MEADOW FLYER

The Newsletter of the
Oxford Model Flying Club
https://oxfordmfc.bmfa.uk

July 2021

It's a brisk, sunny, April morning on the Meadow and the chaps are in deep discussion about the technicalities of modern transmitters.
Mark Howe: *"What does that switch do?"*
Simon Burch: "*Search me mate*".

In This Issue

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Chairman's Chat
Bob Lee

With the easing of lockdown we are no longer limited to groups of six and Members have been making good use of the Meadow and the patch in particular. More about the patch later. We have also been able to resume our meetings at Begbroke and, at the time of writing, have held the first two of these, all of which is good news.

BBQ – Wot BBQ?

However, due to the delay in the latest stage of the relaxation of COVID restrictions, we have delayed the planned BBQ until **Sunday, 5th September**, from 12 noon to 4pm (make a note in your diary). The format will still be as planned, with food and drink (we will have a bar), and of course, weather permitting, flying on the Begbroke field. It's an opportunity to bring some of your lockdown builds for others to admire, and a chance to just get together and chat again. The food however will be a buffet rather than a BBQ, since it was felt that this was easier to arrange and doesn't place so much effort on just one or two people. By all means bring along your 'significant others' and families. MF's editor threatens to host some low key, fun competitions but refuses to tell us what the classes are, or indeed the Rules!

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As I said, the patch has been getting good use and as a result, we made the decision to invest in a new mower. My thanks to Gary Law and Phil Kilby for the work they put into identifying the best mower for our needs and especially to Gary for help in mowing the patch. However . . .

It seems that a member of the public has reported to Natural England that we are mowing an area on a Site of Special Scientific Interest (SSSI). Although we have been mowing a patch since 1969 and Oxford City Council are well aware of what we are doing, we've never had formal agreement to do this. The upshot of this is that we have had to make an application to Natural England for 'assent' to continue mowing the patch.

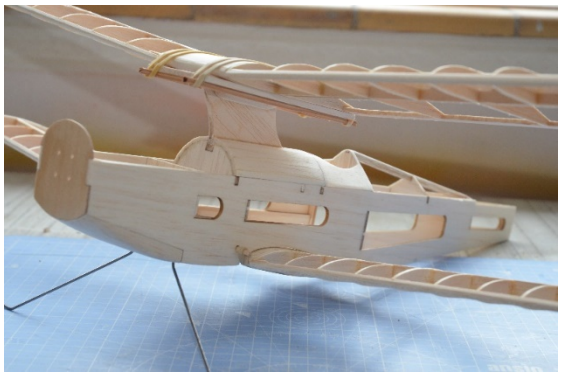
We do have the support of the Council, so hopefully this will just be a formality. In case you are wondering what's so special about Port Meadow, it's that the Creeping Marshwort (Apium Repens) grows there; an unremarkable plant that grows in wet ground which is grazed and trampled by horses and cows (does that ring any bells?). It is listed as being 'critically endangered' and grows only at two sites, both of them in Oxfordshire, Port Meadow being the most important. Fortunately, our patch is on a very dry area and the plant has never been known to grow there.

I would like to thank all of those who have been mentoring and assisting new Members on the Meadow. Having myself been on the receiving end of such assistance, I have to say that such help is invaluable and saves a lot of early disappointment. I have been to a couple of Wednesday evening sessions and it's been a good group of mainly new members making good use of the facilities and help. I know the Meadow is also being used by the free flight community, but I haven't had the opportunity of late to get involved here.

In the last MF we put out an appeal for someone to help re-vamp the website, and as a result three members offered to help! Chris Brainwood stepped up first and he has done a brilliant job of bringing the site up to date. Many thanks for that. The look and feel of the site is unchanged, but all the content has been rewritten by Simon (Burch) and myself, and Chris has refreshed the photo gallery. In future we'll ensure the site is kept up to date and will provide a valuable source of up to current information. If you haven't looked at the new site, it's at https://oxfordmfc.bmfa.uk/

You will also have seen that we have made some changes to the Club Rules and Constitution. These are in force now but will need to be ratified at the next AGM. The most important change we have made (by popular demand) is a relaxation in the times for IC flying on the Meadow, you may now fly IC on any day of the week, with the only significant time limitation being on Sunday. Easy to remember, they are:

Monday to Saturday – 10:30 am to Sunset Sunday – 1.30 pm to Sunset



As for my personal activities, my build of the *Meadow Lark* is progressing (see photo right) and there is a report on this later. I have (temporarily) moved over from free flight to the ranks of the RC community (I will be back**!**). This is partly because of some knee issues that would have prevented me from chasing around after a free flight model and also because I thought it was time I made an effort to fly RC. I bought and assembled a *Multiplex Funnystar* electric glider and am getting to grips with this.

As for free flight I have almost finished some repair work on two electric models: my Tomboy and a 36 inch Lanzo Record Breaker, and I hope to be out on the Meadow with these soon.

