

## Sticks and Tissue No 159

If you can contribute any articles, wish to make your point of view known etc please send to or phone 01202 625825 [JamesIParry@talktalk.net](mailto:JamesIParry@talktalk.net) The content does not follow any logical order or set out, it's "as I put it in and receive".

Thanks to Mark Venter back issues are available for download from <http://sticksandtissue.yolasite.com/>

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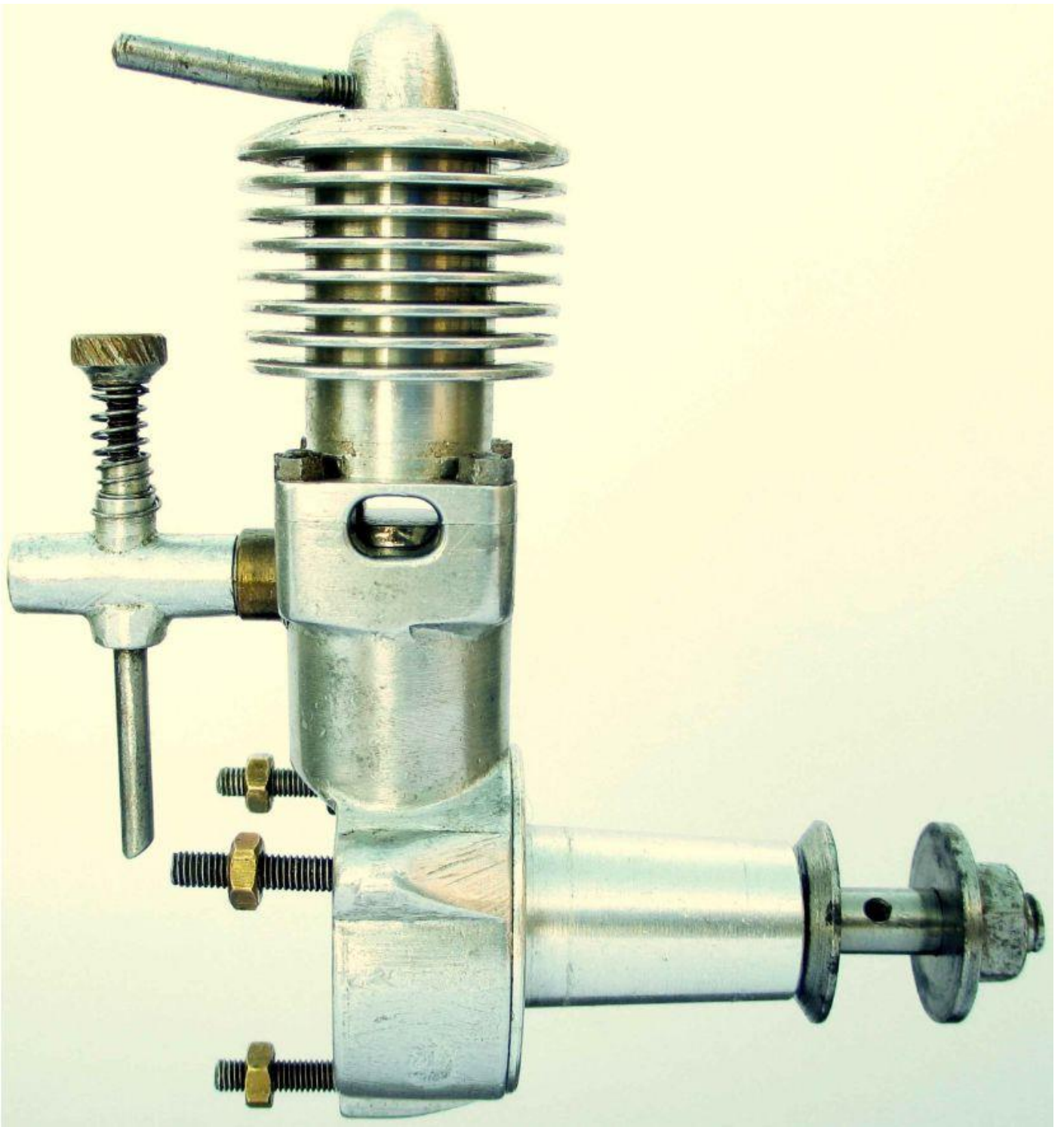
**Photo sent by Peter Renggli taken at the 2017 MG Bern Antik Flugtag. Photos by Urs Brand and Peter Ziegler**

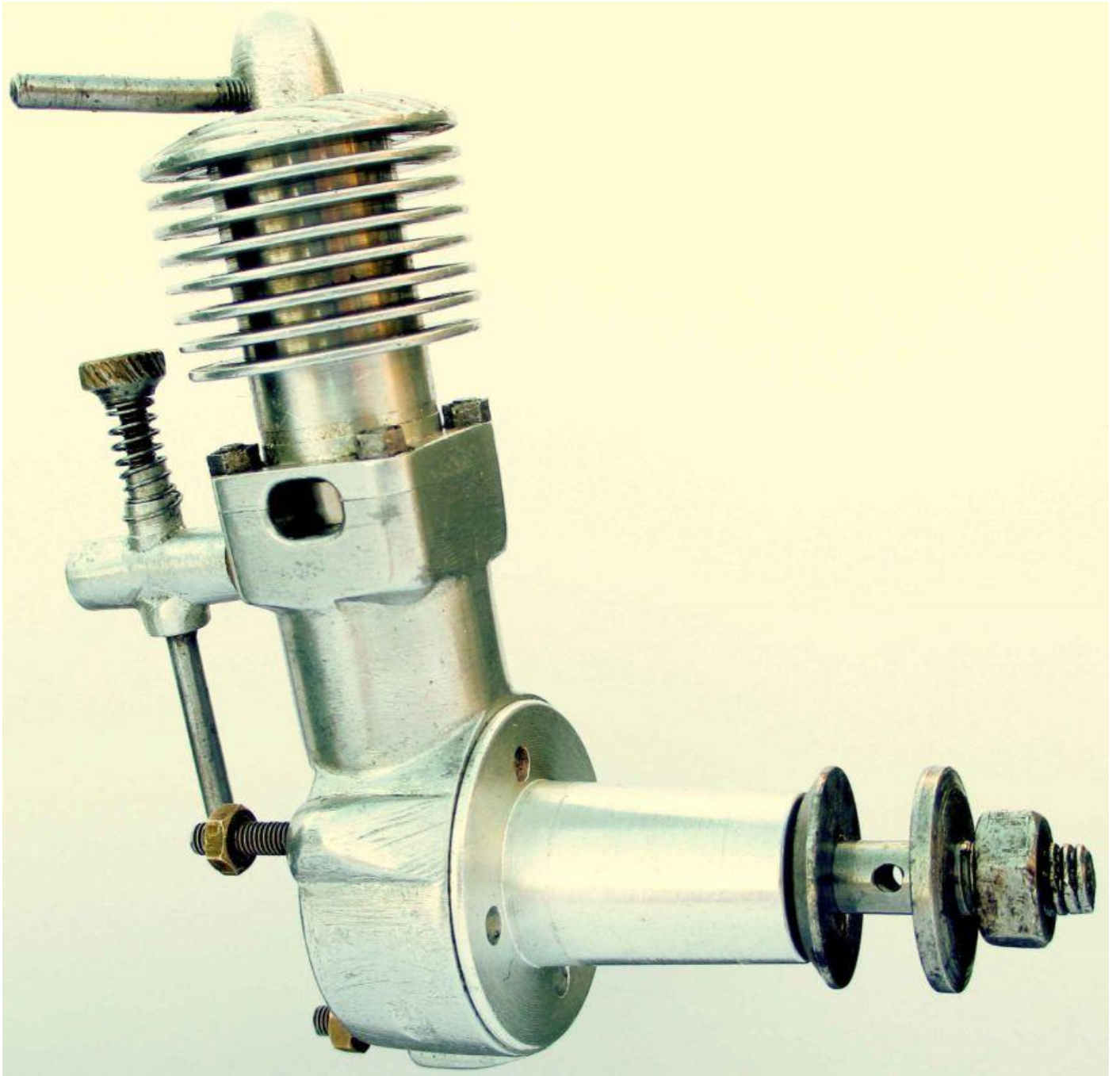
## **Půrok 2,0**

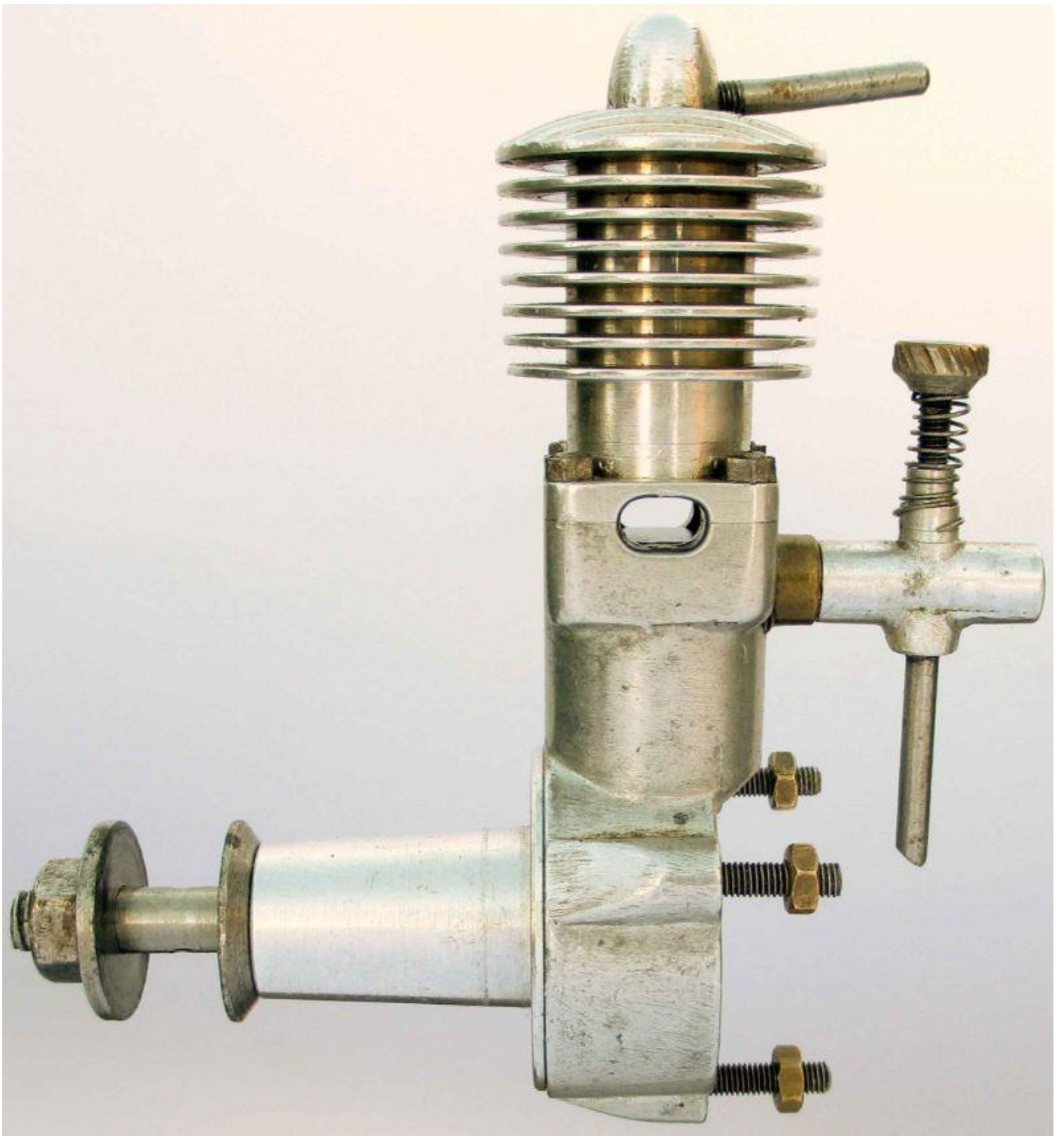
Auctions especially Model Engine Auctions can be very exciting, full of surprises, expensive and frustrating. It was quite by accident that I started collecting model engines it was when I had nowhere to fly my models. At the Auction the gentleman I sat next to leaned towards me and said 'It's an Addiction collecting engines!' I had to agree! I am interested in the engines that were readily available when I was lad but sadly I never had the money to buy them! OK I can not relive my youth but every engine I get my grubby little mitts on I really appreciate. I try to find out its history who made it and when. Most surprises happen at the Auctions like when a quarter size DC Wildcat went for an amazing £650 hammer price + 18% commission and VAT for a total of £767. There was a bit of a hush while most of us wondered what we had missed. Sometimes the surprise is after the Auction when you find out what you bought!! Not always good I might add.

