice skating or dancing, it is not the pure performance that counts, the whole presentation ought to have a touch of 'beauty'. Not that there is any good reason for this but the judges are only human – you know what I mean! Not so long ago, a top US stunt pilot preferred to appear all in white: shirt, trousers, shoes, model – just to give an appearance of cleanliness!

Although strongly against the awarding of appearance points as used in the States, I'm convinced that a 'clean' model is not only a source of great satisfaction to the builder, but also forms good publicity for our sport. When watching the stunt circle until it's your turn to fly, you realise that most stunt flyers agree with this opinion. How often do people ask you 'is that plastic or metal'? What is missing is just the *originality* of design. Most models still look like the *Nobler*, and the colour schemes vary even less. With such an abundance of 'full size' aircraft to choose from, I have far more ideas for stunt designs than I can ever build – take, for example, just the 'jet fighter' section.

This type of model has always impressed me most, I think, the sleek and elegant, yet straight and clean lines are most suitable for the task of today. *Commodore* is now my fourth model in this style, the forerunner was originally inspired by the sleek lines of Milan Drazek's *Orion* team racer some 8 years ago. It was an elegant model, but I found the shape somewhat too 'round', and since the 60 in. wingspan proved too much for my Volkswagen, it gave way to the *Commodore*.



Since the fuselage has little effect on the flight characteristics, it was chosen to be the most distinctive part of the design. The only criterion was to place most of the side area aft of the centre of gravity. I prefer to use a large fin with a considerable amount of right rudder, instead of much engine offset, to maintain line tension, because this is still effective during the occasional engine 'burps' and when the engine stops. Side area in front of the CG is kept to the minimum, so the engine is not fully cowled, and this eliminates cooling problems. With an otherwise immaculate model, the protruding cylinder head of a *clean* engine does not detract from the overall appearance.

The most important part of any design is the wing, and there are a lot of planforms and airfoils to choose from! In general, the planform is fairly similar in all stunt designs, but small modifications to sweep back, tips and flap shape give a different look without affecting the flight characteristics. The airfoil is a different matter altogether, although it is impossible to state which is best – it mainly depends on what kind of aircraft you like, what flying style you prefer, and how fast your reflexes are. I will not delve too much into the aerodynamics, but in short the possibilities of design are: thickness, point of maximum thickness, nose radius, and curvature of the airfoil fore and aft of the point of maximum thickness. As for thickness it should be pointed out that the *Nobler* wing – which is nominally 17 per cent – is actually just 13 per cent with the flaps included, and I see no reason why the flaps should not be taken into account. Since we have to fly in different weather conditions, you either have to build two different airplanes or one with average flying speed and manoeuvrability.

In my own case, I find that my reflexes are not the fastest, and I like the big, open, smooth and slow pattern which means that I must have a lightly loaded airplane at medium speeds on long lines with 'grooving' flight characteristics, especially during corners. To achieve this I rely on a section with medium thickness, a large nose radius, steep camber to the point of maximum thickness (at 30 per cent of the chord) and little curvature behind that. Such an airfoil provides a separation of airflow at a high angle of attack, thus making for tight corners without 'wobbling' on the exit. Thickness increases from 13 per cent at the root – for reasonable speed – to

The modern, jet-like appearance of 'Commodore' is greatly aided by the immaculate white finish, together with carefully applied indian ink 'panel lines'. Certainly a distinctive model – and a breakaway from the usual 'stereotyped' stunt designs.

16 per cent at the tip, for stability around the yaw axis. Increased leading edge sweepback adds to this effect. To turn tightly in the square corners, I use large control surface movements (elevator over 90°, flaps over 30° total movement). The CG is located at about 28 per cent of the root chord.

Before designing an airplane, you have to decide which engine you will be using. As my 35 size models have always been powered by Mr. Fox's excellent products, the moment arms have remained basically the same. Since *Commodore* came out a lot too heavy and with a rearward CG, I had to look for a more powerful engine. My choice was the O.S. Max H40S which from Mr. Chinn's engine test seems quite a capable stunt engine. Unfortunately it was not readily available at that time, but I acquired a secondhand O.S. H40P, which when fitted with extra cylinder head gaskets and after trying various venturi inserts, made a quite satisfying stunt engine.

I do not recommend this pylon racing motor as an outstanding stunt engine, but over the years some manufacturers have attained a similar level of performance to Duke Fox and this motor is no longer the only choice. Take a look at the weight figures, this eliminates most of the otherwise powerful engines, but a motor that is most suitable is one whose crankcase has been designed to take different capacities, for example the Super Tigre G21/46 (.40, .35 cu. ins.), the Veco 45, (the 50 is even lighter). Also the O.S. Max 35S should be a good buy - it is sold with a suitable light muffler, too.