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The Editor's Bit

David Lovegrove

It's recently been brought home to me that those of us who have been in this glorious hobby for umpteen years can become quite blasé about the knowledge we've accumulated. It's so easy to forget just how valuable this resource is and, more to the point, just how great the knowledge gap when you're just starting out in the hobby!

New OMFC member Aubrey King and Simon Burch discuss glider tactics at the BVH

It's also notable that we now have a growing number of multi-rotor pilots – far more than at any time in the Club's history - the statistics revealing that around 25% of our members are either principally or partially active in Multi-Rotor craft. That came as a surprise! (confession time: even I have had a dabble!)

We should celebrate this diversity. Ours is a broad church and there's plenty of room within it for each and every modelling discipline. Our unparalleled asset is, of course, Port Meadow, which has been a major factor in the recruitment uplift. Added to that, the Committee's and, more recently, the BMFA's efforts to open our doors to a category of model flyers we couldn't previously accommodate has been a significant component.

In the latter half of the last century(!) the Oxford Model Flying Club's membership basically comprised freeflight (FF) and a relatively few RC power flyers. Before that, there were no electric models; no foamies; no micro RC and certainly no multi-rotor craft. We've come a long way from there . . .

Indoor Scene Mapping with Small Monocular Drones

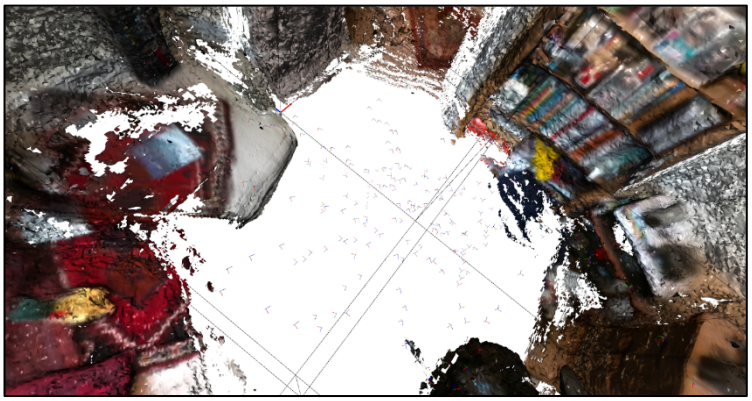
It's been great to see that several recent new members have an interest in flying multi-rotors. As you'll have seen elsewhere, we've been making some changes to the club rules to make it easier for people to fly them on Port Meadow. It's clearly a great flying site, and as the club moves to embrace multi-rotor flying as an additional flying discipline, we're very keen to encourage anybody who wants to take it up and to get them out flying on the Meadow as soon as we can. More broadly, we're also keen to encourage our multi-rotor flyers to play an active role in the life of the club and as such, it seemed as good a time as any to write a drone-related article for Meadow Flyer.

In this article, I want to share a bit about part of the project I've been working on in the University's Computer Science Department, where we're looking into using drones for indoor search and rescue in confined spaces. The focus of the article is on how the drone can build a 3D map of the site that it can use to help it explore the scene.

For a number of years now, drones have been used to build maps in a variety of environments, ranging from urban areas to archaeological sites to underground tunnel systems. However, the drones used for these tasks often rely on multiple cameras to perform depth estimation. This tends to increase the cost, weight and size of the drone platform involved, and this leads to problems when working in tight, possibly populated indoor environments.

Large, heavy drones are not well suited to navigating through confined spaces or operating in close proximity to people, and this motivates the use of much smaller drones such as this *DJI Tello*. However, because of the much more constrained payload such drones can carry, they tend to be equipped with only a single camera, and this makes the process of depth estimation (a key part of the 3D mapping process) much harder.

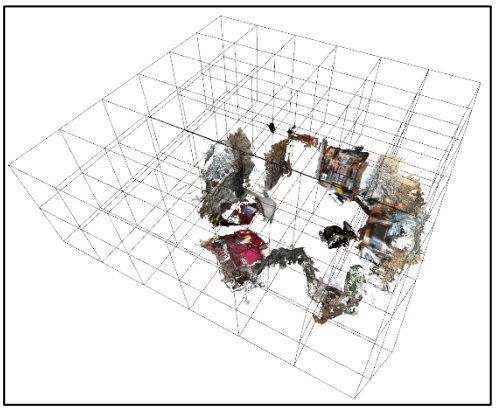
One solution to this, at least in static scenes, is to use a technique called Structure-from-Motion (SfM). This is where you save some of the images observed by the camera as *keyframes*, and then use them to estimate the depth of the scene from the current position of the camera by triangulation. This is usually more accurate than trying to estimate the depth using only a single image, as there is more information to work with.



