# WATTS-AROUND ?

A modern Electric conversion of -


## DON STILL'S "STUKA STUNT"

This classic control-line stunt design had its origins as long ago as 1950 – just a few short years after WW2. Perhaps a curious choice of prototype for a championship-contending stunter, given its infamous rôle in the Spanish Civil War and elsewhere? Maybe, but being a Texan and I suspect also a noncombatant, perhaps it didn't have the same associations for Don? Who knows.

Whatever the case, the model was successfully campaigned in Budapest in the summer of 1960 and appeared as a large feature in the *Aero Modeller* in the January 1961 edition. A clearly-drawn plan served to inspire a certain spotty-faced, 17-year-old yoof, who immediately cadged a bit of leftover wallpaper from Dad and redrew it on the back, to the correct size. I can't remember much about the model that eventually emerged from my somewhat agricultural workbench in the garden shed, and I very much doubt it would have won any awards, but my word, I do remember that it flew extremely well! Unusually for me, it also survived the course, as I went on to learn various manoeuvres I'd previously only dreamed of and seen in magazines. Eventually, still undamaged, it was sold on to a school friend and I heard nothing more of it. I hope he enjoyed it as much as I did.

So, skip half a century and the arrival of re-inspiration to build a successor. Why so? Well, at the end of last year a friend from my teenage years (but after the control-line phase) John Mellor, proposed building an electric–powered, control-line **Midget Mustang** *(reported in a previous S&T article).* Just for the hell of it, you understand. I thought it would be fun to build something myself, to keep him company throughout the process and to have something we could compare notes on as we went along. But what to build?


**'Somewhere' in Oxfordshire**

A number of options were looked at and discarded for various reasons. Electrics demand a fair bit of space up front, so a generous nose-length is a "must", but unfortunately it's not the norm on most control-liners. Then I recalled the *Stuka* and wondered if it would do the job.

I enlisted the help of our good friend Derick Scott, who not only provided a nice copy of the *"Ambroid"* kit version of the model, but also other useful additional information in the form of the original *Aero Modeller* article and drawings. Ah! Sweet nostalgia! And yep, it looked a goer. A bit of research showed that the model's nose would have to be shortened a tad – one and a quarter inches/30mm would have be lost to take account of the slightly greater weight of the electrics. Otherwise, it all looked pretty straightforward.

Nearly time to attack the balsa but first, I needed to work out the best power train. What motor/battery? How much power would she need? How was I going to control it?

All this proved very absorbing and, as far as the motor was concerned, kept me in doubt right to the very end. There were one or two frustrations, largely self-inflicted, but I'm delighted with the outcome!

Following Mike Spencer's brave but ultimately drama-free maiden flight on the balmy morning of Thursday the 24th May, I took the handle and started re-living the summer of 1961. Priceless.

Mike, John and I now have a dozen or so electric-powered control-line flights under our collective belt. I don't doubt there will be a lot more to come.

One of the biggest problems, from my stand point at least, was that as a flyer of several other kinds of electric-powered powered models, both fixed-wing and rotary, freeflight and RC, I know what works. But there's very little information out there concerning electric control-line. That means that any attempt we made could have been marred by under-performance. Being a pessimist, and firmly of the opinion that you can never have too much power available, I found I was constantly revising my estimates, upward, as the time for flight approached. I think I was proved right.

So, from virtually a standing start, Mike, John and I have established our own ground rules for success. We've proved conclusively that this is not only the quietest and least antisocial way to enjoy control-line flying, but also that it's eminently practical for sport-aerobatics. And with more attention to weight control and refinement of the power train, it will do far more than that. After all, the RC world of competitive fixed-wing and helicopter aerobatics flying has seized EP technology almost 100%. It's now appearing in World-Championship Control-line as well. The power is there for the asking; no question (believe it or not, there's already a 1:1 scale, man-carrying EP sport aircraft flying successfully).

If anyone out there would like to have a crack at ECL, and would like to know more, we'd be happy to share our knowledge. It's not hard, just different.

