

**ADS**



**Short Finals**

**MERRY CHRISTMAS, EVERYONE**



*2004 AGM*

*Getting Knocked up*

*Lithium Polymer fun & games*

*The Gladiator (no, not that one)*

*Ground Effect (it doesn't just rise & smite thee)*



Our esteemed publisher John Barnes, who's only recently recovered from writing, editing, and printing a 40 page epic account of his adventures at the 2004 F5B/D Electric World Championships, has once again been working night and day to get this edition of the ADS rag out before Xmas. For those of us who requested a copy, the "Championships Special" covered the event from every conceivable angle, from the flying through to the social gatherings, with a fare smattering of photos thrown in for good measure. In short, a comprehensive insight into the specialised world of competition electric flying ... and to think my concept of the cutting edge of technology was sticking a 480 "race" motor into a foamie designed for a Speed 400! A sterling effort ..... well done, Mr.B.

I won't attempt a recap of the flying year, but summer, such as it was, resulted in more outings to the slope than balmy fly-ins at Calder Park, although both the Hazlehead event and club BBQ fared well. As I recall, the best of the weather invariably occurred mid-week, giving the shift workers and retired types more opportunity than the 9 to 5 boys for extra stick time. So, fewer large gatherings, with groups of 3 or 4 bods chasing the wind or looking for a calm oasis ... fewer witnesses and less embarrassing when you forget to pull out of a loop!

Unfortunately, I've had more embarrassing moments than most this year, resulting in a backlog of models requiring some tender loving care (my wife also wondered if she too would get a little more "TLC" were she to fall to earth from a great height? I treated that question with contempt it deserved! ...but then

again, she won't release the funds for me to buy a brushless set up. Mmmm, maybe a trip to the top of the Citadel is long overdue?). The up side of breaking newer planes is that I've been forced to fall back on a couple of old models that haven't seen the light of day for years, and what a pleasant surprise it was to find that they're still a bundle of fun to fly.



*If you haven't seen Star Wars, I won't even attempt to explain this!*

Hopefully we can entertain you with an interesting collection of articles gleaned for this issue. First time contributor Colin Stewart, model builder/flyer and full size pilot ("What

**Cover Pic:**

*The first of Mike Pirie's airborne collection brilliantly captures Graham Donaldson's very slippery "Whisper" scooting across the club's favourite slope.*

scale was he before?”, do I hear you ask? No, no, I mean he flies real aircraft too!), gives you the low down on “ground effect”. Perplexed? Stand by to be enlightened!

Bill Stark fools around with an old-timer! Bill admits that there’s some things he can’t do so well now, but getting to grips with a big American lady is right up his street!

Our new chairman, Herr Multiplex, gives an exhaustive account of the joys of Li-Poly battery packs ... it may look like heavy going but hang in there; big, cuddly Neil tells it how it is!

Pocket sized Terry Shields, another first-time contributor, is Knocking on Heaven’s door with tales of a rarely visited slope!

Departing chairman Mike Pirie concludes his term of office with a brief summary of the goings on at the November AGM. Ever since getting his hands on a Canon G5 digital camera, Mike’s been the club’s most prolific photographer, getting better and better at those elusive ground to air action photos. Alas, after a rather high attrition rate during the summer,

all I have left of two models are his superb pictures!

By the way gents, there’s no calendar of events for 2005 available as of yet, but we should have something for the next issue. In the meantime, just remember that the winter meets at the Cove Bay Hotel take place on the 2<sup>nd</sup> Tuesday of every month. Any changes will be posted on E-mail, or telephone if you’re not into these ‘ere electronic gizmos. Also, please note that any outstanding SAA or club fees should be paid to Jim Ruxton pronto!

*Jim Ruxton, 6 Seafield Road, Aberdeen, AB15 7YY*

Thanks to everyone who contributed to the newsletter over the course of the year. There must be plenty of projects under way that, with little effort, could be committed to print and shared with the rest of the guys. A few anecdotes, old photos, new photos, anything ..... send it in!