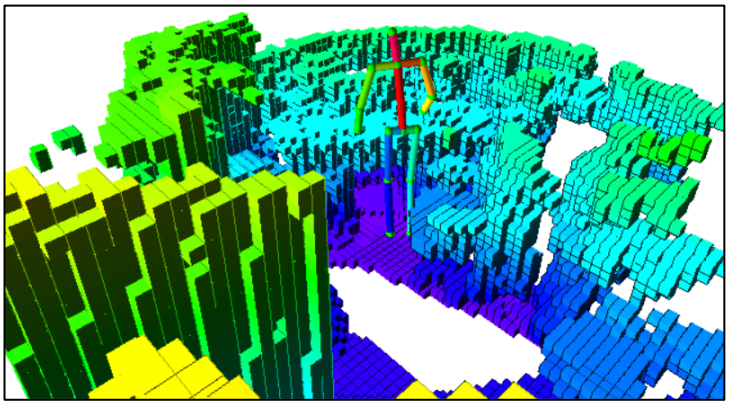
Keyframes seeded throughout the space (the little coordinate axes around the gridlines in the middle of the room show their locations and poses)

However, this simple description glosses over a number of issues that must be tackled if you want to make a system that actually works in practice. To triangulate against the keyframes and estimate the depth, you first need to know the poses (that is, the positions and orientations) from which the keyframes and the current image were captured by the drone's camera. Then, you also need a way of choosing *which* keyframes to triangulate against. The triangulation process itself can then be done in a variety of ways, some being better than others. Finally, the whole thing can break down if people start moving around the scene within the view of the camera.

In my system, the poses of the keyframes are obtained by using a monocular camera tracker to track the camera as it moves around the scene and storing the poses alongside the keyframes for later use. The pose of the current image can also be obtained from the tracker. With a monocular tracker, the scale of the scene is ambiguous (that is, you don't have enough information from a single camera to work it out), so in practice I'm having to estimate it by briefly flying the drone up and down in front of a special marker at the start of the flight.



A typical map of a 3-D scene



A hybrid map showing a person standing at a desk

Choosing the keyframes against which to triangulate is a bit fiddly in practice. It boils down to scoring all of the available keyframes based on a couple of suitable criteria and picking a good one. The details are beyond the scope of this article but do ask me sometime if you're interested.

The result of triangulating against the keyframes is a stream of depth images as the drone moves around. Using the poses provided by the camera tracker, these can then be fused together to make a 3D map of the scene.

Dealing with people moving around the scene remains a little tricky with this approach. One way to deal with this is to detect the moving people and remove them from the images, leaving only the static bits of the scene. The detected people can also be added back into the scene for visualisation purposes, as shown in the figure.

That was a bit of a whistlestop tour, but it does cover most of how such a system works. Please feel free to get in touch if you'd like any more details, or if you'd like to join me for drone flying on the Meadow sometime! Stuart Golodetz

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A DIY Control Liner – Andy Blackburn

I think the first model aeroplane that I ever saw was probably a Keil Kraft Phantom on Heath Common in Wakefield, sometime in the 1960s: I was probably 6 or 7 years old. Much later (maybe 1976/77) I built a Warlord combat model from a Pegasus kit and – rather unwisely - used it as a control-line trainer. It survived, just about, but I was never a very good pilot. Fast-forward several decades and having seen Alan Trinder's recent presentation on Zoom, I'm now thinking about trying control line again, after nearly 50 years (!)

Electrickery is probably the way to go these days and my first thought was to get hold of one of Den Saxcoburg's power electric systems which run at about 100-120W on a 7" prop (somewhere between an A.M. 10 diesel and an early PAW 1.49) and fit it in a Keil Kraft *Phantom*, plans for which are available on Outerzone. However, Den pointed out that this might not be a good idea and so did our esteemed newsletter editor, who described it as "small, somewhere between a trainer and a team racer" and for good measure mentioned its "lack of wing area and consequent high wing loading"! *(Did I really say all that? Moi? Ed.)*

The venerable KK Phantom C/L classic

Luckily, I can easily identify a subtle hint when it's delivered with a mallet, so started thinking about something bigger and slower, with a built-up wing. At some point the idea of designing something myself began to surface, and the more I thought about it, the more attractive it sounded. There was, however, just one problem; over the years, I have designed various Radio Control and Free Flight models, but I have *never* designed a Control Line model before. Basically, I had no idea what I was doing – not a clue!

Basic Configuration

Still, where would we be if we let a small thing like lack of expertise stand in the way of progress? I wanted a model that would serve the dual purpose of renewing my Control Line experience that could also later be used for stunt flying, so as an initial gambit I looked on Outerzone. I found a few 1-1.5 cc stunt models and took some measurements:

Model Name	Wing Area (Sq. Ins)	Tail Area (Sq. Ins)	As % Of Wing	Approx. Tail Vol.
Elf Cat by J.H. Bailey	184.2	33.4	18.12	0.37
Rascal by R.G. Moulton	139.7	29.5	21.15	0.39
KK Gazelle	163	20	12.27	0.19
Averages	162	28	17	0.32