Without knowing it, I had bought a Půrok, 'A what?' I can hear you say? Before we go further I must thank Jiri Linka and Adrian Duncan for the invaluable information they gave me about this engine. If you want more information it can be found on Adrian Duncan's Website. Briefly outside Czechoslovakia this engine isn't really sort after! In short, Gustav Bušek of Bus engine fame, together with Anton Půrok designed a 2cc engine based loosely on the Swiss Dyno of 1941. Making these engines in small batches while working in a factory which was almost certainly under Nazi control was a very brave move. Production had to cease in 1942 after the Czech partisans assassinated the Nazi Reinhard Heydrich. After that you can imagine what would happen to anyone who was found using machinery for other purposes than the Nazi war effort! Simply the risk was too great and production ceased. Given how few of these engines were made and considering the attrition rate during the last 78 years there are very few surviving examples.

Over the years this engine has lost its tank. The advertisement is reproduced courtesy of Adrian Duncan, it shows the engine with a tank but without crankshaft!! I have produced a left pointing photo to allow comparison with the advertisement. The venturi tube is a tight push fit inside a brass or bronze bush which is screwed into the crankcase. As purchased the fuel tube was blocked with very hard black decomposed castor oil. Heavy file marks are still visible on the crankcase despite obvious signs of polishing over the years. Notice the top right hand lug was miss-filed. The mounting lugs are threaded 3mm to accept screws or studs with nuts. The bearing housing is screwed into the crankcase and tightened with a pin wrench. I must admit that finding the right settings took me a while I didn't expect the needle valve to be almost closed. The needle valve setting is very critical just 1/16th of a turn open. This has to be kept an eye on as there is a tendency for it open slightly, slowing the engine down. There is quite a bit of free movement in the compression screw although it works alright. Once these two problems are understood starting is fairly easy. Slacken the compression screw then take up the slack ready to increase it, set the needle valve open by a very small amount. Inlet prime or a light exhaust prime is sufficient to get the engine running, increasing the compression increases the rpm then just make small adjustments to the needle valve. Amazingly this 78 year old engine runs smoothly and can turn a 10x4 prop with ease!!! One interesting and curious feature is the hole drilled and tapped 2.3mm by .4 mm pitch through the shaft (see pictures). The purpose of this hole is not directly apparent and certainly does not add strength to the shaft!!! For its time weighing in at 4.7 ozs it was a very smart, light weight and practical engine.









## **Covering models with tissue over mylar or document laminating film.**

### **A brief history of model coverings – George Stringwell**

Back in the late 1940's when I started to build flying model aircraft at the tender age of 6, there was effectively only one choice for the covering to be used on 99% of open framework, built-up structure models – tissue and nitrate cellulose dope. A few bigger IC powered models and big gliders made use of silk or (rather later) nylon covering, but still using cellulose dope. This situation continued until around the early 1960's when self adhesive plastic covering films arrived and quickly found acceptance with radio control and, to a lesser extent, control-line fliers. Over the next few decades the range and variety of the plastic film coverings available expanded with heavier and lighter weight versions plus, for bigger models, various plastic “fabric” coverings (e.g. Coverite), but in general free-flight modellers still stuck to traditional tissue and dope. The reasons for this are easy to see – weight is one but also the fact that most free-flight models rely on the covering to provide torsional rigidity, something at which almost all plastic film coverings are not very good. The tissues available ranged from products like light and heavy weight Modelspan to various versions of “Japanese tissue” but one common factor that all the best model covering tissues had is that they retained their structural integrity when wet – they had “wet strength” - something sadly lacking in most “gift wrap” type tissues as anyone who has tried using these for model covering will ruefully testify!

Of late there has been something of a shrinkage (no pun intended!) in the variety of plastic film coverings available, with several well known brands going off the market. This may be partly in response to the reduction in demand occasioned by the fact that the majority of radio control modellers now buy their models in ready built and covered RTF or ARTF form rather than build and cover their own, but whatever the reason the available range of choices in plastic film covering is now more restricted than it was 20 years ago. Model covering tissue is also now not available in a very wide range of choice; heavy and light Modelspan tissue can still be found, but only in plain white not in the wide range of colours formerly available but fortunately at least one brand of good “Japanese tissue” - Esaki – can still be found in a good range of colours and up to three weights.

### **Enter Tissue over Mylar**

Whilst tissue covering offers good torsional properties and excellent strength/weight ratio for use on

traditional built-up balsa structure models it does have one considerable drawback – it is easily punctured. To solve this problem competitors in the FAI free-flight classes – F1A, F1B and F1C – developed, in the 1970's onwards a system of composite covering comprising an inner skin of thin, transparent, mylar film and an outer covering of tissue and dope. The outer covering provided the required torsional properties and the inner skin imparted a degree of puncture resistance, all at very acceptable light weight. These days, of course, these FAI F/F class models have mainly progressed, especially at the top levels, to more sophisticated high-tech structures featuring carbon fibre and epoxy glass finishing, techniques which are very suitable for “semi-mass production” as many competitors now purchase professionally built models. However, the mylar/tissue system, now outmoded for top level FAI contest use, is exactly what the builders of traditional and vintage free-flight, radio and control-line models are looking for.

From my own point of view, I adopted the mylar/tissue covering technique around 1990 when, after two decades of intensive involvement in competitive thermal soaring, I “retired” and started building electric radio models, both soaring and sport “power” types, and vintage free-flight models adapted for electric flight and radio control. Thirty years ago the electric “hardware” available to us was a far cry from that which we enjoy today. Motors were brushed types of relatively low efficiency and high weight, batteries were nickel cadmium cells of very poor power/weight ratio compared to our present day lithium-polymer ones, radio equipment was still relatively heavy and this all meant that one had to take care to save weight everywhere possible in order to enjoy a decent flying performance and flight duration. This resulted in the need for carefully designed open structure airframes of traditional construction and I found that the mylar/tissue covering system was ideal for such models and provided a light and very satisfactory and practical finish. In particular, for the converted vintage models it provided a finish which looked totally authentic reflecting exactly what the tissue covered originals would have looked like but with much of the hard wearing qualities and puncture resistance of a film covering. The result is that I have used this method on ALL of the hundred or more models I have built in the last 30 years and wouldn't contemplate using anything else, albeit that in the last few years I have used document laminating film rather than the 5 and 10 micron mylar I used to use, but I will explain the reasons for this later. The ONLY drawbacks are that it is a bit more work and that there is a certain amount of “technique” to be mastered which can make early efforts seem rather frustrating, but the payback is in the final result of a light rigid finish which is, at least to eyes used to traditional models, also very attractive.

In the following piece I will attempt to show how to achieve a satisfactory tissue over mylar/document laminating film (referred to from now on by the shorthand name “doculam”) finish, but first a few caveats.

- These methods are ones I use or have used myself which work for me. There are variations of these methods, and indeed other quite different approaches which appear to work for other people and I am not claiming that the way I do it is either the best or the easiest way, but I can be sure that they are methods that WORK.

- You do need to be careful to get the right materials. The problems of non wet strength tissues were mentioned above, but whilst the 5 and 10 micron plain mylar film mentioned is pretty standard, doculam does come in a very wide range of weights, finishes and base materials. I will try to be clear about what I am using as these are the only materials I can say with certainty work, many others may be equally usable but I don't know because I have not used them!

- I only build electric powered models and hence do not need to get involved with fuel proofing at all. There is no reason why any fuel proofing that you would apply over a normal tissue finish should not be perfectly OK over a mylar/tissue one of the type I describe. However, in a second article I will be outlining the tissue and other decorative methods I like to use, and where such things as lining pens and water colours are involved, some fuel proofers may not be suitable for use over these, so tests are required before application to finished models.

**So – down to the nitty gritty.....**



The very first model I covered in mylar and tissue was my original “Sundancer 74” (above), the first E400 class electric soarer I built. The technique I used on this was the one I used on all the subsequent models which used 5 or 10 micron plain mylar under the tissue and I will describe this in detail. The only variation was on a few models I built after moving to France when, for a while, I could not get adequate supplies of nitrate dope and used WBPU (aka Eezedope) instead, but I will deal with the necessary variations as an appendix to the basic technique. The system I use on the models over the last ten years which have used 37 micron doculam instead of the plain mylar is somewhat different and I will describe this separately.

