

Smoke Trails no 23

Roger Simmonds

8 Orchard Way, Offord Darcy, St Neots

Cambs PE19 5RE

rsimmo@globalnet.co.uk



A few *Smoke Trails* back (ST 13) I featured the plan of the Keil Kraft Fiat G.80, and wondered why the instructions were in both English and Italian. A *KK* advert, *Aeromodeller*, July 1954, where the G.80 took pride of place (see above), resolves this puzzle. The advert claims: "The G.80 [was] produced in response to requests from our Italian customers, but we are sure that you too will enjoy building this sleek model". This accounts for the bilingual instructions (*AM* complained these lost some of the usual standard of instructional simplicity) and why the kit was comparatively rare in the UK. *AM* reported, on what evidence I do not know, that it was a 'grand flyer', but Richard Crossley found his slightly reduced version quite tricky to trim and needed extra dihedral to prevent the dreaded 'spiral dive of death'.

David Dodds asks some pertinent Rapier-related questions in his letter to the editor (published elsewhere in this issue). Here are some (hopefully useful) answers:

1. There always was an issue with the quality control of Rapiers, and David's experiences are not untypical. The major problems are associated with substandard cases and uncertain fuel specification. David (in conversation) suggested that gaps in the inhomogeneous packing allow the formation of voids that fill with 'blow torch like' gases.

Without L2 motors, our jet fleets are all but grounded unless we 'reverse engineer' them for a Jetex 50. As I have said before, in the days of eBay and the like it is possible to build up stocks of old motors, fuel and accessories to last at least a couple of flying seasons. Trading in all things Jetex can be done most conveniently via Internet websites, but I am happy to act as a 'Clearing House'. However, for those now used to the convenience of Rapiers, all that waiting for motors to cool down, cleaning, reloading etc will have become quite irksome! (See Howard Metcalfe's observations later).

2. Sprinkle any ground up Jetex pellets and chips around the roses. Putting them in motors is not a good idea, as the rate of burning and hence thrust will be very variable. At best the flight pattern will be even more unpredictable than usual, at worst the motor will burst and destroy your model.
3. I hope Ryan Lever of *Powermax* will take advantage of the niche vacated, temporarily we hope, by Rapiers, but the Jet-X range of motors will need better engineering and the quality of the newly developed fuel maintained. This will need a substantial investment of course – not easy to justify in these uncertain times.
4. Electrical ignition of Rapiers is now quite popular and the necessary tool can be bought from SAMS. They work well with L1s and L2s, but may need a longer filament for L3s. It is perfectly possible to replace the batteries and filaments of this light and convenient medical cautery tool (don't ask) so don't worry too much about the initial cost.
5. Howard Metcalfe too has long championed the use of Depron, and Chris Richards uses Depron in both his profile and real models. John Darnell's Midge could be modified – Depron in the wings and fuselage shell, for example – and lighter model result, but the motor would need to be mounted externally. Tony Betts' replica of the original flew very well with an internal L2, so I'm not sure the tailplane needs to be enlarged.
- 6 A 'flat bottomed' 10% section at the root tapering to 8% at the tips seems to work very well at our typical model sizes, wing loadings and speed of flight.

Rounding up the nose to give a 'Philips entry' seems to do no harm either – my Skyleada Hunter flew splendidly – but don't forget to incorporate at least $\frac{1}{16}$ " washout on those swept back tips.

Some of the smaller Jetex Tailored models like the Voodoo and F-100 sported a 'flat plate' wing, but the later ones like the Hunter and Skyray had built up wings. The real 'problem' with these models was that they were rather small and heavy. Recreating them in Depron is an interesting option, but the motor would have to be external.

As to useful decals/transfers for our latest prides and joys, Hannants is always a good place to start. They also sell blank decal sheets that are compatible with ink-jet printers and I use these all the time.

Troubles with Reynolds Numbers



Steve Bage has some pertinent observations about the Conover-Lippisch Jetex deltas (ST 21):

"The extract from the 1951 *Model Airplane News* is very interesting. As you say, it does cast doubt on the 'lightness is all' approach (which generally I subscribe to). In defence of this, may I point out that Dr L was referring to *reflexed* airfoils which, it is now recognised, don't work well at very low Reynolds Numbers (Re). The problem is that a 'separation bubble' of stagnant air forms in the hollow in front of the reflex so air moving over the upper wing travels over the 'bubble' and doesn't 'see' the reflex. The model behaves as if there was no reflex and dives into the deck. The solution Dr L discovered was to fly the model faster so that the 'bubble' gets 'blown away'. I ran into what I believe was the same phenomenon on my Me163. Calculations implied it had enough reflex, but these were based on airfoil data collected at 'normal' Re. At low Re it did not work as expected and I had to add more reflex with trim tabs".