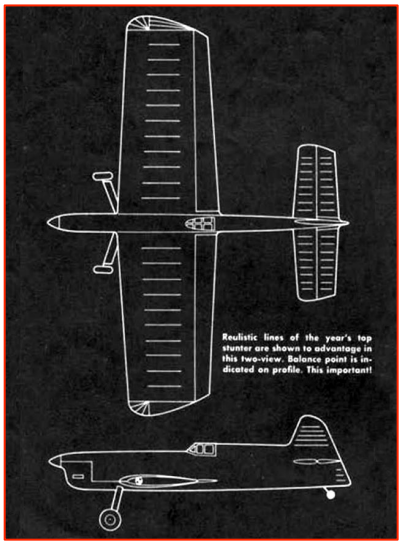
Most people will know what tail volume is, but, for those who don't, it's defined as:

Tail Volume = (Tail Area/Wing Area) X (Tail Arm/Wing Avg. Chord)

and it's useful because it takes account of the tailplane position as well as the area. Models with similar tail volumes will usually tend to have similar amounts of longitudinal stability, so it's a number that's worth paying attention to. Those average values provided a decent starting point.

It seemed wise to think about a tail volume that was at the upper end of the sample group (so, around 0.4) and hope that the model's small size would help it around tight corners. Also, should it have flaps? I really wanted to fit them but decided that, on balance, coupled flaps were too much of a complication at this stage. However, if I was careful with the wing design they could probably be retro-fitted.

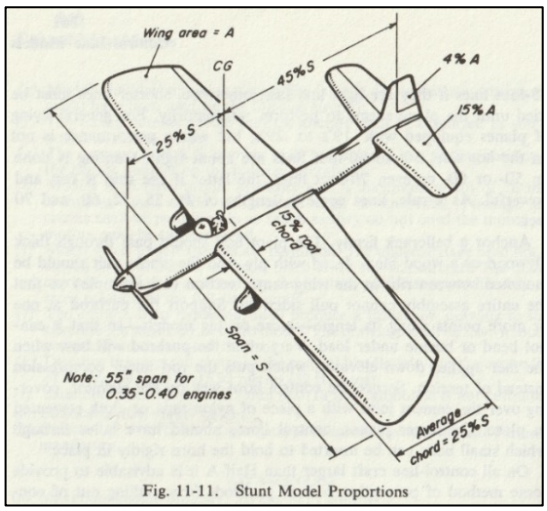
And after some consideration, the wing area was increased to about 180 sq inches on the basis that it might slow the model down a bit, and wouldn't do any harm.



So, how to proceed with the design? Well, bearing in mind that I still didn't have a clue what I was doing, taking a leaf out of the "Cargo Cult" school of design seemed to offer some promise, The classic stunt design is probably the George Aldrich *Nobler* (see image right), which dates from 1951. It was kitted by TopFlite and later used in modified form by Bob Gieseke and others, so I acquired a 2-view of the Nobler from the May 1952 edition of Model Airplane News (Outerzone again), imported it into TurboCAD and began laying out the top view.

It was at this point that I remembered that I had a copy of Howard G McEntee's "The Model Aircraft Handbook" (Reference 1) which was first published in 1968 and can usually be relied upon to provide sensible guidance. It had a rather nice sketch showing the accepted proportions for a control line stunt model, as well as a number of detail sketches which were very helpful.

Re-scaling the proportions for a wing of about 180 square inches demonstrated – helpfully – that the "recommended" proportions were very similar to the Nobler, so I increased the stabiliser area to get the tail volume up to about 0.4 and went with that.



Stunt Model Proportions – from The Model Aircraft Handbook by Howard G McEntee

Detail Design

Power and Wing Loading I'm afraid I haven't really got any metrics for wing loading or power loading – I haven't got a clue what will work! It looks as though I'll just have to make everything as light as reasonably possible and hope for the best.

Line Length I'm not sure about the length of the control lines. I don't want to use overly short lines because aerobatics will be more difficult (manoeuvre size will be constant, but space available increases as the lines get longer) so about 40' is probably reasonable.

Asymmetric Wing Planform Some larger aerobatic models have a longer inner wing to offset the weight of the control lines; I'm not a great fan of this and in any case it seems that many designers of smaller models don't bother, partly (I guess) because the lines will be shorter and therefore lighter.

Airfoil Section Obviously, as this is an aerobatic model we'll be using a zero-camber airfoil and I really have no idea what would be suitable, other than to guesstimate that a 17-20% thick section (ignoring the flap) is probably about right as it seems to be roughly the same as most other aerobatic models of this size, and it'll allow quite a lightweight structure.

There's a YouTube video where someone talks about stunt model design and claims that he's previously drawn around the edge of his shoe to get a decent airfoil, but I picked one from one of the many plans that I'd been looking at and "adjusted" it slightly to fit – it's probably as good as any for a first attempt.