Wishing you all a very merry Xmas with health, wealth and happiness for the New Year. May the force be with you! **DR**



*My re-introduction to aeromodelling back in the late 80's began with this unusual design which had been mothballed until the demise of my favourite sloper. An aging "Black Diamond" cruises Brimmond late afternoon in November this year. (photo Mike Pirie)*

# 2004 AGM

This year's AGM was held at the Cove Bay Hotel on Tuesday 9<sup>th</sup> November and was attended by 15 members. Apologies for absence were received from John Donald, Jim Masson, Bill Stark, Alan Stewart, Graham Irvine and John McConville. A full account of the meeting can be obtained from the Club Secretary, but a summary of the main points is given below:

1. The minutes of last year's AGM were approved
2. Chairman's report: Mike gave a resumé of the year's activities. He said that generally both flat field and slope activities had been enthusiastically supported throughout the year.  
There had been three winter meetings in the Cove Bay Hotel and some club members had attended indoor flying sessions at Inverurie. It had been a good year for slope soaring particularly on Brimmond.  
The planned Cairn o' Mount outing was moved to Brimmond due to the excellent north westerly wind blowing there at the time. The Knock Hill outing was cancelled because of an invitation from the Deeside Gliding Club to attend their open weekend on the same dates. However, Terry Shields and Iain Manson had independently investigated the hill and gathered information regarding car parking and access. Meikle Carewe on the Slug Road had been used on several occasions for a south westerly wind.  
The Hazlehead weekend on the 5/6 June was a big success because for once we enjoyed tremendous flying weather. A 'Taylor Trophy' style competition was held on the Sunday and this was won by John Barnes. It is to be hoped that this style of competition will become a regular feature of the weekend in future. An All-Up/Last-Down competition held later that

afternoon was won by Neil Davidson. The barbecue on 15<sup>th</sup> August was a success despite a strong wind curtailing flying in the afternoon. Mike thanked all those who helped on the day. He also thanked the members of the committee for their support during the year and also the newsletter team (John and Derek) for the production of an excellent magazine.

3. Treasurer's report: Jim reported that Club funds presently stands at £997.79, a surplus of £224.52 over the year.
4. Election of new committee: Mike stated that he was standing down as Chairman. Neil Davidson was elected as Chairman, Jim Ruxton as Secretary/Treasurer and John McConville as Safety Officer. As no one was willing to take on the post of Events Organiser, Brian Allen agreed to be co-opted as a fourth member of the committee without a specific task.
5. Club fees remain at £12 ordinary members, £6 junior members.
6. Winter meetings: Three winter meetings will be held at the Cove Bay Hotel. Ideas were for these were discussed. The committee will decide on a programme and members will be informed.
7. Under A.O.C.B. Neil agreed to look into getting an 'Aberdeen & District Soarers' banner made up for use at exhibitions and displays etc. John Barnes announced that 'Soarhigh Models' had ceased trading in Banff, the modelling business being sold. The shop is now 100% fishing tackle. It was agreed that our meeting room at the Cove Bay Hotel would become a 'No Smoking' zone at all future meetings. The committee will look into the possibility of including another Knock Hill outing in next year's calendar. Slope soaring site information will be issued at some point, as well as information on the frequencies in use within the club. **DR**

## Knock, Knock.....who's up there?

Terry Sheilds

As there was to be an ADS day outing to Knock Hill, scheduled for the weekend of 24<sup>th</sup>/25<sup>th</sup> July, the intrepid duo of Iain Manson and myself decided to do a "recce" of the said hill, to pinpoint access roads, car parking and general whereabouts of this mythical slope soaring venue. It was said to be an inverted pudding bowl shape, giving access to 360 degrees wind direction, and sitting next to the main road half way between Huntly and Portsoy.

We left Aberdeen and travelled to Huntly via Oldmeldrum, Colpy and onto the A96 at the Glens of Foudland. No map required so far! On reaching Huntly, we turned off the A96 just after crossing the river Deveron before doing a map check ..... shave! Iain had packed the Stonehaven & Mearns OS sheet, which was going to be no bloody help at all! As it turns out, Knock Hill is the biggest feature for miles around, so once on the right road we could hardly miss it. In terms of distance it took about the same time to reach as a typical drive to the Cairn 'O' Mount, but there the similarity ended.