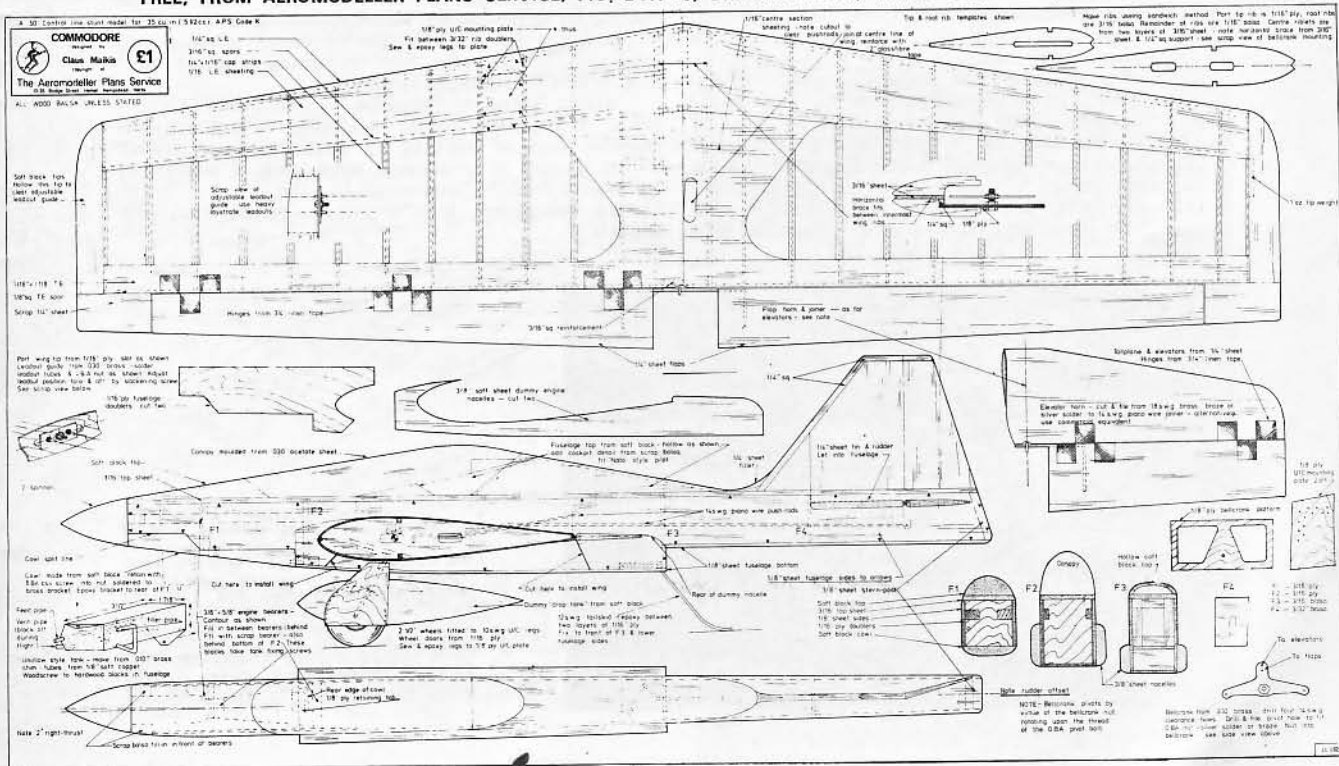
This brings us to the fuel tank. Since all my models feature a tank compartment for a removable tank, one can try different types and shapes in several airplanes. I have had the best results with the uniflow type. My opinion is that the shape and dimensions of a tank are not so critical, the most important



The designer with his model at the Helsinki World Championships, where he was a member of the German team. Rather too generous an application of paint caused it to be overweight, which handicapped his flying. Be warned! factors are the position of the vents: where the tubes begin and where they end.

What also do we need? R/C elevator horns are easily available but - at least on my large stunters - I prefer to make my own from 14 s.w.g. steel wire and 18 s.w.g. brass sheet. All holes are bushed with small brass eyelids. I mount the bellcrank by soldering a OBA brass nut into the bellcrank. A suitable screw is bolted to the platform, and the bellcrank then rotates on the screw. A brass nut and steel screw fit

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rather tight yet free, have little drag, and last forever.

I don't like those springy undercarriages! If you often fly over a grass surface the legs will bend sooner or later. I use 10 s.w.g. steel wire for the legs, with big semi-pneumatic wheels, this type of wheel has the advantage of spring and damping effect, whereas weak legs and sponge wheels only spring. With this undercarriage you can put the aircraft on the ground hard and fast - it just remains there, bumpy landings are a thing of the past.

I won't say much about the finish: everybody has his own - but since I'm not willing to rub down all those millions of brush lines, and on the other hand do not own a high pressure spraying unit, I use spray cans. Do not spray at cold temperatures, as I did and found that I had to put on twice as much dope to get the stuff flowing! This resulted in a model weighing over 50 ounces. With the *Dupli Color* spray as base colour and a resin-type clear finish, it should be possible to build this airplane to a weight of no more than 45 ounces. Alas, this method is not cheap.