Steve's Me 163 flies beautifully, better than the original *Aerographics* design on which it is based, and one hardly notices the acetate trim tabs.

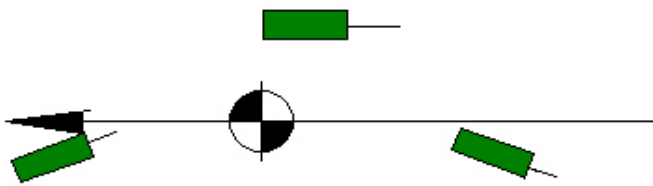
Left: Steve Bage's Me 163. The Eppler 325 (root) and 270 (tip) airfoils were designed for tailless gliders, but not for ones this small!

Steve, as usual, finished his model superbly (middle), but as is the nature of things, it grew some excrescences during trimming (bottom).

I'm not sure if this phenomenon (airfoils behaving badly at low Re), is partly to blame, but Steve's 'Wingding', his derivative of the original Jetex Flying wing, appears somewhat trickier to trim than its larger progenitor. All the original Jetex Flying Wings I've heard of fly wonderfully with L2s of any rating from LT to HP: in contrast, a number of flyers have found that all their Wingdings really (I mean really) want to do is loop. Most strange. Initially, both Steve and I thought this was perhaps a case of 'too much power'. Steve comments:

"One factor may be the high thrust [80 mN or so] of the mid-2008 vintage L1 motors. One remedy (assuming one has no lower thrust motors) would be to increase the height of the pylon a little. The wingding is very sensitive to small adjustments, so maybe try initially a 1/8" packing piece between fuselage pylon and motor tube and work from there. Raising the front of the motor (nozzle pointing down) should also achieve much the same thing".

Hmmm ... somewhat counter-intuitively, raising the **nozzle** end 1/16" or so was found to be an effective cure. This (I thought) was the equivalent of putting in upthrust, but this may not be the case: it all depends, where the cg is, horizontally and vertically.



Right: The cg of the Wingding is perhaps not where Steve (or I) thought it was, at least in the vertical plane

I am indebted to Howard Metcalfe for this diagram. Note that all positions and angles of motors give downthrust.

So, if you find your Wingding is prone to continuous looping, a little packing under the nozzle end will work wonders. Mind you, some of the L1s last year had barely enough thrust to keep a Wren in the air – probably be just right for a light and efficient Wingding!

Back to the Future?

Howard is less than enthusiastic about going back to Jetex motors (though I note he has been surreptitiously building up his supplies just in case he has too). He writes:

"There was a big jump from Jetex to Rapiers, but we soon got used to it. Having been spoilt by the cleanliness and rapid turnaround of Rapiers, going back to Jetex-type reloadables that require cleaning and messing about with is probably no longer an option for most of us. When Rapiers first came out I thought them a little pricey so homed in on the L1s which I (being an old skinflint) thought gave the best value for money. But I have slowly got used to the idea of buying a batch and then trying to forget about the price, even when pals on the flying field josh me about throwing money away. When several flights end up in the grass shortly after launch who can blame them? But then, that is what makes achieving good flights so thrilling: you always know how close you were to disaster, and, having just 'wasted' say £5 smoking in the grass, that last perfect flight becomes a thing of wonder. Nevertheless, some relief on the prices would be a boon and bring in more flyers".

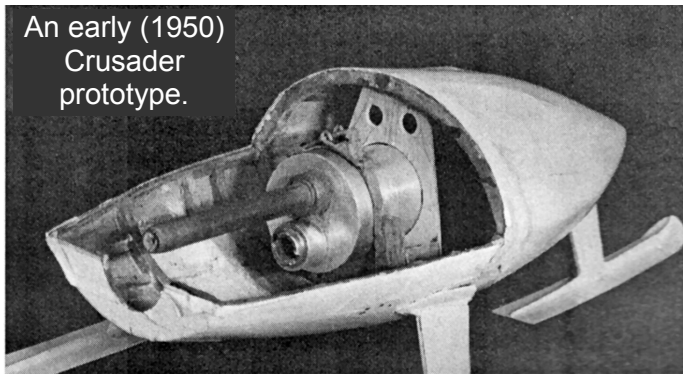
More Jetex Liaisons

The M7 Delta Flying Boat and the Zyra Spaceship were not the only collaborations Joe Mansour had with what could loosely be called the 'Entertainment Industry' of the age. Some of the memorabilia these liaisons generated are very popular with collectors; for example, a Donald Campbell/BP boxed set went for a tidy sum on eBay recently.