Important Design Parameters There are a number of design parameters that act together to ensure that the model is safe to fly and which really have to be set to "safe" values, but about which I have – unfortunately – very little idea! They are:

1. Engine offset 2. Rudder offset 3. Wingtip weight 4. Bellcrank size 5. Bellcrank position
6. Elevator size & throw 7. Leadout wire position(s)

Engine Offset I found "The Control Line Aeromodeller" (Reference 2) on the RCLibrary website; it has this to say: "Some people prefer one or two degrees of engine offset (i.e. right thrust) to aid line tension, and others do not think it necessary", which is not that useful. On balance I'd prefer to cancel most of the torque that's rolling the model inwards towards the pilot, so the design has 2 degrees right thrust.

Rudder Offset Reference 2 says that "A certain amount of fin and/or rudder offset is usually built in during construction and this is not a critical factor". I settled on "A small amount".

Wingtip Weight No real clue about this one - I'd guess half the weight of the control lines as a starting point, but modern control lines seem to be lighter than lightweight laystrate lines of old so this might not be very much. The outer wingtip therefore has a weight box so that the correct "sit" in the air can be sorted out experimentally.

Bellcrank Size Luckily, Reference 1 has some basic control system parameters; this is extremely useful because it tells us how much elevator movement is advisable for each inch of leadout movement and if we follow these guidelines the model should be reasonably flyable.

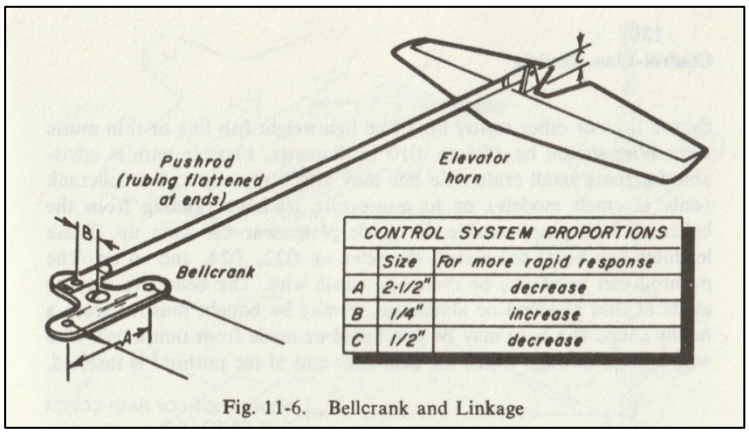


Fig. 11-6. Bellcrank and Linkage

Doing the sums with this (or just drawing it all out on a sheet of graph paper), it seems that the above setup will produce just over 30 degrees of elevator movement for every inch of leadout wire movement.
However, I don't think it's going to be possible to use a full-size bellcrank (simply because it doesn't look as though it'll fit), but a 2" Micro Mold bellcrank from Den's Model Supplies looks OK – it will still generate about 30 degrees of elevator angle for each inch of control movement, so everything should be fine when our highly skilled and expert newsletter editor performs the maiden flight… ☺ (?!-Ed)

Bellcrank Position It's fairly obvious that the bellcrank must be mounted quite close to the c.g because if it's too far away the model will tend to yaw as the centrifugal force increases, which we don't want too much of. Also, since we don't want the model to yaw inwards towards the pilot (!), the bellcrank pivot really ought to be behind the c.g.

So, how close is "quite close"? I don't really know and it'll probably be affected by the weight of the model, but a short survey of the three example models above does provide some guidelines:

Elf Cat c.g. is 0.58” ahead of bellcrank pivot; Rascal c.g. is 0.73”; Gazelle c.g. is 0.96”

The average of these is approximately three-quarters of an inch which doesn’t sound unreasonable, so I went with that.

Elevator Size & Throw To be completely honest, I haven’t a clue. However, most stunt models seem to use a very large elevator, around the 50% mark, so I went with that. Looking at some of the example plans it seems that a typical elevator throw for this type of model is about +/- 30 degrees; that’s good enough for me.

Leadout Wire Positions It was suggested that adjustable leadouts were a good thing because they were “helpful in ensuring the model won’t attempt to assassinate you!” – very reassuring!
In accordance with reference 2, the front leadout was initially set to exit slightly (circa 0.5”-0.75” for this size model) behind the c.g., with the rear leadout no more than 1” behind that; this is supposed to be a “safe” set-up and will be adjusted during the trimming process to give the model the right sort of feel (i.e. weight) on the lines.

Miscellaneous I won’t bother with an undercarriage as I am reliably informed that Port Meadow requires at least 2.5” wheels which would look a bit silly.