Looked like a steep hike ahead of us with no obvious route up. How to get to the top of this slope soaring paradise then? We stopped and spoke to a local plumber, who directed us back to the Glenbarry Hotel which sits immediately opposite the "Knock", on the junction of the Keith road. Shortly afterwards, we turned left

at the end of a row of 6 or 7 cottages, onto a single track road that led straight to the bottom of the hill and a small parking area.

We were now looking at the east face of the Knock and set off up what seemed to be a well used, dried up burn that led almost to the top .....all 1412 feet of it! (*Brimmond is approx. 790 ft high – Ed*) That's a lot for the littlest leggies in the club to cope with!

I found a small plateau about half way up and proceeded to fly from there, leaving Iain to continue on to the top. Steep slopes all round, less so for the north to north-westerly direction.

As the wind was too strong for his light-

weight soarer, Iain made his way back down to where I was and we took it in turns to fly my Phoenix Fun Start. Landings proved to be fairly non-problematical as there were no whin bushes or boulders in evidence, only nice soft, forgiving heather. An hour or so later, having achieved our goals of finding, climbing and flying this site, we set off for home.

A second sortie to the Knock was arranged for the beginning of October, and this time Iain, Derek

and myself climbed straight to the top using the same route as before. From car to top took around 25 minutes, including a couple of fag stops!

This time the wind was blowing from the south-west, so we crossed the top of the hill and took a bit of time to pick a launching/landing spot, as there were more boulders on the SW face. Lift was great and we were rewarded with a super afternoon's soaring.



*Almost there. A long, steep climb, but well-worth it when the weather's good. Don't leave the tranny in the car!*



Eventually, the 25 mph wind increased to gale force making it impossible to stand, let alone fly!

Not a place to be on a cold winter's day, but I think it would make a great day's outing for a club picnic and fly-in sometime next summer.

*(Got your Banff OS sheet handy? Continue north, past Huntly on the A96, turn right onto the B9022 and keep going until this road meets the A95 Keith/Banff road. Knock Hill is on the left at this junction, with the Hotel/Inn on the right. Proceed north for half a mile then turn left at the end of a row of widely spaced cottages, up past Swilebag farm to the small parking area just beyond, where the dry burn cum footpath to the top can be clearly seen. Ed)*

*[A long walk, but an excellent site to fly from with the wind from almost any direction. This hill used to host some fine cross-country soaring competition events as well, Tommy, Gary and Guy Taylor the organisers. It was some sight to see 4m+ scale ships (the popular choice by many pilots then) more than 1000' BELOW one's height as the pilots struggled to recover from adventurous flying around the course. Brilliant stuff! JB]*



*Howzzat! It's a measure of how new chairman Neil's flying has improved ..... not only can he bring it back to the same field, but now impresses by catching the Easy Star at the end of each flight. [The pilot's ejecting. Neat trick! JB]*

## Lithium Polymer Batteries

Neil M. Davidson

The first practical battery or cell that we modellers used was the famous NiCad (Nickel Cadmium), which is still widely used and capable of producing considerable power. The next stage in battery development was the introduction of the NiMH cell (Nickel Metal Hydride). However, the early units produced only modest current outputs, but cell for cell weighed less than the NiCad and had a significantly higher capacity [*and much shorter life!* JB]. Improved outputs have led to the GP 3300 packs discharging at well in excess of 30 amps. (100+ amps in competition circles!)

Then the Lithium Ion cell arrived. This was similar in size and shape to the NiCad/NiMH cell – i.e. cylindrical. These cells never really caught on due to the fact that they were heavy and only produced modest currents. They were rapidly replaced by the Lithium Polymer cell (Li-poly), which were basically the same as the Lithium Ion but housed in a flat Polymer case – a huge saving in weight!