#### Using 5 or 10 micron mylar with nitrate cellulose shrinking dope

The first thing to appreciate about 5 or 10 micron mylar is that it can be very awkward to handle if not approached in the right way. It is, of course, very thin and also tends to pick up static and stick to itself and everything else if allowed. Forget about cutting it with scissors, the only way to handle the stuff is by the use of a cutting mat and very sharp knife – either a NEW number 10A or 11 scalpel blade or a razor blade – and a steel ruler. The second thing to realise – and this works to our advantage – is that it is very thin. This means that open areas of structure can be covered with just a small overlap without leaving a perceptible ridge when the tissue is applied. Sheeted areas are thus covered only in tissue. The third thing to consider is that this is plain mylar with no adhesive, so a suitable adhesive will need to be applied where it is to be stuck to the framework

The sequence of events if working with nitrate cellulose dope is;

Finish sand the airframe as normal and then apply several coats of thinned dope overall, lightly sanding any raised grain before the last coat. It is not really possible to be specific about the degree to which the dope is thinned as this depends upon how thick it is out of the tin! OK, that is stating the obvious, but to explain; back in the good old days of the 1990's when I used dope bought in 5 litre tins from H Marcel Guest in Manchester, it was so thick that the contents of three or four of the same sized tins of best automobile quality thinners was needed to reduce it to the right consistency. Dope bought from model shops in retail size tins is far thinner to start with. So all I can say really is that the dope should be thinned until it is “nice” to brush on. Whilst on the subject of dope, a word of caution regarding thinners. Many of the cellulose thinners sold in DIY outlets have proved to be of the lower quality sold for auto painting as “spray gun cleaner” and the

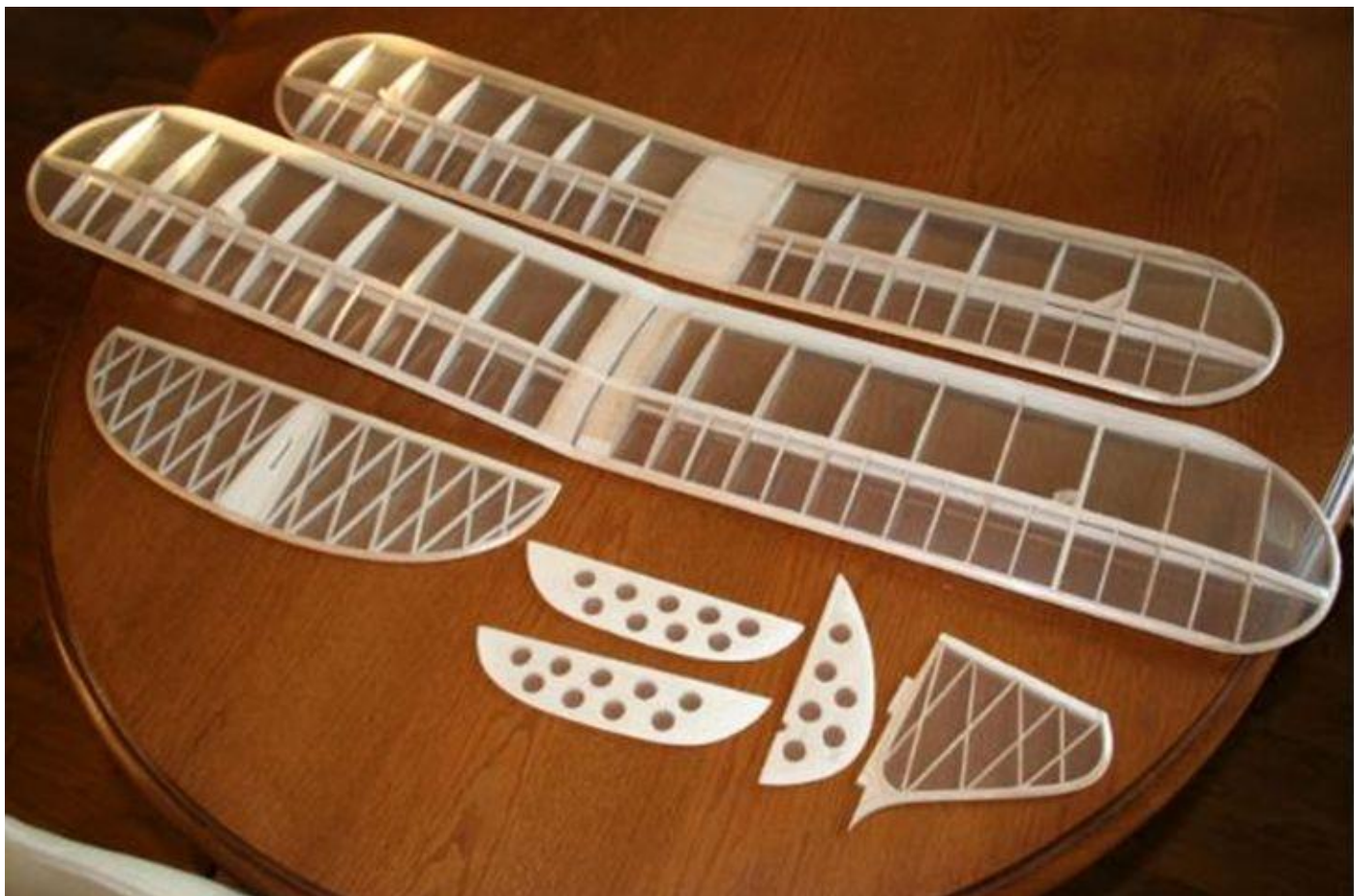


water content in these can cause real problems in the form of a white precipitate if it is used to thin model finishing dope. Similarly, whilst acetone WILL thin dope, it is also likely to cause problems. To be totally sure, only the best quality thinners as sold for thinning paint for car spraying will do.

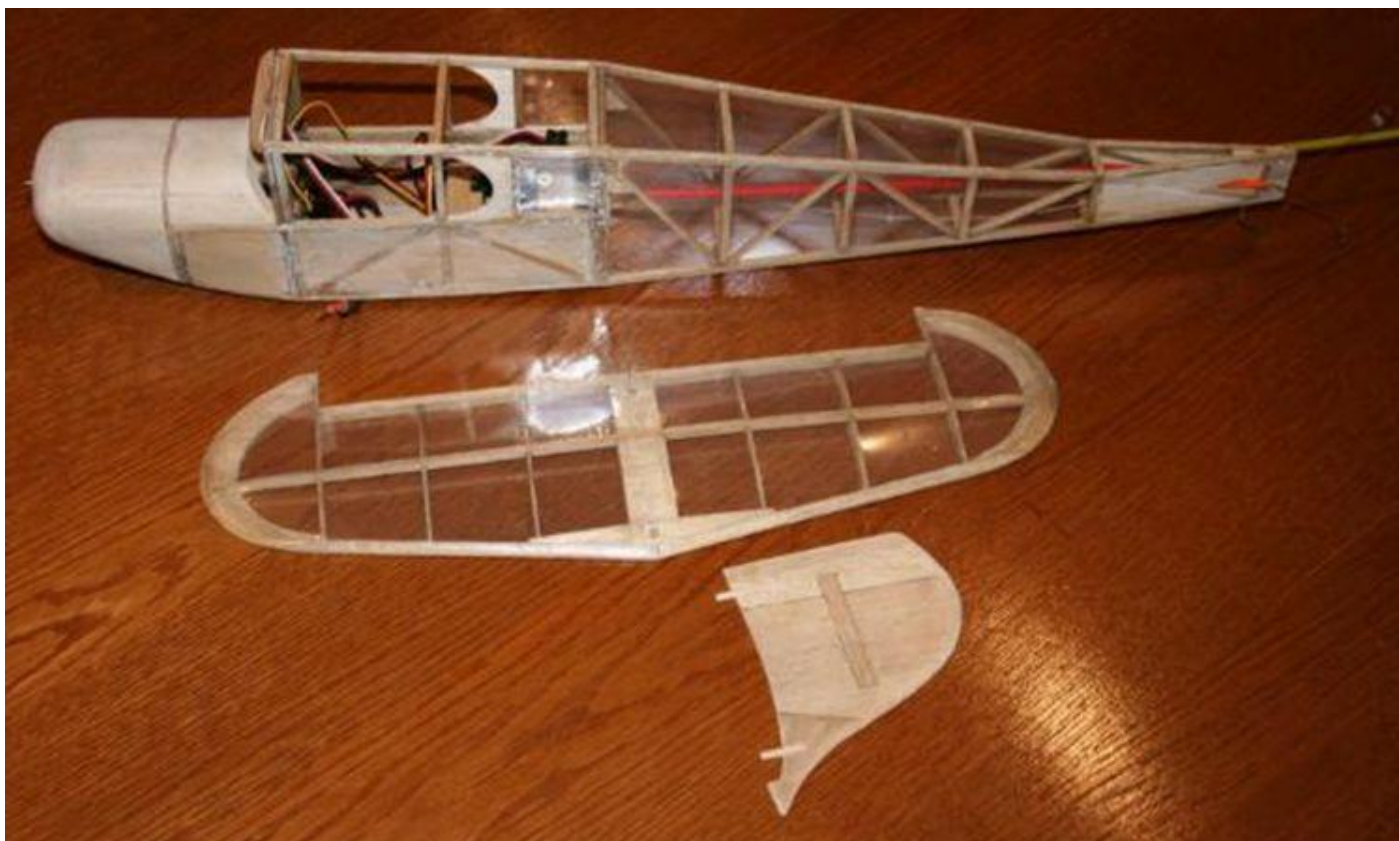
Once the framework is prepared, we need to cut panels of mylar large enough to cover each open area plus a small – 5 mm or 1/4” - overlap all round. The easiest – in truth the only satisfactory – way to do this is to prepare, by reference to the plan, a template for each area cut from cardboard such as a breakfast cereal box. Don't forget to allow for the curve on the top surface of a wing by increasing the chord wise dimension of the template by a few millimetres. Then lay out the required number of layers of mylar on the cutting mat, press the template down on top and cut round using the scalpel.

The next step is to run a bead of the adhesive to be used around the outline of the open area and over all ribs or other structural members within it to which the mylar must be attached, using a small paint brush. This must be a heat sensitive adhesive, Balsaloc works fine but my personal preference is for a contact adhesive such as Evostik thinned with thinners to brushing consistency – but be warned, this does go off quite quickly! Once the adhesive is dry, the mylar panels are attached using a film covering iron (or a small domestic – non steam! - iron. Do this by carefully positioning the mylar and tacking it down at corners and intermediate points. The aim is to get it on evenly, don't worry too much about getting it tight at this stage. Once the mylar is stuck down all round the outline and to the intermediate structure (i.e. ribs in the case of a wing) then it is shrunk tight with the covering iron, turning up the heat setting as necessary. Don't be too worried by any small wrinkles which may occur in the corners of bays, they will not pose a problem. One area where special care is required is the bottom surface of undercambered wings. You need to pay particular attention to ensuring that the mylar is firmly attached to the ribs over the concave area.





*(Above) Rubberdub and twice size Frog Tomtit covered in 5micron mylar*



*(Above) Frog Zephyrfuselage and tail covered in 5 micron mylar*

When the mylar has been applied to the whole structure it is time to add the tissue. First of all cut the tissue panels to size allowing a sensible overlap of at least 10 mm (1/2") all round. The tissue is applied wet; this can be achieved in two ways:

1. Lay the tissue panel in place and mist it over with water from a spray bottle. The type of spray that domestic kitchen cleaners are packaged in is ideal for this. The damp tissue will wrinkle up somewhat and will need to be carefully spread out and gently pulled flat.
2. This is my favourite method and the one I use 90% of the time. Obtain a shallow tray, mine is a pensioned off roasting tin, and put about an inch of water in it. Holding one end of the tissue panel draw it across the surface of the water (shiny side up if using Jap tissue). The surface tension will "stick" the tissue to the water and when it is drawn fully over it will be wet on one side only. Hang the wet tissue from the edge of the bench (the water will stick it there), place the mylar covered framework to be covered on the bench, pick up the tissue panel and carefully "flop" it onto the framework getting it as close to the final correct position as possible. Gently lift and reposition any misaligned areas and carefully stretch it out.

