

Newsletter

September/October 2014

Sorry that you have had to wait for this newsletter. As many of you know, my brother passed away mid September so I've been a little bit tied up with other things. After the funeral, Jen (his wife) very kindly gave me his remaining models - the Airspeed Courier, a Spectra motor glider and a couple of Rat Racers. I brought the Courier to one of the social evenings. I will miss my brother very much - we were constantly discussing model aircraft and flying. Model aircraft was the only hobby he stayed with throughout his life and I guess that he started making models certainly by the time he was 7 years old.

You will also know that Chris Bromley passed away this month and many of you will have attended his funeral.

On a brighter note, the club enjoyed a glorious day for the Scale and Aeroshow competition. This year the Scale trophy went to John Higgins with his Corby Starlet and the Aeroshow trophy to Chris Vernon with his YAK 54. It was a good turnout.



We have in fact had one of the best Octobers weatherwise, than I can remember for some years. Last Sunday was so calm and lovely warm sun, I was itching to get out and fly. Unfortunately, I was tied up on EBay because I was selling loads of my brother's old camera gear.

Sticky Things in the Airing Cupboard

September/October 2014

Article by John Higgins

As some of you might know, I'm in the process of scratch building my latest scale project. One of the problems associated with such an endeavour is that few, if any, of the many bits and bobs that are needed are readily available "off the shelf". We do our best to choose the model's scale so that such things as wheels, of the right size, will be commercially available, but items such as undercarriages invariably prove a little more problematical.

The undercarriage for my particular model is not available "off the shelf". No problem, you might say, just knock one up out of alloy. My undercarriage has a track of over half a metre and, what's more, the legs are curved. I very much doubt that I could make such a thing in alloy, and besides, such an undercarriage would turn out to be very heavy. The solution was to have one made to order from carbon fibre/glass. I've had quite a few composite undercarriages made in the past, some have failed in short order (always at the bend where the leg joins the fuselage) and some have yet to fail!

Before Christmas 2013 I contacted the chap who has made undercarriages for me in the past, well before the project had advanced to the stage when the part would be needed; there is always a significant amount of "lead time" with these things. Well, the months dragged on and with them the list of excuses for not having done the job ("I'm just reorganising the workshop", "I'm waiting for some new machinery to be delivered", "The roof is leaking", "My cat has just died and I'm very upset"...Okay, I made that last one up, but you get the general idea!). Eventually, I just gave up on the chap and will never put any business his way again. Alternative sources of supply needed to be found. You have probably heard of a firm that makes replacement cowls and undercarriages for many popular models, they advertise and are sometimes at the shows. This firm will make components to your drawings. I have had no direct experience with this company, so I did what any of you would do. I asked around and started looking through the many feeds on the internet – what I found was not encouraging. If you bought an apple pie you would expect it to contain apples, right? If you bought a carbon undercarriage you would expect it to be made of carbon, right? You might even expect it to be laminated with finest epoxy resin? How wrong you would be! If the comments on the internet are to be believed, then neither of these assumptions seem to be true. "Carbon Look" is not the same as carbon. In fairness, the company does not claim that its products are made from carbon or that the resin is epoxy. I decided to give this lot a miss, which leaves as the only alternative... a DIY undercarriage.

I don't normally do any proper building during the flying season but the prospect of a DIY, carbon undercarriage fired my latent enthusiasm. I did many hours of internet research: mould making, lay-up techniques, health and safety issues, different grades and patterns of carbon,



Sticky Things in the Airing Cupboard

September/October 2014

Article by John Higgins

pot life of resins... the list went on and on. Eventually, I felt sufficiently clued-up to order materials and, whilst waiting for them to arrive, made a start on making the moulds. The moulds are made from pink foam lined with ProSkin (a thin, fibreglass sheet): I made female and male moulds and prepared them for the lay-up with the application of brown packing tape and release agent (packing tape makes an ideal release film – resins, of all sorts, just refuse to stick to it). The undercarriage itself is constructed using unidirectional carbon fibre tape, with a thin glasscloth skin on the outside surfaces (to improve torsional stiffness) and thin fibreglass sheet at the position of the axles (to resist splitting). Incidentally, if you are thinking of having a go at an undercarriage of your own, do not use woven carbon fibre – 50% of the fibres will be in a direction that contributes nothing to the bending strength of the legs.