Improvements in output have led, for example, to 4<sup>th</sup> generation Kokam cells being capable of producing 20C discharge rates – C is cell capacity, so for example a 1500 mAh cell can deliver 30 amps. A novel aspect of these batteries is that several cells can be connected in parallel and/or series to form a larger single unit. This is an area where people can become confused.

Irrespective of capacity, a single Lithium Polymer cell has a voltage of 3.7 volts. Using the 1500 mAh cell as an example, we can connect two cells in series and this will produce a battery of 7.4 volts (3.7 x 2) volts, still at 1500 mAh capacity. This is written as 2S1P. If we now hook up two cells in parallel to our two cells in series, then the voltage will still be 7.4 volts (3.7 x 2) but the capacity will be 3000 mAh (1500 x 2) parallel. This is written 2S2P.

So, to summarise, the voltage increases in steps of 3.7 volts when the cells are connected in series, and the capacity of a battery pack increases in steps of the individual cell capacity when the cells are connected in parallel.

Here's another example using the 2000 mAh cells, which may be easier to follow;

4S5P - voltage =  $4 \times 3.7 = 14.8$  volts;  
capacity =  $5 \times 2000 = \mathbf{10000\ mAh}$   
(This pack requires a total of 20 individual cells)

3S2P - voltage =  $3 \times 3.7 = 11.1$  volts;  
capacity =  $2 \times 2000 = \mathbf{4000\ mAh}$ .  
(This pack requires a total of 6 individual cells)

The one great advantage of the Lithium Polymer batteries is the weight saving! I currently use a NiMH battery of 8x1050mAh cells in my Easy Star. The weight of this battery pack is 180 gms. I previously used a 7.4 volt 3000mAh Li-poly battery in this model. That gave 3 times the capacity of the NiMH pack and weighed only 130 gms – 50 gms less than the NiMH! (1oz = 28.4gm). The cost of the NiMH pack was £22, whereas the Lithium Polymer battery was £60. Ouch!

Why did I go back to using NiMH's? Unfortunately I forgot to disconnect the Easy Star's Li-poly pack after a flying session and left the model untouched for some considerable period, during which time the pack voltage dropped below the minimum 6 volts. Physically the pack looked undamaged, but would only take a partial charge thereafter ..... a costly mistake!

Apart from the cost, other possible [!/] downsides to the Li-polys are:

1) They are extremely combustible. There are numerous stories about these cells bursting into flames, causing severe damage to cars and houses. Charging must be carried out at no more than 1C (2000mAh pack at 2A) and with, of course, a suitable charger. At 1C, long charge times are to be expected – mine regularly took 1 hour 15 minutes!

2) In use, they must not be discharged over the limit stated for the pack (40amps for the new 2000 mAh packs). If this is exceeded, the battery can go into thermal runaway. When this point is reached, it may combust even though the battery is disconnected. It is also important to ensure that the voltage does not drop below 3 volts per cell. Flattening the battery during flight is not an option, either a

dedicated Li-poly ESC is required for the model, or a careful eye kept on the stopwatch if damage to the pack is to be avoided.

3) The Polymer cases are relatively fragile and easily damaged. Should the model suffer a rough arrival or crash, it is best to remove the battery and leave it for 20 minutes to ensure that it does not burst into flames.

4) Interestingly, the Graupner web site states that *“The capacity of a Lithium Poly battery declines every time you charge or discharge it. In typical modelling uses these batteries will be subject to high discharge currents and motor induction currents, with the result that their capacity will fall to around 50-80% after 50 charge/discharge cycles, even if you observe all the charge /discharge requirements.”* Needless to say, this is hotly disputed by the manufactures!

A number of manufacturers produce a range of Li-polys, but Kokam are disputably the current leaders in the field and the following is a brief summary of their activities.

The first generation 145 mAh HDR cell (high discharge rate) appeared in 2002, with a modest 5C capability. 2003 saw the introduction of a second generation 600 mAh, 700 mAh and 1200 mAh cells, which upped the output to 6-10C, followed quickly in spring 2004 by the third gen. 340mAh/20C, 1500mAh/10C, 2000 mAh/15C and 2100 mAh/20C cells.