Once satisfied with the positioning of the tissue, brush through over the periphery of the panel (i.e. that part of the framework not covered by the mylar) with thinners; this will penetrate the moist tissue and reactivate the dope on framework. The thinners and reactivated dope will dry out whilst the tissue is still damp and the edges can now be trimmed with a SHARP scalpel blade and doped down. Now allow the tissue to dry out, the water shrinkage should result in a nice tight surface as long as it was applied properly.

Using well thinned shrinking dope, dope around the periphery to make sure that the tissue edges are firmly doped down, then when this is dry dope through the tissue with as many coats as desired – I find that three or four is usually enough – to shrink it down and bond it to the mylar underneath.

Here are some models covered with Esaki Liteflite tissue over 5 micron mylar using nitrate dope



*(Above) The underside of one of my o/d "Square Dancer" lightweight aerobatic aileron/elevator models, finished weight 14 ounces with 140 watt brushless motor; the top had the same covering with a contrasting colour scheme*



*(Above) Paul Plecan "Hummingbird" with RET R/C and 50 watt electric outrunner, AUW 7.5 oz*



*(Above) Electric R/C version of John Barker's famous Lulu II, Esaki Liteflite over 5 micron mylar, AUW 10.5*



*(Above) Electric R/C REAMT version of Rubberdub seem earlier with mylar applied, now finished in Esaki Liteflite. AUW 4.5 ounces*



*(Above) Electric R/C RET Frog "Tarquin", AUW 7 ounces*



*(Above) Electric R/C RET Frog "Witch II", Esaki Liteflite over 5 micron mylar. AUV 4.5 ounces*

Variation – using 5 or 10 micron mylar with water based polyurethane varnish (WBPU) or Ezeedope

It is not necessary to pre-dope the framework it just needs to be sanded smooth. WBPU varnish or Ezeedope does not reactivate with recoating so the technique of securing the tissue by reactivating the WBPU with thinners or a further coat of the varnish cannot be used here.

The process of applying the mylar is exactly as described above, as is the preparation of the tissue panels. However, in this case the panels are applied dry using either tissue paste or a Pritt stick type adhesive around the periphery, then water shrunk with the spray once the adhesive has dried. The WBPU is then brushed through, care is required to not create any wrinkles as there is very little shrinkage available with WBPU or Ezeedope. I found that no more than 2 coats was necessary – remember you are not aiming to air proof the tissue, the mylar will take care of that.

The results using WBPU are perfectly satisfactory, and the four models I finished using this are still going strong, the oldest (Frog double sized Tomtit) after 10 years and well over 200 flights and the only drawback I have observed is a tendency for the covering to slacken in damp evening air, something that does not happen with models adequately doped with nitrate shrinking cellulose. However, my personal preference for ease of use is to use the cellulose – easy for me as I have a detached workshop and personally don't find the smell of dope and thinners either offensive or troubling, but for those who either have issues of one sort or another with dope fumes, the WBPU provides a viable alternative. Here are some finished examples using WBPU (V3V floor varnish which is a local brand available in DIY shops here in France



*(Above) Double size Frog "Tomtit" electric R/C model, 140 watt outrunner motor, auw 16 ounces covered in Esaki Liteflight orange over 5 micron mylar using WBPU varnish (actual brand is W3W gloss) Still flying after 7 years and over 250 flights – but a bit more faded than this now!*



*(Above) KK "Bantam", 120 watt electric RET R/C, AUW 12 ounces. Light Modelspan and WBPU*



*(Above) Frog "Zephyr" 60 watt outrunner powered RET R/ model, A UW 9 ounces. Notice that the WBPU gives a rather more transparent finish to the Esaki than dope does.*

#### Using Document Laminating Film with nitrate Cellulose shrinking dope

Regarding the film itself there is bad news and good news. The bad news is that, as already mentioned, the films on sale vary widely in type of base material and finish, and are often only available in quite large rolls. The good news here is that they work out at a fraction of the cost of model covering films. On the further good news side of the equation doculam is a wonderfully easy material to use, especially when compared to the tricky and fragile mylar. The inbuilt heat activated adhesive grips tenaciously and the film shrinks beautifully; much higher temperatures can be used in the shrinking process than with model films and it is thus much easier to eliminate any odd wrinkles. Of course it is thicker than the mylar films meaning that a slightly different approach to that described above is needed, but the weight penalty of the thicker material is not significant and I now use 37 micron film on models right down to 20 inch span with complete satisfaction. Teamed with the lightest Esaki tissue Liteflite, it produces a very tough finish, extremely puncture resistant. With the heavier Jap tissue grades or lightweight Modelspan it is extremely tough and with heavyweight Modelspan practically bullet proof, certainly more puncture resistant than all the normally available model covering films and making it a perfectly suitable covering for larger models up to 72 inch span or more.

The first doculam I used was a small batch obtained from Australia, but I was immediately sufficiently convinced to invest in a 150 metre roll of 37 micron semi-matt finish material which I have used ever since. The cost of this worked out at well under 50 pence per metre and despite having helped quite a few other modellers out with 5 and 10 metre lengths for them to try I still have enough left to cope with my probable builds for a year or two.

Airframe preparation can be either doping and rubbing down as described for the mylar/cellulose/dope



variation above, which I prefer, or simply restricted to sanding smooth. The main difference is that the doculam is applied over the whole frame, not just the open areas. It needs to be positioned and then tacked in place, the position of the tacking depending on the configuration of the surface. On a flat surface – e.g. underside of a flat bottom wing, flat fuselage side etc – tack it in the corners and then work around the periphery. On a cambered surface such as the top of a wing, the bottom of an undercambered wing or a stringered round section fuselage or turtle deck, tack it at each end of the highest point of the camber and then fasten down along the camber line, stretch it out fore and aft to the leading and trailing edge (or top and bottom in the case of a fuselage) and then tack it down there. Trim off the excess and stick the film down around the periphery and then shrink it. You can use a heat gun on a highish setting, but I prefer to use the covering iron for shrinking. During the shrinking process the film will change from a semi opaque to transparent appearance as the adhesive is activated. Doculam will tolerate higher temperatures than typical model films and has good shrinkage making it easy to get a wrinkle free surface, and the adhesive is very effective. Excess film is trimmed around the periphery with a sharp scalpal and the edges ironed down for a neat finish.

Apply one or two coats of thinned dope around the periphery of the frame and **along the high camber line on curved surfaces**. Pay particular attention to the maximum camber line on undercambered wings. When the dope is dry (which will take longer than on a permeable surface) tissue application, trimming and finishing is as described in the mylar/tissue/dope section, wet with thinners brushed through on all the pre-doped areas.

#### Variation when using WBPU

As with the mylar apply the tissue dry but in this case tissue paste is unlikely to work well as it will be applied over the doculam surface, so Pritt stick or similar is used. Water spray and when dry brush through with the WBPU, adding a second coat if desired, but watch out for runs as, unlike when using dope, these cannot be corrected as the WBPU does not reactivate.



*(Above) Bill Winter "Airknocker" 52" span with flying surfaces covered in document laminating film prior to finishing with tissue.*



*(Above) "Airknocker" after finishing with white light Modelspan tissue and Esaki Liteflite coloured trim using nitrate shrinking dope.*



*(Above) KK "Bandit" rear fuselage covered in 37 micron document laminating film, note that film is almost completely transparent after shrinking, before this the adhesive gives it a translucent appearance*



*(Above) Completed electric R/C "Bandit" finished in white and coloured Esaki Liteflite over the doculam using nitrate shrinking dope. AUW 14 ounces, 160 watt outrunner.*



*(Above) Ken Willard designed "Scorcher" wing covered in doculam*



*(Above) Finished "Scorcher", heavy weight yellow Modelspan on wing with colour trim of Esaki Liteflite overlaid, nitrate dope finish.*



*(Above) "V" tail and alternative aileron and RET wings for double size Frog "Widgeon" covered in 37 micron doculam*



*(Above) Finished 2x "Widgeon", Esaki Liteflite yellow, red and blue, nirate dope*



*(Above) Eric Clutton "Sharkface" wing covered in 37 micron Doculam*



*(Above) Finished "Sharkface", wing is lightweight yellow Modelspan with tissue trim from Esaki Liteflite black and blue, shark fin graphic found on the Internet*

#### Final points

When using cellulose with wet or damp tissue, a degree of blushing may take place as the tissue dries, especially in cold, damp or humid conditions. This will disappear with subsequent coats of dope.

Doculam adheres very well to itself, so overlapping at leading and trailing edges is practical.

#### Sources

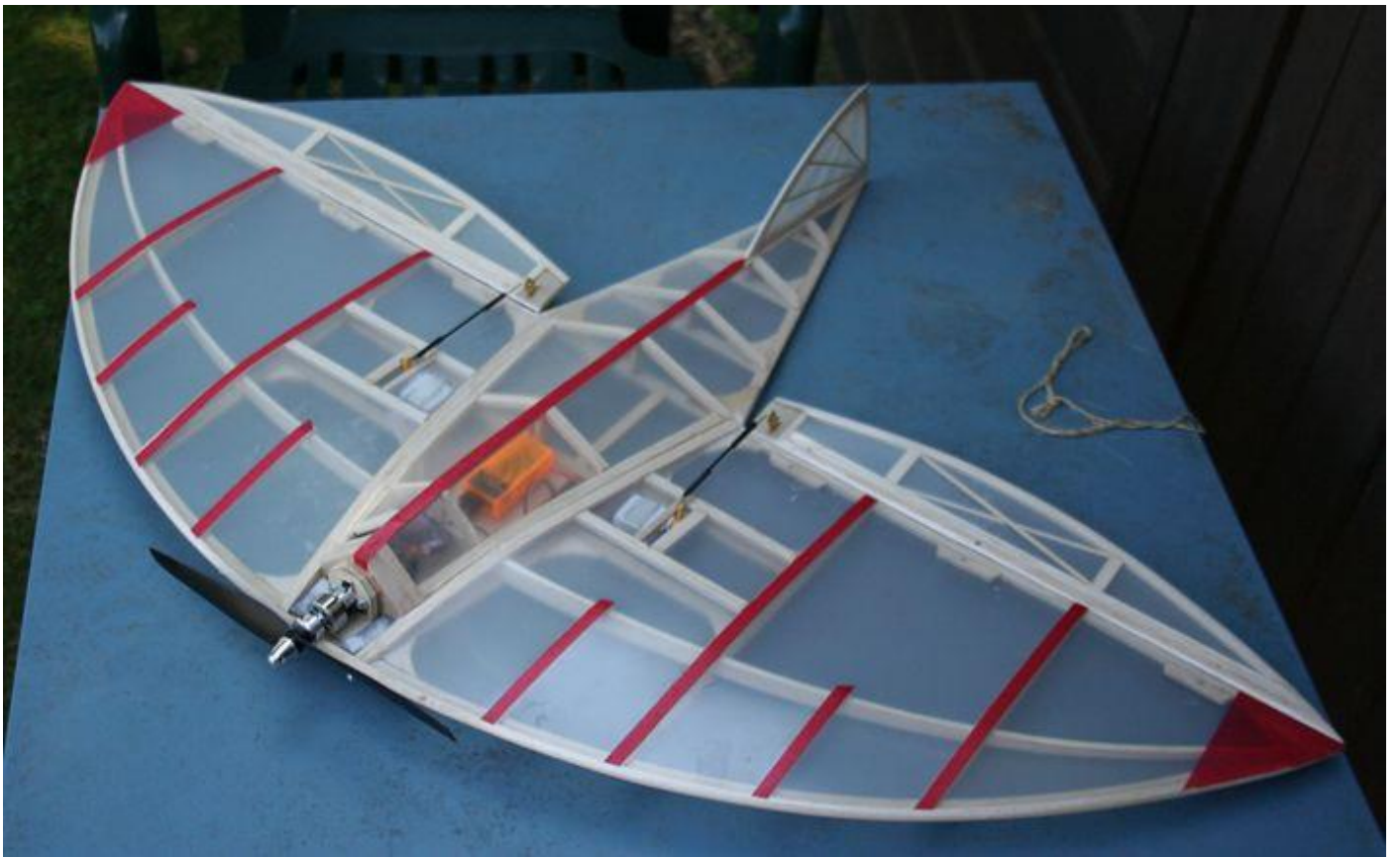
I have always sourced my Esaki tissue and 5 or 10 microm mylar from Mike Woodhouse at [www.freeflightsupplies.co.uk](http://www.freeflightsupplies.co.uk). Doculam is trickier, mine came from an office supplies company which no longer seems to exist, the best I can suggest is to search the net.