Right: Jetex/Sebel produced this attractive 'collectable' to coincide with Donald Campbell's successful speed record attempts

Andy Blackwell comments: "These models were really only toys, and bear only a rough resemblance to the CN7 car and K7 hydroplane. Being injection moulded plastic, they didn't take kindly to the heat of an Atom 35, and I've seen [expensive] examples with melting and charring after what could only have been one or two runs. Not good. Incidentally, Jetex planned a Crusader to tie-in with John Cobb's record attempt in 1952, but this was shelved when Cobb was killed on Loch Ness".



Jetex's involvement with John Cobb was more serious than just a tie-in with his record attempt, and began when Peter Du Cane, the Crusader's designer, asked Mansour for a motor to propel his early free-running prototypes. These, made locally by Vosper (see the example left), were actually quite large, and even a Jetex 350 was inadequate to propel them at the required speeds.

So a larger motor had to be developed. This is shown above, mounted in an interesting experiment that Vosper nicknamed the 'Egg'. The motor developed up to a pound of thrust, and enabled some useful, though inconsistent, speed/drag data to be generated. Some of the variability was put down to erratic thrust caused by the hygroscopic propellant. This, like other Jetex fuel at that time, was guanidine nitrate based and manufactured by ICI. Sorting all the motor-related problems out generated some acrimony between Jetex, Cobb, and ICI, who claimed the fuel hadn't been stored properly. The motor's reliability did improve, but du Cane turned to R. P. E. Westcott to provide a motor for his later (even larger) models. Their 'Water Baby' rocket used cordite and generated around 30lb thrust. It too, it is fair to say, was not without its problems. But that's another story.

Jim Free found the account above in 'The Last Crusader' by Barry Stobart-Hook, from which I purloined the nice Egg illustration. The last reference to Jetex in this splendid book confirms what Andy says: "Mansour, of Jetex motor fame, wrote saying that the model of the Crusader which he had intended to put on the market would not proceed, as he thought that in view of the accident, it would be in rather bad taste". A pity all round. Incidentally, the Jetex motor with a long orifice may well be the one Peter Cock tested in his early days at Jetex. This anecdote, first reported in the *(Jet) X Files 14*, bears repeating:

"It [the motor] was about the size of a starter motor for a big car. I remember a test run of this thing. They buried it in a big mound of earth and left about four inches of fuse hanging out. Somebody handed me a box of matches and said, 'Er . . . , Peter, go and light the fuse'. The others were all miles away hiding behind mounds of earth. Well, this thing was really frightening. It started with a faint whistle and a small plume of smoke and the whistle got louder and louder until it got to an ear-splitting screech and the mound surrounding it was all steaming. I was fully expecting it to explode any moment, but it didn't and it burned itself out quite safely. The jet was on a neck, a tube about six inches long with a nozzle at the end. This tube got practically white hot".