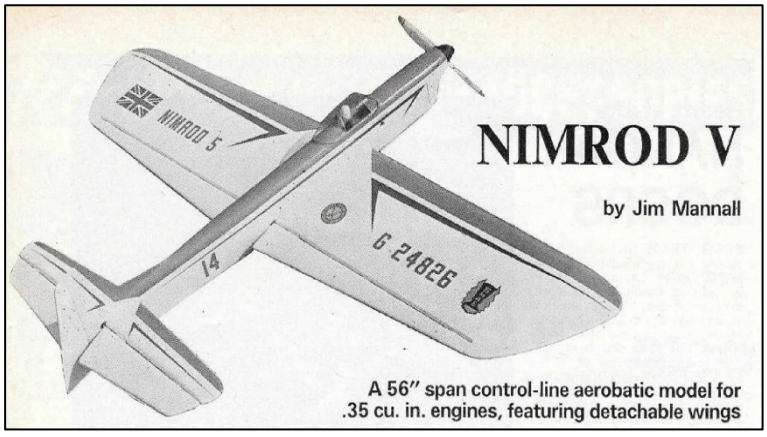
Structural Design A brief survey of similar models provides some useful guidelines. Kit model structures are particularly useful as they are more likely to produce a robust model, but on the other hand, it has to carry a dirty great flight battery, so the structure needs to be as light as reasonably possible. The list below comprises my final choices for the wood selection.

Fuselage: Sides – 1/16" sheet, 1/16” nose doublers : Longeron(s) – 1/8”x3/16” & 1/8” sq : Formers 1/16"-1/8" sheet. Firewall 1/8" liteply : Top & bottom - 1/16" sheet

Tail surfaces : 1/8” sheet

Wing Leading edge - 1/4" sheet : Spars - 3/16" sq : Trailing edge - 1/16" sheet top & bottom : Fixed Flap - 1/8" : Ribs - 1/16" (2” to 3” spacing) : Centre section ribs sheeted over 1/16" ply bellcrank bearers

<u>A Small Matter of Style . . .</u>

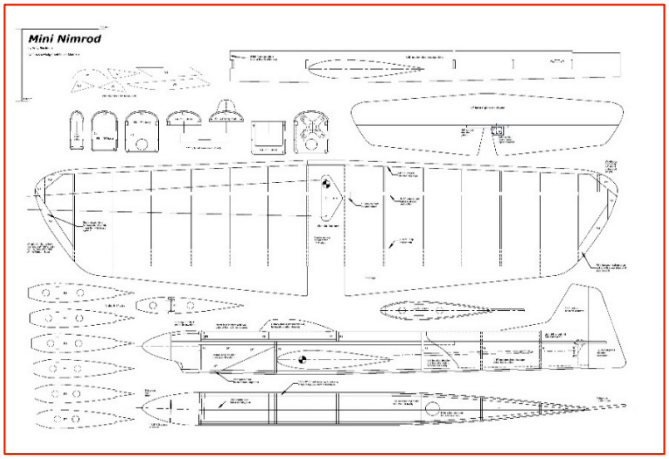


I suppose I could make my DIY Stunter look like an overgrown Keil Kraft Phantom, but that would require elliptical planform wings and stabiliser to do the job properly which is non-trivial with a built-up wing. However, there is another – highly deserving – candidate . . .

I started buying “Aeromodeller” in 1972 and some of those magazines made a deep impression on me. Some people may remember Jim Mannall’s Nimrod V aerobatic model in the September 1972 issue, and it was – I think – the first aerobatic CL model plan that I’d seen in print. I thought it was a very attractive aeroplane and if I’d have been able to afford a Merco or Fox 35 I’d have wanted one; but I couldn’t so had to lust from afar. I’ve been lusting after Control Line Stunt models ever since.

Meadow Flyer

I have therefore made my DIY Stunter look a bit like a reduced-size Nimrod V; it's not a perfect match because it's a smaller model and there's a minimum width to accommodate the battery and motor and the smallest generally-available spinner is 1 1/2" (38mm), but I like to think that it looks sort-of-similar.



Summary As a rank amateur, I've managed to complete the entire design process with reference to very little mathematics, which you don't really need if I'm honest. Let's hope it flies . . .

I should like to express my grateful thanks to David Lovegrove and Alan Trinder for reviewing the design and providing much valued advice.

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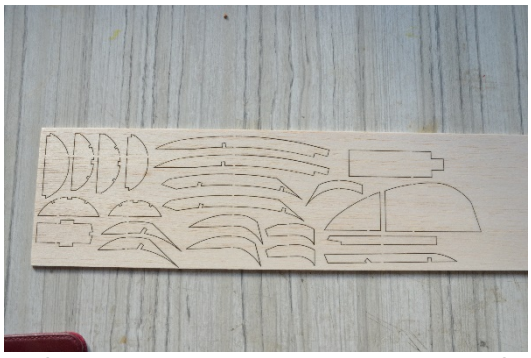
Our *Fluggruppenfuhrer* Bob Lee has been busy, giving the lie to his own question: "*surely I'm not too lazy to cut some bits of balsa out?"* So what's the answer? Read on.

The Laser Cutting Experience

My current project is a one-and-a-half times version of the Tomtit biplane from the Frog Senior range. The original model has an 18 inch wing span and is rubber powered, my new version has a 30 inch span, is electric powered and called the Meadow Lark. When I started the project it was always my intention to have a set of parts laser cut, if for no other reason than to find out what is involved, so the intent of this piece is to recount the custom laser cutting experience.