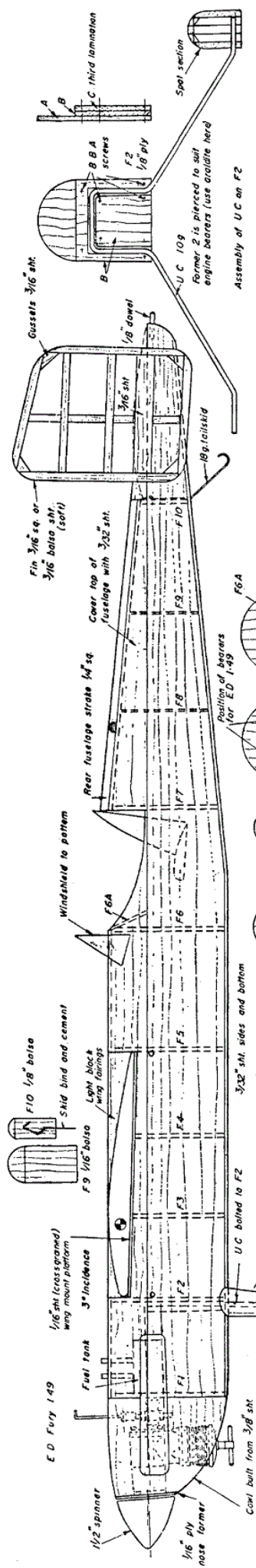
#### Decoration

Obviously, as we are working over a base covering of film, different coloured tissue panels can be butt joined at any point on the surface, not just where convenient structural members occur as is the case on a normal tissue only finish. I will hopefully put together a follow-up to this to outline my approach to tissue decoration and creating attractive colour schemes which sometimes involves overlaying areas of coloured tissue on plain white or yellow base covering. I use this a lot since my painting skills are cr.....er, not very good!

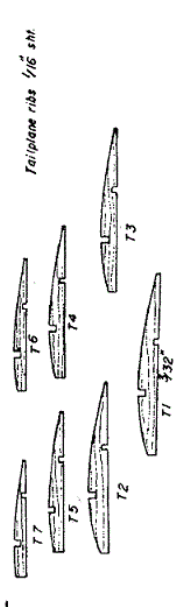
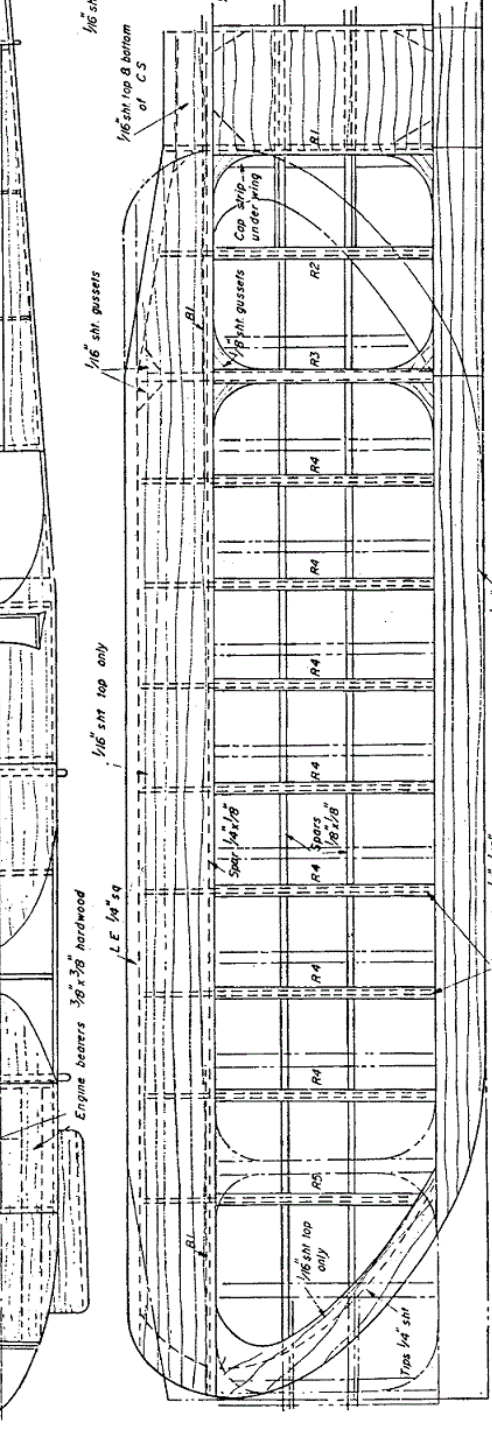
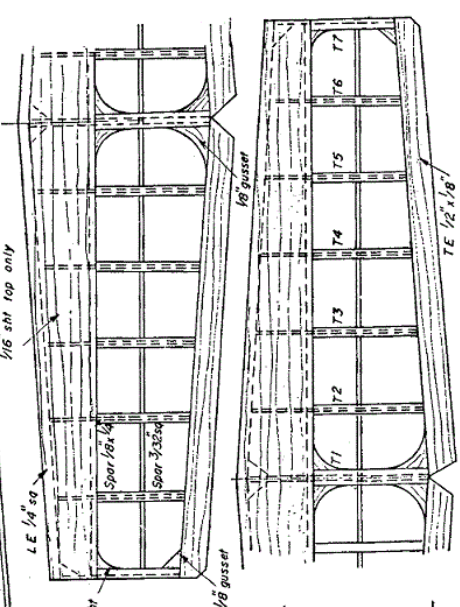
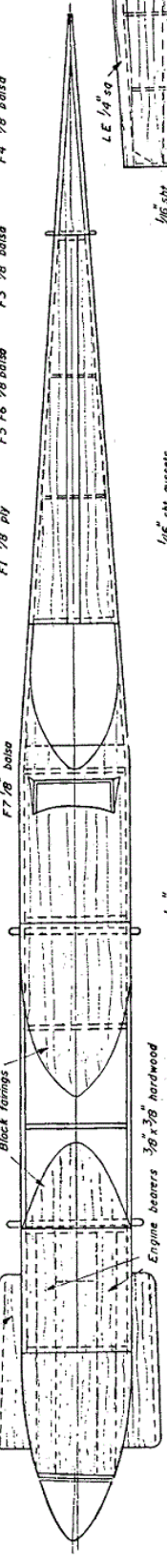
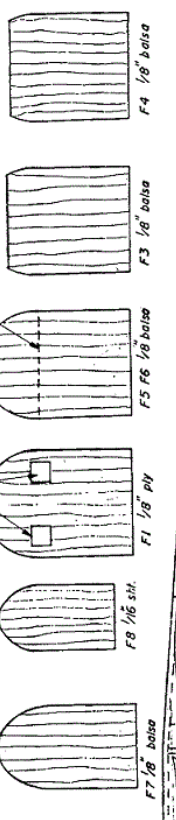
#### Foot note

Oh yes – some models are perfectly happy with just the doculam, like my Tom Hunt "Elipstik 260" – but don't take your eyes off it! I added some red tissue striping on top to try and help with orientation; it does – a little!





**GULLIE**  
M.A. CERREAD  
375  
LENGTH 31" SPAN 50"  
ENGINE 1-1/32cc  
MODEL AIRCRAFT 1962  
19-20 NOEL ST. LONDON W1





## Gullie A 50 inch wingspan free flightter for 1 – 1.5 cc engines by Colin Read from Model Aircraft January 1963



Gull wing sports models have a fascination all their own, so it is surprising that one does not see this attractive layout more frequently. Gullie is the result of much experiment with parasol and gull wing designs, built in various sizes over the course of several years. It is big enough to accept single channel radio, but also makes a tough, stable, free-fighter that is exciting to fly, with its fighter-like lines and racy performance.

No attempt was made to build a light weight model, everything being solid and with plenty of sheet covering. Although I covered the original in orange jap tissue, silk or Viscotex would be better. Viscotex can be

dyed any colour, using nylon dye of a good quality, orange being good for visibility.

### Construction

Commence by cutting out the fuselage sides and formers, then build up u/c former F.2. Upon the choice of engine will depend the spacing of the cut outs in F1 and F.2, any 1 c.c.-1.5 c.c. diesel or a low powered 2.5 c.c. glow motor being suitable.

Araldite the engine bearers to F.1 and then cement both fuselage sides and u/a former F.2 in place, afterwards adding formers F.3 to F.6. When dry cement together the fuselage sides at the rear and add the remaining formers.

If a separate fuel tank is to be used, this should be cemented firmly in place at the rear of F.1, between the engine bearers and level with the jet assembly of the motor used. Be sure to fuel proof this bay thoroughly. The upper and lower surfaces of the fuselage are now covered in 3/32 in. sheet ¼ in wide being used to plank the curved portions. Cement the cowl sheeting temporarily in position and sand to shape, then remove the cowl and carefully make the cut outs for the engine controls. Several coats of dope will be required to prevent fuel seepage.