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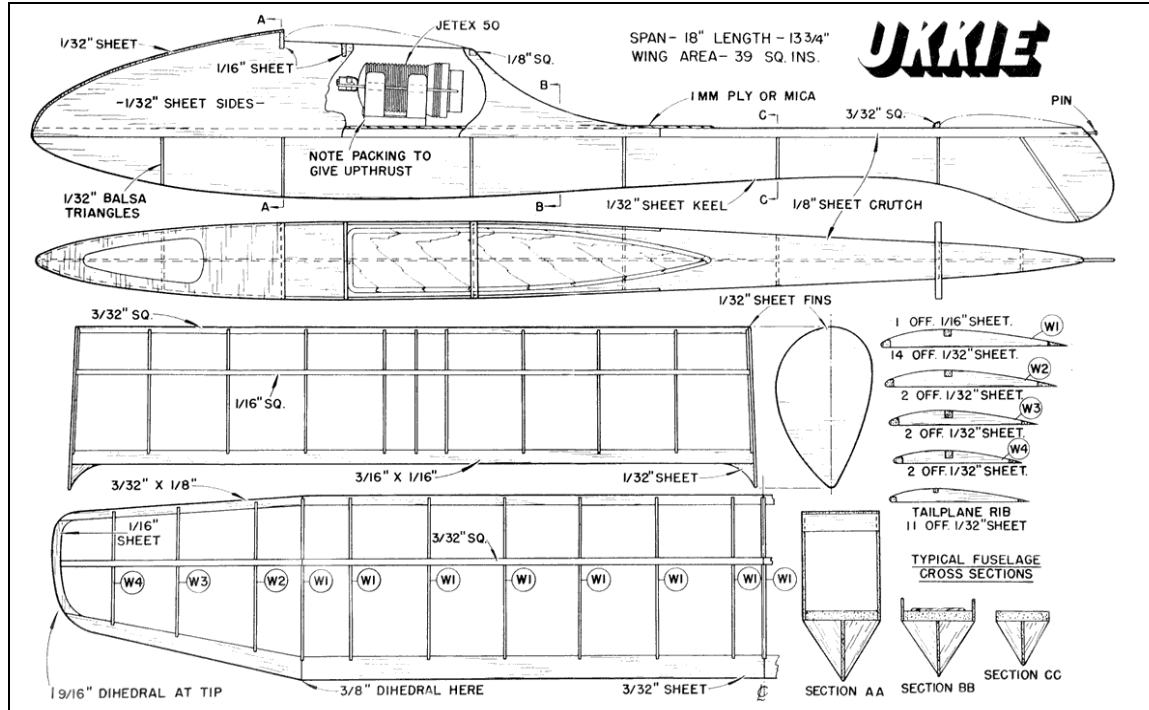
If Joe Mansour had qualms about marketing the Crusader, *East Anglian Model Supplies* didn't. I gleaned the advert (left) from a 1955 *AM*, but I'm sure it had appeared a lot earlier. Though not, we may hope, before the dust, or rather water, had settled.

Jim says the design is really quite nice, being 'built up', not 'solid'. It is, though, an odd model for Skycraft to have produced. Is there a story here?

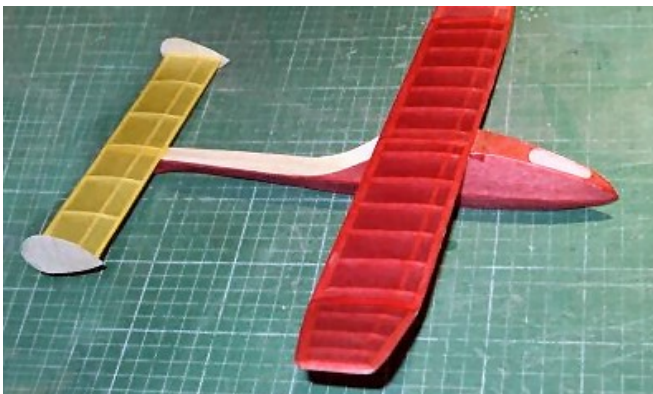


Skycraft were of course more famous for their 'solid' scale aeroplanes, not boats, even if it was a hydroplane. I'm pleased to see that jets were emphasised in this advert (left). Does any reader remember Skycraft (fondly or otherwise)?

Anyone for a Little One?



Chris de Vries' oddly-monikered Ukkie (it means 'Little One') appeared in the *AM Annual*, 1953. Note the Junoesque body and a motor mounted in a questionable square trough. It was anachronistic even then, compared to, say, Dick Twomey's Stiletto, but, like the latter's Twizzler, it is full of character and ripe for revival.



Fred Steer assures me the original went very well, so I was pleased when Chris Wellington, a C/L modeller stimulated to return to our FF roots after a visit to Mike Stuart's website, asked for advice about a Rapier powered replica. Good Advice is something I'm always happy to fabricate; fortunately Chris has been saved from this fate by Steve Price in the US, who has actually made and flown one recently (left).

Steve writes: "I mostly built my Ukkie according to the plan, using $\frac{1}{32}$ " almost exclusively for the ribs and fuselage. It was a relatively easy though time-consuming build, as I have multiple opposing appendages, i.e. I'm all thumbs with $\frac{1}{32}$ ". I was also quite apprehensive about trimming, but it all worked out in the end, with a straight glide from a light chuck, to almost a loop from a hefty throw. It flew well with both 'peppy' [80mN] and regular L1s [not L2s] and I managed a few nice flights. Two things: don't forget the foil behind the motor, which throws out a lot of gunk, and poke a hole in the bottom of the motor tube so you can use a piece of wire to push out the motor. Don't ask, I figured it out the hard way".

That last piece of advice is most relevant given (a) the variable diameters of Rapiers (b) Rapiers can swell with the heat in use. Commercial tubes can give a very tight a fit – even if you can push 'em in, you risk damaging the model trying to pull 'em out post-sortie!