Things change rapidly, and at time of going to press the current range of Kokam cells are likely to comprise the following mAh rated units – 28, 145, 340, 640, 740, 910, 1250, 1500, 2000, 2100 & 3200.

Here’s a couple of examples from the above with the relevant statistics :

**640mAh/15C** cell – 4.4 x 33.5 x 58.5 mm – weight 17 grams (approx. 0.7 of an ounce)

**3200mAh/20C** cell – 7.6 x 43.5 x 131 mm – weight 82.5 grams (on the 3 ounce mark)

These new cells will bring about a revolution in electric RC modelling with their ability to deliver short bursts of 30 or 40C, and 15 or 20C continuously, without damage or significant reduction in cycle life, and by using Kokam connector modules, may be assembled in any

series/parallel combination, as desired. (Also, unitised packs will soon be made available in series/parallel format Super Packs, that have all the provisions for cell balance charging and maintenance.)

In combination with a powerful, efficient brushless motor and matching ESC, any RC model can now be powered cleanly and quietly *[umm, as they have been for many years before the advent of incendiary Li-Po bombs, Neil! JB]*. For perhaps the first time, electric powered flight will be on a par with the IC models – thanks to Lithium Polymer batteries. *[Yawnn...!]*

**PS.** A new cell has now emerged – the Saphion cell. At the moment, this appears to be a backward step as the weight is higher due to the metal case, and the output considerably lower than that of a “conventional” Li-poly. It’s strength appears to be that it is regarded as the safe cell which will be less likely to burst into flames with misuse. As with all things, these cells will no doubt develop further and it will be interesting to watch their progress.

*The Ed. I currently use an 8 cell 9.6v pack of GP3300 Nimhs in a number of my electric models, so if I’ve done my sums right, a 3S pack of 3200 mAh Li-polys (as a unit, more or less the same height and width, but considerably shorter than my current packs) would give me the same capacity, but deliver 11.1 v and weigh almost exactly half that of the Nimhs ... no doubt that the reduced wing loading would bring about improved handling, but how long would my ferrite motors last? Add to that the cost of the Li-poly 3S pack (£80 - £100.), dedicated ESC, suitable charger, and we’re talking silly money!*

*However, I do agree with Neil, this is the future of electric flight, but for me there’s still a bit more mileage left in my ferrite/Nimh fleet. Unless Camelot can help me out! Derek.*

Neils reply! A 7.2v 2S pack works reasonably well with the 6v & 7.2v Sp 400 motors. The situation gets better with larger “can” motors such as the Sp 600 upwards, which can handle the 11.1v. Brushless motors usually offer a voltage range more suited to this size of Lipo battery.

## The Gladiator

Bill Stark

As for the “silly money” comment, I cannot agree! A small brushless motor & controller, which will last considerably longer than any “can” type, can be had for under £100. Also, please note that Lipo cell prices continue to fall steadily. There! That’s you sorted out!

*First my wife, now you! ..... what have I done to deserve this? Ed.*

*[Interesting info on your Li-Po experiences, Neil. You’re right about the safety issues with these cell types. One area of flying which they’ve really opened up though is indoor/parkfly type models, where the light weight and capacity of the Li-Po packs really is a significant benefit.*

*I’m well behind both of you in cell type experiences. So far I’ve used nicads only, but will be dabbling with the new-fangled NiMH cells in 2005!*

*My reason for sticking with nicads has been their ease of use and longevity. Nicad maintenance and storage requirements are simple and a pack will last for many years. NiMH packs have nothing like the lifespan of nicads, but more importantly aren’t quite as simple to maintain. Both cell types self-discharge, at a different rate for each cell in a pack, so if a pack is stored full or part charged it progressively becomes ‘unbalanced’ (Schulze states that both cell types should be stored discharged, even if one plans to use a pack again the next day!). Nicads are tolerant of overcharging at a modest current, so all cells in a pack can be brought up to full capacity again by trickle charging. NiMH cells are apparently not tolerant of overcharging, so to ‘re-balance’ a NiMH pack, each cell has to be discharged to c. 1V per cell before a pack is recharged. I’d guess that any cell with less than 1V would need to be charged to that figure. As my old charger couldn’t charge/discharge individual cells, not an option for me.*