The nose fairings can, now be built up from 1/8in. sheet and sanded to shape before cementing in place. Add the 1/16 in. ply cowl ring and sand to a smooth finish before adding the wing and tail attachment dowels. The completed fuselage should be well sanded to a smooth finish. Several coats of sanding sealer are given, sanded down between each coat until a very smooth surface is obtained.

The u/c wire gauge is quite heavy for a model of this size and being short, this results in a very rigid unit, so a good pair of 2 in. airwheels is essential to absorb the landing shocks.

Wings. These are very easy to build, but care is necessary at the gull dihedral section. Commence by pinning down the spar and leading and trailing edges of one wing half and cement all the ribs in place as far as the centre section. Now add the wing tips and upper spars and cement in position the ply dihedral braces for the centre section.

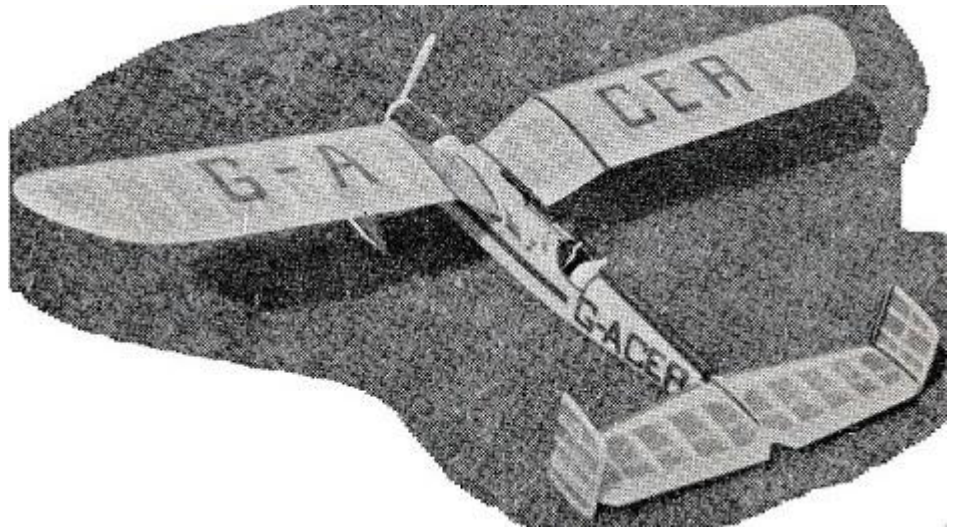
Remove the half wing from the building board and cut at the dihedral joint, cement in position the dihedral braces and carefully check that the dihedral is correct. Trim the L/E to fit flush with the 1/16 in. sheet wing L/E covering and cement all gussets firmly in position.

Cover the wing panels with 1/16 in. sheet as indicated and add capping strips.

Build the other wing half in a similar manner and join together at the centre section, cementing the ply dihedral braces securely in position. Sheet cover the centre sections top and bottom with 1/16 in. sheet and sand the wing to a smooth finish, carefully checking for any faulty joints. The fairing blocks can now be fixed to the centre section to give a smooth wing to fuselage joint and the final sanding of these is done with the wing held in position..

Tailplane. This is built flat on the drawing board and no difficulties should arise. Pin down all ribs, capping strips, sheeting, etc., to the building board to prevent any warping of the structure. The two fins are built from 3/16 in. sq. and scrap 3/16 in. sheet balsa—one on top of the other. When completely dry they are separated and sanded to a streamline section. The whole tail assembly is doped and covered with jap or lightweight Modelspan tissue.

General. The wing covering should be given three or four coats of clear dope and the tailplane assembly two coats. If jap tissue is used six or more coats can be given on all surfaces and the resulting finish is really good and tough. However, the



structure of Gullie is quite strong enough to take silk or nylon covering, should you desire

Now the model is ready to fly, but certain details such as a machine gun, to give that little bit of extra character and individuality, could be added, while the open cockpit simply cries out for a dummy pilot Flying. Add weight to the nose if necessary to bring the C/G to the correct position, then test glide until a shallow glide (turning slightly left or right) is obtained.

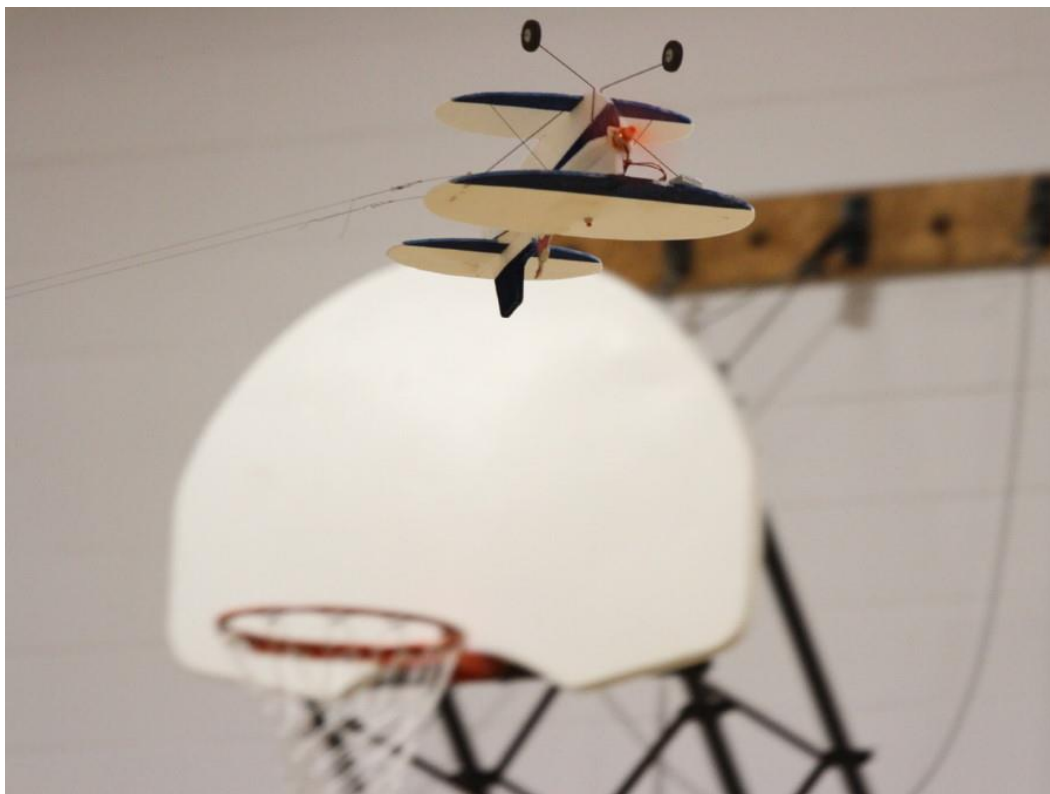
The first power flights should be made on a calm day, engine running slowly and with about a 10 sec. run. If a turning tendency is evident, adjust the rudder very slightly to open the circle out a little, as on full power it will tighten up considerably, although power turns in either direction are quite safe. The engine power can be gradually increased, but the engine run should be kept to around 15 secs, as Gullie climbs very fast and will a full fuel tank, especially as the glide is extremely good – almost of contest standard in fact – so do not forget your address label!

## From Christian Moes - Indoor Control Line - Part 1 of 2

During the cold winter months here in Northern Ontario, Canada, two local clubs (Soo Modellers and Far Valley MFC) fly get together each week in a local school gym for indoor flying. We have just finished our fourteenth season, the most recent venue being Boreal School in Sault Ste. Marie, Ontario. We are a "small" group of 6-10 aeromodellers each week. Although our primary interest has always been R/C, we have also enjoyed freeflight, RTP, and control line models from time-to-time over the years. My control line micro "Phantom Mite" was a notable success enjoyed by clubmates way back in 2012, and was published as a "Free Plan" in Quiet & Electric Flight International (this magazine now long gone). There are pictures of these models on the Soo Modellers website and a video on my YouTube channel "FarValley" (see links below)

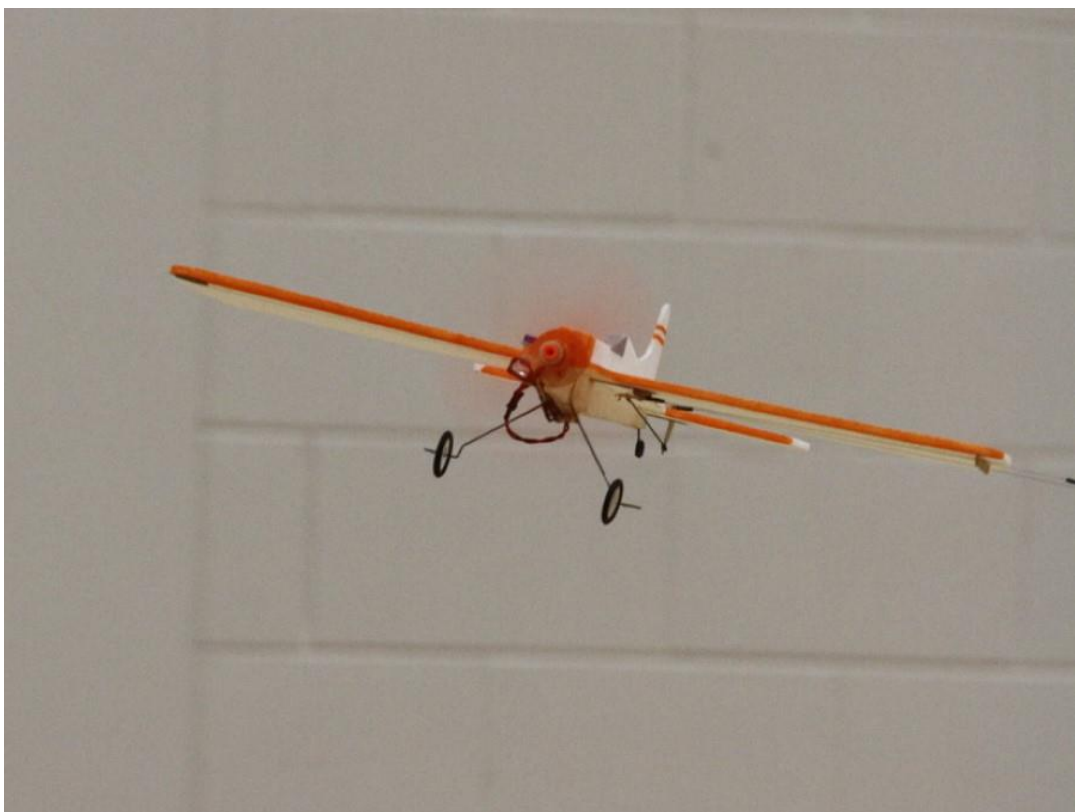
With a rekindled interest by the Far Valley club members in control line flying (outdoors) over the last few summers, including some "dizziness" training, we agreed to try our hand at indoors this season. All our models are powered by small brushless outrunners, with brushless ESCs, 250mAh - 400 mAh 2S LiPo batteries, and controlled by Hubin C/L flight manager/timer. We especially like the features of the "FM-0c" model - which includes a delay that provides time to walk to your handle before startup (no assistant req'd). These devices also have throttle speed compensation, which nudges the throttle setting forward occasionally to compensate for the slow decrease in battery voltage. Nice! The indoor models are EPP foam sheet - 9mm & 4mm - very difficult to obtain these days. Many thanks for the help of my UK "connection" John Stennard!