Let's start at the beginning. Why have a set of parts laser cut; surely I'm not too lazy to cut some bits of balsa out? No, I'm not and have done it many times in the past. One of the big advantages of laser cutting is that it no longer matters how complex the parts are. This means that you can make a lot of use of what I'll call 'tab and notch' construction. So, for example, rather than have a fuselage former simply butt joined to the fuselage side, tabs on the edges of the former engage with notches in the fuselage sides. This ensures that the former is in the right place, gives a stronger joint and to some extent ensures that the former is at right angles to the fuselage side. OK, you could do all of this by hand cutting but then the issue would be accuracy. This only works if everything is cut very accurately, if not you would spend a long time, 'tweaking' things until they fitted. Provided the parts have been drawn correctly, a laser cut set are all going to fit. Anyone that has built one of the Vintage Model Company kits (and if not, why not?) will be very familiar with this type of construction.



I started with the wings but despite using the 'tab and notch' system, did actually cut all the parts by hand. The wing has a full depth main spar with half depth notches and the ribs have matching half depth notches. The ribs also engage with a notched trailing edge. This means that you can assemble the

complete wing ‘dry’ then run around all the joints using Super Phatic, all very simple. A future wing built this way would be laser cut.
It was when I got to the fuselage that I decided it was time to move to laser cutting. There is a lot more to the fuselage than the Frog original with lots of cut-outs in the sheet sides and a fair number of complex formers. This is all to make it much more rigid than the original and provides a removable top hatch to allow access to the electronics and battery. The model also has removable wings which the original did not. I drew the whole thing up using Draftsight and, to reduce the costs, made everything that I could from one wood size, 3/32(2.4mm). Having completed and checked the design I then copied all of the parts that I wanted laser cut over to a separate file and laid them out on a standard size balsa sheet, taking care of course with the grain directions. Actually, it took more than one sheet, I had to use about 1/3 of a second sheet. This actually worked out well since I had included the fin and tailplane parts as well and having these on the second sheet meant that I could specify this to be a lighter grade of balsa.

So, time to get it laser cut. SLEC advertise a laser cutting service in Aeromodeller but there is nothing about it on their website. I email them, attaching .pdf files of the laid out sheet, at this stage not knowing if they would be interested in a one off job or what the costs would be. To my surprise they replied the next day with some very reasonable costs (these are all ex VAT):-

Two sheets of 3/32” Balsa: £4.90; Cutting Cost: £13.50; Set up £5-50; Total Cost £23-90
They requested the files in .dwg format, which I send and then phoned them with my card details. I also ordered 6 sheets of balsa at the same time to make up my stock. Actually, I just checked the invoice and there was no postage cost, I assume that’s because the total order came to £65.

Two days later I found a three-foot long package waiting by the door. I hurriedly unpacked it. What can I say about the laser cutting other than the fact that it was first class. The wood was some of the best balsa I have seen and the cutting was excellent, no excess burning, all the parts cut through but nothing fell out of the sheet before I cut them out. I couldn’t have done better. But would the parts all fit?

I’m glad to say that the answer was yes, all the parts fitted perfectly. The only errors I had made were of omission. One of the formers should have been two off but I only put one on the cut sheet. In a few places I left off some cutouts such as for the tailplane seats in the fuselage sides. These where things that were all easy to fix and I changed the drawings for every problem that I found so that any future sets of parts will be correct.

Was it worthwhile? Yes, but it does very much change the design process. Had I been cutting the parts by hand, I would probably have drawn up a part of the model, built that, then drawn up a bit more, etc. Drawing and building would have progressed together. However, since it’s laser cut and you want to get all the parts cut at the same time to reduce the costs, you have to complete the design before you can do any building. Not just complete it, but check it, check it again, give it a final check then walk away from it for a few days before a final, final check. No point in getting parts cut that are wrong.

One thing to bear in mind was the low setup cost from SLEC. This was because there was very little for them to do. I had laid all the parts out on the balsa sheets and supplied the .dwg CAD files. If you send them a .pdf of a plan and ask them to cut the parts, there will be a lot more work for them and a higher setup cost.

Currently the model is just about ready for covering. Assuming that it flies OK, then the next challenge will be to see if I can get the plan onto four A3 sides. If I can then I'll write it up for Aeromodeller with hopefully a laser cut set of parts available from SLEC.

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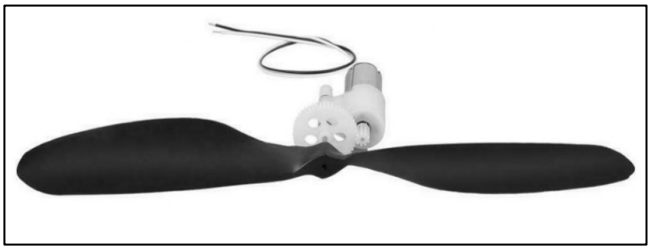
This is a turn-up for the book! Andrew Longhurst (below), dedicated rubber man that he is, is newly-converted to the joys of capacitor power. Here he delves into the arcane mysteries of Electric-powered FF and comes out smiling!