**Stuka Stunt Model Details:**

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| **Length** | 32.75" |
| **Span** | 47.5" (1206mm) |
| **Chord** | 11.125" at the root; 8.75" at the tip |
| **Wing Area** | 466 sq.ins. (of which the flaps comprise 76 sq.ins) |
| **Tail Area** (*total*) | 87 sq. ins. |
| **Motor** | AXI 2814/12. A bit OTT perhaps, but has the flexibility to give a wide speed/ power band plus, of course, excellent mechanical strength and build quality. |
| **Prop** | We tried an APC-E 9" x 4" initially, followed by a 10" x 5". I thought the lap speed was perhaps a shade too quick so I've ordered a couple of Zoar 10" x 4" (wooden!) to slow it down a bit. |
| **Battery** | 3S - 2100MAh 35C and 2200 MAh 55C (The current drain is fairly high and I deliberately opted for higher "C"-rated packs in order to ensure that:<br>a) heat build-up in the confines of the rather crowded battery compartment was not excessive (I ensured there was plenty of through-flow cooling ventilation too!) and<br>b) on the other side of the same coin, to ensure good power delivery at reduced throttle settings (typically around 80%). |
| **Weight** of EP SS | 40 ozs./ 1140 grams (*compare 30 -32 ounces for Fox 25-powered original*). |
| **Motor RPM** | Using 10" x 5" APC-E Thin Electric Prop: 10,300 (compare with 9" x 6" on Fox 25 - exact RPM unknown but approx. 12500?) |
| **Current Draw** | 35.41 Amps (equates to 16C constant current draw) |
| **Watts Input** | 416 (yes!) |
| **Input Power Loading** | 166W / Pound |
| **Line Length** | 57.5' (17.52m) 7-strand Sullivan |
| **Covering** | Fuselage tissue/dope<br>Flying surfaces 10 Microns Mylar/Esaki Lightweight Tissue/Dope. One coat white primer, followed by Halfords MINI "Chilli Red". A poor choice as it turned out, because although the substrate is relatively easy and quick to apply, the paint added excessive weight. Next time, I would use Profilm. |
| **Flight Power Management** | Keith Renecle "KR-2" http://www.keithrenecle.co.za/Electric%20CL.htmtimer<br>controlling a Perkins EnerG Pro 40 Amp Electronic Speed Controller, with 5V BEC (required to power the timer) |

**David prepares for the maiden flight**

**Airborne at last**

**General Comments**

This reiteration of the Stuka impressed as being a very smooth and responsive model, without twitchiness - in fact, a classic stunter from the 50s/60s, clearly very carefully honed over a long period for competition work by the designer, Don Still. Incidentally, the reason he chose this semi-scale prototype was that the need for a competitive edge at the time was apparently pushing the c/l aerobatics fliers towards "different" styles of models. One can imagine that with judges having to sit through hours and hours of watching identical manoeuvres performed to very similar standards, anything which differentiated one model from another would help to impress them! I daresay the Stuka's distinctive lines achieved that aim.

No problems were experienced during our initial test flights, although test-pilot Mike felt a little more line tension would help. We therefore changed the prop to an APC-E 10" x 5" which sorted that, but maybe a little too well, the speed being noticeably greater. This will need to adjusted. One idea I intend to try is fitting a pusher prop, so that the torque reaction pushes the nose outwards rather than inwards (try that with a glow motor!). I'll also try a Zoar 10" x 4" Wooden prop. (APC don't make a 10" x 4" E-prop, as far as I can see). This should still produce plenty of thrust, whilst holding the speed down a bit.

After the initial couple of flights, the consensus was that she was also maybe a little nose-heavy. The removal of 15 grams of lead from the cowl helped and there is more scope for experimentation in that respect, as in order to achieve the indicated balance point, I'd added about 50 grams in total. Otherwise, I'm pleased to say the model tracked extremely well and held a level line superbly. Landings and takeoffs were completely drama-free, even considering the long unmown grass from which we were flying.

The power input figure was particularly illuminating. From the only prediction I could trace, I expected the model to be adequately powered with the AXI 2814-12 consuming about 250 watts on the APC-E 9" x 9.5". That equates to exactly 100 Watts per pound, but with the eventual 416 Watts input (166 Watts per pound - much higher than I'd anticipated) giving a spirited performance, I believe this is probably close to the output of the original's Fox 25. I haven't been able to find any specs for that engine but I reckon it must have been around 0.5 BHP/375 Watts - if anyone knows the exact numbers, I'd be pleased to hear from them.

If you fancied following a similar course, the available choice of brushless electric motors is huge and there's no need to pay silly money. Likewise, Electronic Speed Controllers are cheap, although I must mention a caveat I discovered only after extensive, frustrating attempts to get the timer to work reliably - do beware of using salvaged ESCs! The majority of Ready-To-Fly RC models use unbranded power components - in other words units which are mass-produced to a price. And of course it's tempting to extend their usefulness by re-using them elsewhere, but be careful. The KR-2 Timer didn't like the dirty output from the motor and ESC I'd salvaged from a crashed Ripmax Wot-4 E. The problems disappeared as soon as I substituted a better ESC. There are lots of c/l timers out there too, some very cheap, others less so. Yer pays yer money . . .

In conclusion, I'm delighted with my re-choice of model. It was quite long in the building (interrupted by other, smaller projects) but relatively uncomplicated and well worth the effort. I enjoyed the challenge and I think it has unquestionably vindicated the decision to convert from glow power to electric. Probably not up to scratch for modern competition but in the context of vintage contests, I'm sure it still would be. Certainly it will enjoyably serve the purpose of bringing its ageing owner/flier back to somewhere near to his youthful ability on the handle. Highly recommended.

**David Lovegrove** (*Initial contact may be made via the Editor*)