Indoors, we are using 6.7 metre lines (22 feet) - which gives adequate clearance to the walls, but if you fly higher than approx 45 degrees, a ceiling strike is likely - and is not pretty - especially when the model falls back onto slack control lines line with the prop spinning. We have tested this a couple of times. As the models are made of EPP foam, they are not easily damaged, but some patience may be required to untangle the lines from a stalled motor. Just sayin'!...



The first two photos show my "oversize" 17 inch span EPP "Breezi Bipe" - designed by the legendary Ray Malmstrom many moons ago. The only design change was to move the motor (thrust line) down a bit from the top wing down to the upper fuselage. I added some carbon fibre bracing - but no interplane struts (per

original). With its biplane wing area, the model has a slow flight speed (6 second lap time = 25 kph) and is very aerobatic. Inside loops are tight, outside loops somewhat larger, and flies inverted just fine. The outside wing is noticeably high while upright and flies low while inverted, this being a function of bellcrank location, which is under the top wing per the original design. It could be corrected by moving the bellcrank down to mid fuselage, but not sure if it's worth the effort. The model has sufficient line tension upright and inverted. And there's no breeze to contend with.





The next three photos show a "full size" 22 inch span model with outlines based on the vintage Frog "Chimp" kit. 4mm EPP is used throughout - including the flat plate wing in lieu of the built-up balsa & tissue original. It's an excellent flyer. Very smooth control, and suitable for beginners - except for the speed perhaps. With a lap time of 4.3 seconds (35 kph), dizziness can be an issue for the uninitiated. Funny thing.... I don't remember dizziness being an issue when I was a kid! Although the Chimp is a fine flyer, no aerobatics were on these short lines and low ceiling. Outdoors, I'm sure loops are possible. For both of these models, the throttle adjust has been set to the lowest setting (65%) to limit the flight speed.



Our last photo shows Earl Turner's foamboard "Midwing Special" semi-scale model. Designed to fly outdoors on longer lines, this is a much heavier and faster model than the aforementioned "indoor" EPP models. It would be foolhardy to fly this type of model indoors in a small gym by "conventional" means - that is to say, standing in the middle of the circle. What's needed of course, is Earls' crazy radio controlled control line robot!!! To be continued next issue...

All photos by Peter Smith.

Links:

YouTube Channel: <https://www.youtube.com/user/FarValley>

Soo Modellers website: <http://soomodellers.ca/>

Breezi Bipe plans (Outerzone) [https://outerzone.co.uk/plan\\_details.asp?ID=4290](https://outerzone.co.uk/plan_details.asp?ID=4290)

Frog Chimp plans (Outerzone) [https://outerzone.co.uk/plan\\_details.asp?ID=6883](https://outerzone.co.uk/plan_details.asp?ID=6883)

'till next month, Chris

### **From Eric Clutton in response to Jetx Article**

Hi James .... I was amused by John Salmons discussion about Jetex RTP. I think we went one better in the old Five Towns Club in Stoke . We were meeting in a room over a pub in Tunstall and the pub was being run by the parents of one of our younger members. The Cox . PeeWee glows were very popular and readily available at hat time so we constructed a pole and flew the Cox powered models (mostly built out of sheet balsa) indoors,, hiding behind upturned chairs and tables. We soon discovered that if the models were slightly over elevated they would 'zoom' around, so a new pole was made with a double head so that two models could be flown together, both over slevated and producing indoor unmanned combat ! This was accompanied by much further hiding behind furniture and a good few fly-like splats on the walls ! At a later date when we were meeting in a room in the more sedate municipal buildings in Newcastle U Lyme we changed over to electric power fed by a 12 volt car battery and flew scale models, carrier landings plus combat because we now had throttle control by a rheostat on each wire to the twin head pole. Great fun indeed ! R. Gordon with the C/L job looks like it could be Ray Gordon who was a prominent member at that time but I may be wrong. I am 92 now myself so Ray may no longer be with us ! ERIC.

Photos sent by Peter Renggli taken at the 2017 MG Bern Antik Flugtag.  
Photos by Urs Brand and Peter Ziegler.













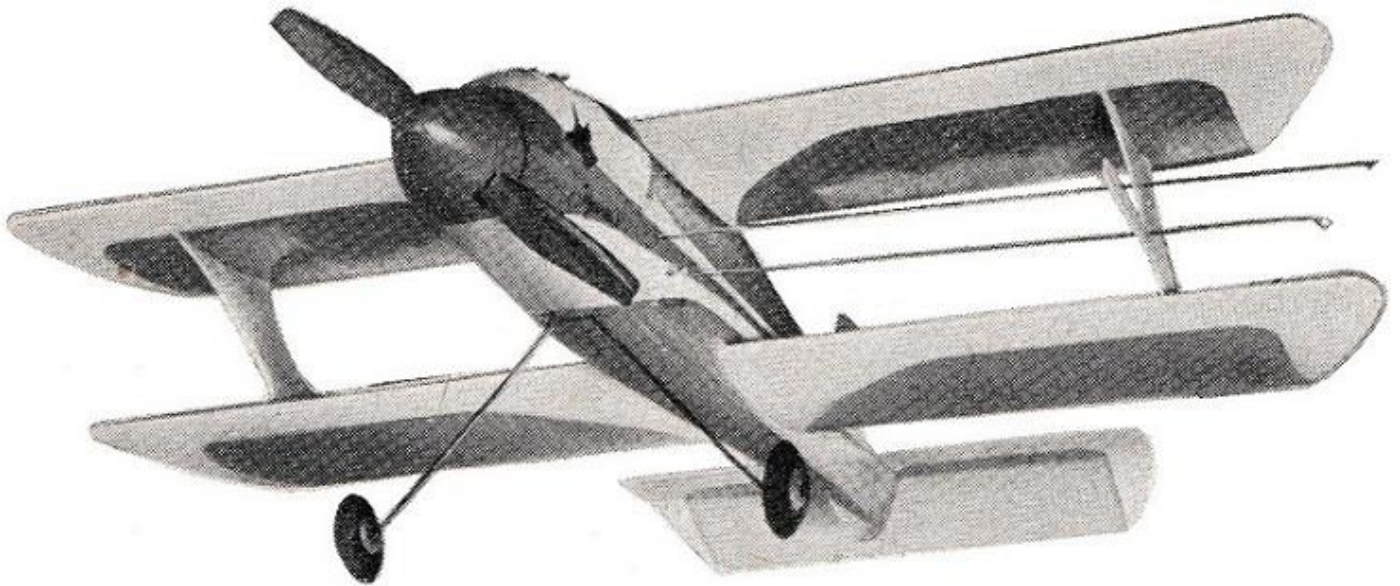








## Yoicks by J W Coasby a 450 sq in biplane stunter for 10 cc engines from Aeromodeller October 1949



Interested in the monoplane versus biplane stunting controversy, impressed by Henry Nicholls' performance with his de Bolt Bipe and H. N.7, and encouraged by the advent of a beautiful new shining Fox 59 from America, the designer set about designing himself a real stunt bipe capable of all the manoeuvres of the original oozlem. With a Fox in front—well, obviously it had to be Yoicks and so this attractive machine materialised. Construction is all balsa, simple but sturdy, and the finished weight with the Fox was only 2 1/2 lbs. However, any 10 c.c. engine will take it through its paces and the plan is drawn for a Nordec even with which the weight should still be under 3 lbs.

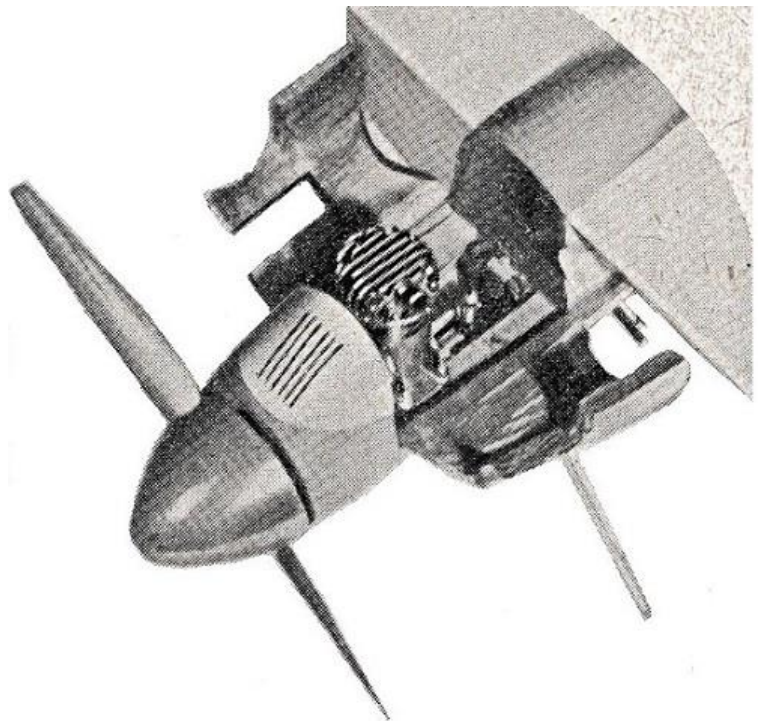
The cowling question was settled once and for all by a neat arrangement using baby brass hinges for the flaps, and spring steel clips locating on wire or gramophone needle pegs as the snap-shut fixture. No trouble was ever experienced with shutting this cowling or keeping it shut in flight.

The model as might be expected flies fast and long lines can be used without fear of any tendency to turn in. Seventy feet lines were originally used, but eighty to ninety feet will give considerably less armache. Very sensitive, the model will perform anything in the book plus extras, but is none the less easy to handle for anyone with average stunt experience.