You will have noticed that this is not a construction article as normal! Those who need building instructions will not usually try his hand on a model like this, and this airplane is not a beginners project, anyway. However, just a few hints.

The ribs are cut from quarter grain wood between two templates in the traditional 'sandwich' method. The inner tip rib is made of $\frac{1}{8}$ in. ply to take the adjustable lead out system. Lead out wires are heavy weight laystrate. Discard the two root chord ribs made in the sandwich method, and replace with a pair cut from $\frac{1}{8}$ in. balsa. Very light wood is used for all planking.

Be sure to glue the landing gear mounts very securely, I do this with false ribs above and below the plywood plate, these points will have to take high stresses. A layer of glass fibre cloth should be applied at the centre section to reinforce this point.

I build my wings on four supports (2 at the tips, 2 at the root ribs) which are contoured to suit the corresponding ribs. Measure from all centre lines (leading edge, trailing edge, flaps, tip blocks) to the building board. If all dimensions are the same, your wing is straight! Cloth hinges are used for ease of installation. The tailplane is built from quarter grain stock, the fuselage sides, too. Don't forget the spruce blocks between the bearers and behind the rear former for the tank installation. Engine retaining nuts are soldered onto small brass sheet which is bent

around the engine bearers before adding the top sheet and block.

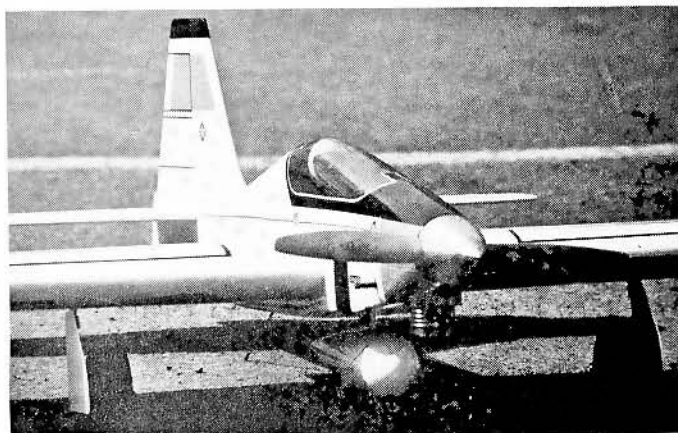
To achieve this unique fuselage shape, it was necessary to mould my own canopy. After several destroyed sheets of celluloid, I found the following procedure best: make a balsa pattern with hardwood grip. Clamp the model in a vice. Take a large sheet of celluloid, well oversize for the job and fix two hardwood spars to the long sides. Drill a hole in each end of one spar and bend a holding frame of 18 swg. steel wire to fit into the two holes in the spar which acts as a handle, allowing the sheet to hang freely. You must be able to remove the sheet quickly from the frame. Put this unit in the oven and heat. During the heating process, frequently watch the celluloid - when it begins to smell and smoke, hurry! Remove from the oven, holding the sheet at the spars, and remove from the wire frame, then pull over the model on left and right hand sides. Ideally, have a helper to pull down the front and back ends. Use gloves!

Glue small pieces of glass cloth, to prevent stress cracks, inside the engine compartment and between the wing leading edge and fuselage, using epoxy resin. Apply a thin coat of epoxy over the whole of the engine and tank compartment. Sand the whole model smooth, and apply two coats of sanding sealer overall, then cover the open areas of the wing with heavy weight tissue. Cover the rest of the model with light weight tissue.

Apply dope until the pores in the tissue are filled, then apply the base colour. The model is now ready for trimming. Lots of transfers are available for this, while lines may be applied by a valve-type ruling pen filled with Indian ink. You have to roughen the surface a little, and do not touch the lines - they smear! Narrow, coloured lines, can easily be made by cutting small strips from a solid colour transfer sheet; these are also fine for imitation of the undercarriage recess, or other areas where masking is awkward. When spraying, don't forget to cover screw holes, lead outs, wheel axles, flap horns and elevator horn exit. When brushing, have patience. . . .

I didn't intend to persuade you to build this airplane - although it's an eyecatcher there are numerous ways of building an attractive stunt model. I just wanted to give some inspiration, a reason or excuse for building an aircraft like this!

And, remember, take a picture before that first flight!



with an otherwise immaculate model, the protruding cylinder head of a clean engine does not detract from the overall appearance. Note the word 'clean' - none of your castor-oil baked, brown effigies please, but gleaming metal! Exposed engine certainly solved the overheating problems which Claus first encountered when silencers for stunt models became mandatory. Take care in building this model - poor workmanship cannot be hidden by layers of paint!