*A new charger (thanks, Santa) allows charging and discharging of single cells, as well as the means to automatically discharge NiMH packs to 1V per cell for storage, hence the toe-in-the-water with NiMH packs in 2005. As for Li-Po’s, I hope to get around to trying ‘em before 2010! Although the new Lithium-Anorganics look very promising... [www.fortu.de/fr/menu](http://www.fortu.de/fr/menu)*

*BTW, I’m told that some cordless tool manufacturers have moved back to nicads because of NiMH pack warranty claims. JB]*

We all have models which we plan to build “one day”, or maybe even build again “one day”. This one for me falls into the latter category. By the way, it’s an American free flight model, not the RAF biplane!

In the late 1930’s and early 1940’s, free flight power was becoming popular in the USA, whilst power flying in general was banned in the UK during the war.

In the United States, most engines were 0.6 cubic inch capacity (that’s 10cc in new money), and ran on petrol, needing onboard batteries, coil, condenser, etc. The method of flying was similar to the free flight power of today ... a limited engine run, usually 20 seconds, followed by a timed glide. For this size of engine, the rules stipulated a minimum weight of 3lbs.

Most models turned out looking somewhat similar to the high wing light aircraft of that era, rather like Bill Dean’s “Southerner”. Pylon models such as the “Slicker” had not yet been developed.

### The original Gladiator

The plane, which was designed and built by Maurice Schoenbrun, won the 1940 Chicago US Nationals and subsequently appeared in plan form in the following year’s AIR TRIALS magazine. In a special edition of RCM&E, around 1982, a scaled down RC version was published.

### First time!

Back around 1990 I built a half sized, tissue covered 30 inch wingspan version, powered by an 0.46 cc ED Baby, sporting two channel radio on rudder and elevator. In calm conditions the plane performed really well, but one blustery day at Calder Park, unable to penetrate, it drifted backwards towards the Redmoss masts. There was no way of stopping the engine, so I watched helplessly as the Gladiator eventually hit the roof of a house, falling to bits in the garden.

Heck! It had always been my intention to build another one, maybe full size!





Bill cuddles the “old bird” in public... displayed at this year’s AECC event in November. Fabulous job, Bill.

### Second time around!

Enter Alan Stewart with his “Southerner”, a very successful vintage electric conversion, which provided the spur I needed to start on my full size version of the “Gladiator”. It was meant to be a winter project way back in November 2003, but it wasn’t until September 2004 that the build was finally complete. So what, apart from being a slow builder, took so long?

To convert the model for electric flight required a redesign of the nose area, to permit the battery to go in and come out. Also, having come down a size in cars (now driving a Ford Ka), I felt that the tail-plane had to be removable. Interestingly, the original had a removable tail, held on with rubber bands, but an RC

element would require accurate location of tail surfaces and easily-made connections. This took some time to work out but was worth the effort ..... and as one club “Guru” asserts, “*if the surface is removable, then it won’t break!*” We will see!

Now that I’m approaching 70, I’ve discovered that there are some things that I can’t do quite as well as I used to. Covering models is one of them! (*A perfect opening for a rude comment ..... but as a measure of the respect I have for Bill, I’ll toss this notion aside!* - Ed). The original had been covered in Japanese silk and then doped. As the open framework needed some additional rigidity, Fibafilm seemed to be a suitable and less messy

alternative. Covering the fuselage sides was OK, but the Fibafilm would not easily go over the curved top and bottom sections, so Solarfilm was used there and also for the tail surfaces. The wings were no problem to cover except at the tips, where once again Solarfilm was used. For the undercambered lower surfaces, thinned Evostick holds the Fibafilm in place and this seems to have worked well.