Capacitor Cameron

Jim



(Paton) waxed lyrical about capacitor power for free flight outdoors, having got his scale *15 Bis* canard scale model to fly. Under his influence I purchased this geared electric motor, complete with 5ins prop, very cheaply via Ebay. Next, I bought two of those 10mf super-capacitor thingies which I soldered together in parallel and found the essential small slide switch in a workshop drawer.

I tried the set up first on an old 25ins *Aryda Student* and that proved there was sufficient power and furthermore demonstrated the incredible simplicity and convenience of this power system. It operates on just 3 volts and can be charged in less than 1 minute just using a couple of dry batteries wired in series. The only extras you need are a bit of wire and a small soldering iron.

"CHEESE PROPSHAFTS"

Problem was that every time it landed it bent the prop shaft which is made of 1mm diameter cheese – and it ain't no cheddar either! Our pal David Bull referred me to an old Aeromodeller where the best layout is

shown on a foamy photo. The caption is not very clear but it seems to be the *Farad* by our own Bob Lee. This layout protects a pusher prop and is therefore just great for cheese prop shafts.

The plan was to build the pusher fuselage to utilise the *Student* wing but along the way I realised that unless we had a very long nose we would have a CG problem requiring the evil of nose weight.

The problem is that the weight of the motor unit is perforce on the TE (trailing edge of the wing) and the capacitors weigh next to nothing so they can't provide much help. In a blinding flash of genius, I saw that swept back wings would be the answer! Furthermore, that I had such wings in the *Cameron* 24 incher which is a great flyer (plan from Outerzone). Holding my breath, I put them on and whoopee, they just cleared the prop by a few millimetres. A super light single surface tailplane helped as did putting the Tomy timer in the nose. CG ended up at 50% of the chord at half the span.

Out on the field Jim scoffed at the need for a DT installation as this power system is most often used for feeble indoor circulation. Well, it flew off the board and with some tiny shims of Gurney strip on the fin it flew nicely. Eventually I got round to charging it up to the massive 3.18 volt maximum and we were shocked as it roared off in a vertical climb clipping my fingers with the prop as it did so! Must remember to hold it by the extreme nose in future.

It went on to produce a climb similar to the 24ins rubber job the wings came from but these capacitors keep the prop ticking over for ages after the thrust has gone and this reduces drag. Also, the fuselage is only 6mm wide so it's all very slippery and the least bit of lift has it wafting up to join the clouds. So, DT absolutely essential.

As an eleven year old in the late fifties I saw Fred Militky (of Graupner and *Silentius* fame. Ed.) realise my dream of electric flight, albeit with fiddly saline batteries and a motor I couldn't afford. Then at the turn of the century we went out with cheap Mabuchi motors and NiCad batteries and I could fly electric too although the power was marginal. Now, electric flight really comes of age with power to spare and a system wonderfully cheap and as simple as falling off a log.

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To round Andrew's article off, I couldn't resist including these photos he sent, depicting him in various moods and poses, with assorted props - live and otherwise. Make up your own captions and send them in (be kind, please). Ed.

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All Done And Dusted

Now is the winter of our discontent made glorious summer by this release from Lockdown . . . or words to that effect (with apologies to the Bard of Avon). I've been out on the Meadow quite a few times this year, flying variously freeflight, RC and Control-Line. The latter has been in company with our Plucky Pensioner, Alan Trinder, the two of us playing Silly Buggers in with our 1954-vintage *Kan-Doo* 2 stunt models. I'd like to say my c/l skills are getting back to what they were when I were nobbut a spotty teenager but, even if I could, it's really not saying much . . . One thing that has helped is the amazing ability of this little model to (mostly!) keep the lines tight, even in the dodgy overhead areas where I can't see it!

And I take my hat off to our Club Secretary, Gary Law, Chief Patch Mower, for his sterling work in producing an unexpectedly good surface out there on the Meadow. He's given us much to be grateful for, unlike the contrary efforts of the Meadow's equine and bovine contingent who insist on leaving us the copious deposits evidencing their perambulations.

Cow-and-horse-poo apart, I'm always reminded of those wonderful East Anglian "Big Skies" that seem to stretch into infinity. The Meadow is a huge open space and we are privileged to have the Oxford City Council's gracious and exclusive permission to use it. We must never forget that it's a Site of Special Scientific Interest (SSSI), and a haven for wildlife, most prominently skylarks and, to my great surprise one recent evening, a quail doing its distinctive "Wet-My-Lips" call nearby.

I say nearby, but these little members of the pheasant and partridge family are skilled in the art of ventriloquism, so it could have been anywhere within a couple of hundred metres of the patch! Not a lot of people know that.

Nevertheless, it was a nice "tick", as we birders say.

Fly safely and enjoy the Summer. David