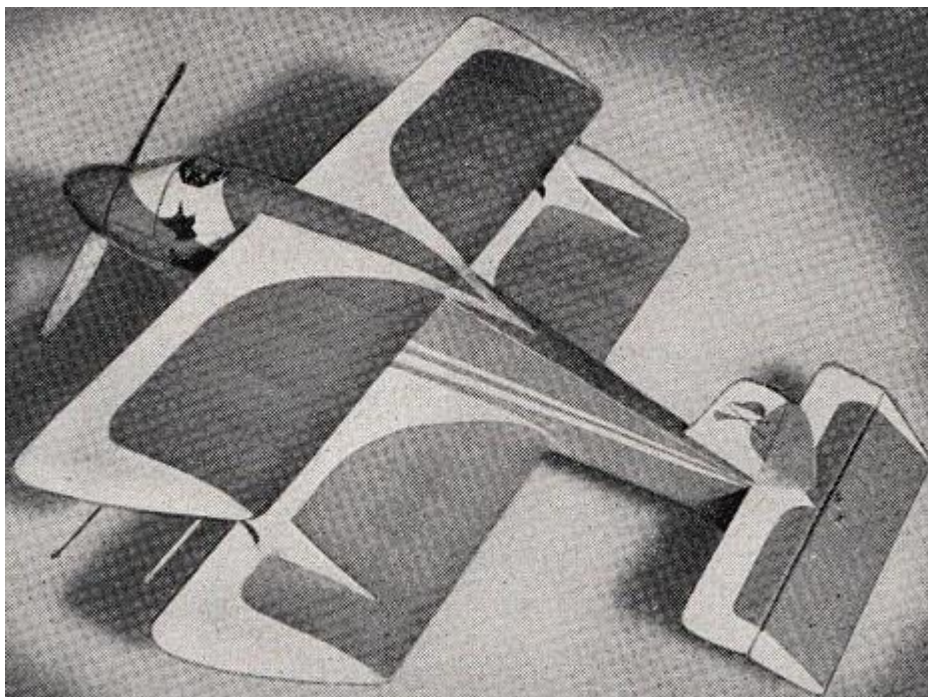
A special feature of the design, laminar flow wings were used after reading some notes of H.J.N's on the subject—and a truly amazing glide is a characteristic of this model which it is often felt the section should perhaps take credit for. The model was designed with a fully fixed undercarriage to comply with the

S.M.A.E. rules, as it seems silly to learn a model's characteristics without an undercarriage, then equip it with one for a contest only to find that the model's behaviour is distinctly different.

Take offs are a joy to behold, and many a time the model has been airborne before it was placed on the ground—one almost places it in the air and watches it carry on from there !







Being so fast it is wise to bold the stick hard back and let it get right off and up before levelling out, as otherwise a slight overcontrolling on take off will tip the model straight in; which is bad for airscrews.

Warning: Don't use this or any other fast heavy model on a U-Reely as the brake on the handle won't usually stand it—the lines suddenly jerk out and comes disaster, witness Yoicks' untimely end at Aldermaston earlier in the year.



Harry Hundleby and John Coasby

## From Jörgen.

Hi James sending you some Pic,s of my latest the Mini Ballerina short kit from Douglas Wass the model weights 208 grams single channel and a RedFin 0,20 diesel one of few models that I have covered with film??





## From Mervyn Tilbury

Hi James. Below are two photos of my latest creations - the first one (four shots ) is a City Slicker electric powered , and the other photo is a Southerner Major constructed as a glider . Both models are currently covered but I'm waiting for warmer weather to add the finish and test fly, hopefully ready for the first Cockelbarrow meet .

I only have one set of wings and tailplane assembly as both models have the same designed wing and tail , therefore less components to carry to the field .

The Southerner has an air toe release built into the nose and I was inspired to build it after watching John Woodfield 's slope soaring videos on the Devon and Cornwall coast.





**Carrying on from last month the last 12 Days of Christmas photos sent by Peter Scott originally included in smaller size issue 157**



***8 more diesels***





***10 Mighty Atoms***



***11 British diesels***



***12 vintage sparkies***





I've kept adverts for events in S&T however your guess is as good as mine as to whether they'll go ahead or not so use your initiative here as to attendance etc I expect formal cancellations for some if not all will be proclaimed or banned by Govt.

I spoke to Tony Tomlin earlier and he thought that the July meeting at Cacklebarrow may well be cancelled. Best to check that events are going ahead before you travel.

**Please note that Totton indoor as run by John Hook is cancelled**

**COCKLEBARROW**  
**VINTAGE RALLIES**

**5th July 2020**  
**16th August 2020**  
**27th September 2020**

All types of R/C up to 1975

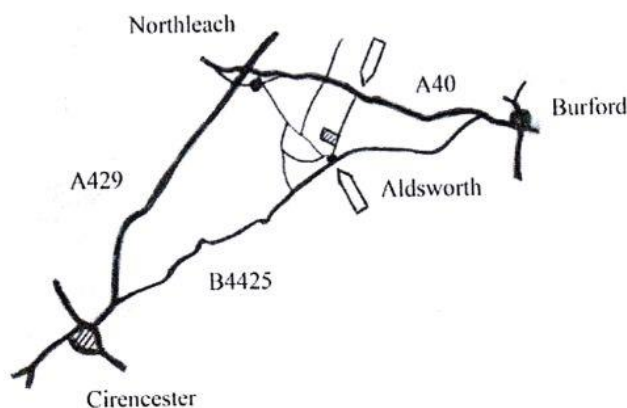
BMFA insurance essential, [A certs. not required]

Camping on field, [no facilities]

Contact - Tony Tomlin

02086413505 / email [pjt2.alt2@btinternet.com](mailto:pjt2.alt2@btinternet.com) / 07767394578

Signposted from Aldsworth, Glos. off B4425 between Cirencester/Burford  
and off A40 between Northleach and Burford [follow SAM 35 signs]



**North Cotswold MAC from Gray**

Last year, the North Cotswold MAC turned 70 years old. We'd hoped to celebrate our anniversary at our popular annual Fly For Fun event in August at our field at Moreton-in-Marsh, Glos.

Unfortunately, we chose the wettest and windiest weekend of the summer and we reluctantly had to cancel the show.

In 2020, we're hoping to have better luck with the weather by holding not one but **two** Fly For Fun events!

The first will be on Sat/Sun May the 16th and 17th. Regular camping & facilities will be available. Our informal fun comps for this weekend will be:

On the Saturday, Own Design models and on the Sunday, a Slow Pylon Race!

The second will be on August 8th and 9th.

Further details on both events to follow.

*Shilton events 2020 from Boycott Beale*

*Hi all. These are the dates for our fly ins*

Weekend ~ 16<sup>th</sup> 17<sup>th</sup> May vintage

11<sup>th</sup> 12<sup>th</sup> July E soar

12<sup>th</sup> 13<sup>th</sup> Sept vintage

As before any fixed wing electric models on the Saturdays with the Sundays for the designated model class.

Campers / caravans as before welcome on site from mid day on the Fridays till Monday.

## **INDOOR F/F MEETING**



Waltham Chase Aeromodellers, in association with South Hants Indoor Flyers, are pleased to announce the continuation of the Indoor F/F Meetings held at the Main Hall at **Wickham Community Centre, Mill Lane, Wickham, Hants PO17 5AL**. These meetings will be held on the following dates:

**Tuesday, 7th. April 2020**

**Tuesday, 5th. May 2020**

**Tuesday, 2nd. June 2020**

**Tuesday, 7th. July 2020**

All meetings will run from 7.00 p.m. to 10.00 p.m. The Main Hall at Wickham Community Centre is particularly suitable for indoor free flight models of all types, with a ceiling free of obstructions. Tables and chairs will be available in the hall, the organisers are always grateful for assistance with moving furniture. A hot drinks machine is available on site.

Admission to the meetings will be £5 for fliers and £1 for spectators, whilst accompanied children will be admitted free. Junior fliers will be charged as adult spectators. Fliers will be required to show proof of insurance. No R/C models may be flown at these events.

Flitehook, who carry a large stock of indoor models and accessories, will attend many of the meetings.

Waltham Chase Aeromodellers look forward to welcoming all indoor F/F fliers to these events.

For further details please contact:

Alan Wallington, "Wrenbeck", Bull Lane, Waltham Chase, Southampton, Hants. (Tel. 01489 895157)

(e-mail: [WCAero@outlook.com](mailto:WCAero@outlook.com))

or see our web site: <https://wcaero.bmfa.org>

## **Notice from Belair**

We have excess stock of some items and would like to give them free to model builders working in the health and emergency services, as a very small token our appreciation for their selfless work, especially at the moment. Please include our email - [sales@belairkits.com](mailto:sales@belairkits.com) and ask them to contact us. I do not require proof of their occupation, as I am sure that no low life would take advantage of this offer. We do have limited stock, so will stop the offer when it runs out. Leon.



*Belair Kits - The Name to build on ...*



## 1939 Korda Wakefield

Ref: ot-39kor

A parts kit for the famous 1939 Wakefield Winner.

The Belair kit includes wing ribs, fin outline, stab ribs, motor mount, ply wheels, fuselage sheet. Just add a plan and strip.



This kit is only designed for the Bob Jones plan available from Mike Woodhouse.

Price: £30.00 Inc VAT

33.00 USD | 35.51 EUR

## Bazooka Parts Set

Ref: ot-bazpk

A great performing rubber job that will do well in Mini-Vintage comps. Good wing with sheeted leading edge. Quick to build.

Price: £15.00 Inc VAT

16.50 USD | 17.76 EUR



## Magician Stunter inc plan

Ref: ot-magcl

**Parts set and plan for the Magician** designed by J Silhavy published in Technical Model Specs - 48in span for 40 size engines

Includes all shaped balsa and plywood parts, such as fuselage sides, doublers, wing ribs, shaped and notched spar, tip shapes, upgraded 3/16" tailplane and fin/rudder, ply bellcrank mount, plus smaller items.

Full size plan included. Builder to supply stripwood and other items to complete. 3 inch bellcrank and leadout kit available below.

Price: £55.00 Inc VAT  
60.50 USD | 65.11 EUR



## Lofty Lady Parts Set and plan

Ref: ot-loftlad

The **Lofty Lady** is a **52" span cabin model**, originally designed as the smaller Loftie Lassie by Vic Smeed. The design has been redrawn by Andy

Brough and is presented as a Parts Set containing all the shaped balsa and plywood parts, such as fuselage sides, wing ribs, tip shapes, bulkheads, formers, dihedral braces, gussets and many smaller items required to build the basic airframe. Builder to supply stripwood and covering. Full size plan included.

The Lofty Lady suits 1 to 1.5cc engines and single channel radio assist and is exclusive to Belair Kits.

Price: £45.00 Inc VAT  
49.50 USD | 53.27 EUR



## Spook 48 Parts Set and plan

Ref: ot-spook48

**Parts Set and full size plan for the Spook 48.** This model retains all the unique characteristics of the original including the gull wing.

The parts set includes all the balsa and plywood parts to build the basic airframe, such as formers, bulkheads, cowl sides, wing ribs, gull wing dihedral braces, tail and fin parts, shaped spars, tip shapes for wing, tail and fin. The gull wing is not too hard to build and the plan guides you on how to build it strong and quickly.

Saves hours of tedious cutting, just add stripwood to start building today. 48" Span for small i/c engines or electric. Our model uses an Enya 09.

Price: £50.00 Inc VAT  
55.00 USD | 59.19 EUR



## Contact us

Our opening times are Monday to Friday 9.30am to 5.00pm

**PLEASE NOTE** - Between 4-5pm, an answering service may sometimes take calls during our busy packing period. We hope this does not cause any inconvenience, please leave your details and we will call back.

To contact us please use one of the following;

By phone : 01362 668658 or International 00 44 1362 668658

**By post** : BELAIR, 86 HOLT RD, NORTH ELMHAM, NORFOLK NR20 5JS

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