Although Fibafilm and Solarfilm are manufactured by the same company, the colours don't quite match ..... no doubt club members will congratulate me on the subtle use of contrasting shades of red!

When Mike Pirie first saw the plans he suggested that the nose be lengthened, the original model having a very short snout which held a heavy petrol engine. Mike was also sure that my proposed 7 cells would never move it. He was right on both counts! As built, she was very tail heavy and my 7 cell pack failed to even move her on a smooth floor.

So yet more delays whilst I added a 1.5 inch extension to the nose and moved up to a 10 cell pack. Moral ..... listen to Mike!

Finished at last and waiting for calm, dry weather ..... the completed Gladiator's vital statistics as follows :

60 inch wingspan  
4.5 lbs AUW  
Speed 600 motor with 2.5:1 gearbox  
10 x 7 Master Airscrew electric prop  
10 x 2000 Nicad cells

### **Stop press!**

**She flies!** At Calder Park on Saturday 7<sup>th</sup> October, a short and obviously underpowered flight took place. Delighted to report that despite the lack of power the Gladiator appeared to be a nice stable flyer, and by way of a bonus, was captured on video by George Whelan.

I'm now hoping that Santa brings me something a little more powerful than a Speed 600! **BS**



*Poetry in motion in this 2 photo sequence, as Terry S. gets his Jamara "Mytos" electric soarer off to a cracking start on a fine summers day at Calder Park. The velcro on your Ed's toupee gives up the ghost as he wrestles with the sticks! (photo Mike P.)*



John Masson flings Norrie's cute little diesel powered Mercury Matador into the air whilst the rest of us tuck into the BBQ burgers. Don't know whether it was the strengthening wind or "dickie" motor, but sustained flight didn't happen on the day.



Our BBQ chef cuts the life expectancy of yet another club member, with this generous portion of calorie laden fat. Delicious though!



## THE BBQ

Anyone who's seen the "yesteryear" pictures of Graham Donaldson published in previous newsletter's will appreciate that the man was a fashion icon. However, he's blown it on this occasion by combining sandals with an "uncool" pair of socks! All it needed was a knotted hanky on the noggin to complete the picture.



Getting little in the way of flying, John McConville spent the afternoon toasting his upper body over the BBQ, while the sun took care of toasting his legs. Thanks to John for providing and manning the cooking facilities!



John & Mary Donald combine the culinary experience with a passive smoke. Our thanks to Brian's better half, Carol, for providing the salad accompaniments and saving the day by nipping down to ASDA when burger stocks dropped dangerously low!



A splendid afternoon's socialising for club members and partners comes to a close with Jim Ruxton's impression of a "gay" Herb Alpert!



*A GWS A10 in desert colours (at Calder Park??) just prior to its maiden flight, in the hands of a very worried looking owner, Brian Allen. Never short of a sense of humour or money it appears, Brian's purchases never fail to amaze! (photo Neil D.)*



*Carefully pre-flight checked by our ex-chairman, the A10 Warthog about to take to the air for the first time. Despite Brian's worried expression, it did fly, albeit only briefly, those two mini-fans draining the 600 mah Nicad pack in under 2 minutes. (photo Neil D.)*

## Ground Effect

Colin Stewart

Have you ever wondered why it is that when you fly the perfect approach to land, crossing the hedge at just the right height, that the aeroplane floats on and on down the runway or field to eventually come to rest nose over in a ditch? I will attempt to explain this often misunderstood phenomenon. The following is mainly of concern to full size aircraft, however it may be of some interest to those of you who fly larger models.

### What is 'ground effect'?

Ground effect occurs when any fixed wing aircraft, operating within approximately one wing span above the surface, experiences a reduction in induced drag (*where induced drag is the by-product of the production of lift*) and a resultant increase in the efficiency of the wing. This is mainly caused by the interference of the ground with the airflow patterns about the aeroplane, or to be more specific the wing's upwash, downwash and also wing tip vortices. To put it simply, ground effect is the cushioning effect of the air as it is compressed by an aeroplane flying close to the surface. Its effects are of greatest concern during landing and takeoff.

### What problems can this cause the Pilot?

During landing: At a height of around one wing span above the surface, drag may be as much as 40% less than when the aircraft is operating out of ground effect. Therefore, any excess speed during the landing phase may result in a significant float distance. Unless great care is exercised by the Pilot, then he/she may run out of runway and options all at the same time! This effect is more noticeable when you watch a large airliner landing, quite often you will see the main wheels just floating above the runway for some time. Most large aircraft however have very efficient drag flaps and spoilers to help settle the aircraft onto the runway surface, then combined with thrust reverse and very good anti-skid brakes, they stop pretty quickly!

Usually our models will not have these

luxuries and so we must be careful when judging speed and the height that we cross the 'hedge' at. Most of us fly our models too fast at this stage of flight (myself included!), and I guess this is because we don't have any method of measuring airspeed and so care must be taken in order to avoid the stall and the wing drop. Your average club modeller will not be greatly concerned by this as we generally use large fields with long grass to stop our models, but this might be worth bearing in mind if you do fly a large, heavy model and perhaps off a tarmac runway.

During takeoff: Due to the reduced drag in ground effect, the aircraft may seem capable of takeoff well below the recommended speed. However, as the aeroplane rises out of ground effect with a deficiency of speed, the greater induced drag may result in very marginal climb performance, or the inability of the aeroplane to fly at all! In extreme conditions such as high temperature, high gross weight and high density altitude, the aeroplane may then settle back down onto the runway. Thankfully these conditions rarely occur in the UK, but it's worth bearing in mind. These factors don't really effect models because they all tend to have very high power to weight ratio's. (*Try telling that to a poor Speed 600 motor that can barely drag my 3lb 4oz Hurricane higher than my Tx aerial – Ed*)

### So now that we know what ground effect is, how do we avoid it?

We can't. Just be aware that it exists! **CS**



*True grit and a truly awful pair of "shades" as Mike Pirie sends his Blenheim off on another mission over the Kerloch site, the launch technique - Bung&Pray - neatly avoiding the risks of ground effect on take-off!*



*Most of the fine upstanding young men who manned the ADS stand at this year's Model Railways exhibition in the AECC. Sterling effort chaps!*



*The Multiplex Twin Star is a pussy cat to fly, but how would it fare slope-soaring off Brimmond ..... for Alistair Marschal, not too well in the strong north westerly on this occasion, but well worth trying again!*



*Our ex-chairman with his fast and slippery plastic sloper. The Microfloh appears to handle anything from a light puff to a howling gale with ease, but just won't slow down for a landing ..... hugely entertaining!*

*A bumper year on the slopes for heather growth, or is Bill Stark shrinking? Bill is considering fitting a "Lost Modeller" alarm to his jacket before attempting to fly off Barmekin again!*



*Normally stopping for a puff between flights, our man Terry Sheilds makes up for lost time after three consecutive "sorties" off Brimmond's east slope! "I only do it for the exercise and fresh air", he reports (yeah, right! Ed). Balsa Cabin "Serenade" at the front, and an own design, fully built-up "Bertha Royale" behind, which surprised both of us by flying impeccably from the first launch!*

***A selection of Mike Pirie's super flying shots, taken over the course of the summer at the local slopes and fields.***







D.A.Russell, M.I.Mech.E. (and author of "The Design & Construction of Flying Model Aircraft"), carries out a "Mayo" launch. Travelling at some 20 m.p.h. (the engine having been started beforehand), the plane rises gracefully from the hands supporting it. This method of launch may be used when the ground is too rough for take-off, or in gusty weather when advantage is secured by the plane being some feet from the ground when released.

*Life before R/C. UK, 1937. A petrol engine powered FREE-FLIGHT model gets away in a cross country competition. The author used a 10' span scale Lysander with a 4 cylinder 40cc petrol engine. The models trimmed to fly in a straight line, a walk of several miles to retrieve them. Wonderful engineering and innovation. Free-flight.....!! JB*

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