At this stage, I was beginning to have doubts with regard to my original intention of using male/female moulds with the lay-up sandwiched between the two – I could not be sure that the gap in the sandwich would be the right size and I would not know for sure until I had completed the lay-up in one half of the mould. I chickened out and decided to do the moulding on to the male mould only. Fourteen layers of glass and carbon were applied and packing tape, coated with release agent, applied over the top. Once this was pulled tight and fixed in place it was into the airing cupboard with it for 24 hours while the chemistry performed its miracle of polymerisation. Warning! Do not try this at home unless you have an understanding wife.

I was on tenterhooks when it came to de-moulding time I can tell you. Would I have a space-age wonder or a nasty, sticky mess? The result was a very serviceable undercarriage, not perfect mind you, but perfectly serviceable and very stiff, very strong and very light. Now that I've got a bit of a feel for composite moulding I'm sure that I'll be doing more of it in the future, after all, I've got plenty of resin left... and another fifty pairs of nitrile gloves!

John Higgins



Lithium Polymer Batteries

September/October 2014

Article by Arran Turner

Basics:

Lithium batteries work with 1 or more cells wired in series, each cell has a nominal voltage of 3.7v, 3.0v when flat and 4.20v when charged, they should never be charged above 4.2v and never discharged below 3.3v, that's the rule I follow anyway.

Charging:

A balance charger should always be used when charging li-po batteries, personally I use a revoelectrics powerlab 8 as it also reads the internal resistance of the battery, but more on that later. Each cell on that battery can drop or gain voltage meaning it differs from the other cells, a balance charger keeps them equal and stops you over or under discharging your batteries. It is recommended to charge at 1 C, meaning a 2200mah battery would be charged at 2.2amps and a 6000mah battery will be charged at 6amps however many manufacturers state the battery can be charge at a much higher C rating, for example, my 'Giant Power' batteries are rated to a 5C charge meaning I can charge a 5000mah battery at 25amps. It sounds very convenient to charge at these higher charge rates however after time charging at high C ratings can deteriorate the battery.

'C' ratings:

I've come to notice people are often chasing the highest C rating possible, when in fact it should not be a crucial element when choosing which li-po to buy, I would personally put choosing a well thought of manufacturer before claimed high C ratings from a lower end of the market manufacturers. Its easy to calculate whether a certain C rated battery is powerful enough for your model.

E.G. A 5000mah 30c battery, By converting mAh into Ah we divide by 1000, so the battery is 5Ah, we then multiply this number by the C rating giving us the maximum discharge in amps of the battery.

$$5\text{Ah} * 30 = 150\text{amps}$$

This makes the battery ideal for a model with a 120amp speed controller because it will not reach the maximum discharge rate of the battery.



Lithium Polymer Batteries

September/October 2014

Article by Arran Turner

The only real advantage to a high C battery is that in flight the battery is stressed less so it will still perform as well for more cycles.

Storage:

Storage of lithium batteries is crucial to them staying at their peak performance for more cycles. They should always be kept in a warm place. Cold kills batteries! If they have been stored somewhere cold, it is also a good idea to warm them before use, it will keep them going ALOT longer!

First use:

When you first get your new batteries make sure you charge them at less than 1C and on a balance charge, for the first 5 cycles I recommend not drawing too much power by flying with less throttle and not letting them drop below 3.8v for the first 5 cycles, this allows the battery to 'bed themselves in' and allows them to last longer and perform more cycles.

Swelling:

When a battery is tired or has been mistreated it can start to swell, this is normally a good sign that the battery is ready to be disposed of, it will usually still work to an acceptable standard however manufactures recommend not to continue using them, if the swelling becomes too bad, the cells can rupture and ignite.

Disposal:

If your li-po battery has noticeably swelled or is not performing as it should it's time for disposal. The safest way to do this is put it in a bucket full of salt water for a week before putting it in the bin, the salt fully discharges the battery making it harmless.

Parallel and Series:

We can wire our batteries in series or parallel to gain voltage or capacity. If we were to wire a battery in series we would connect the positive from one of the batteries to the negative of each other (be careful not to connect one battery's positive/negative terminals together) to do this we need to use the same type of battery, for example two 3s 2200mah batteries wired in series would become 6s 2200mah. Wiring in parallel does the opposite,



Lithium Polymer Batteries

September/October 2014

Article by Arran Turner

to wire a battery in parallel we would have to connect both positives to one terminal of the connector and both negatives to the other side of the connector, two 3s 2200mah batteries wired in parallel would give us a 3s 4400mah battery.

Internal Resistance:

Now for the geeky bit, if you only use small batteries E.G. smaller than 4s or you're only using your batteries in a model that doesn't need so much power like a scale aeroplane you don't need to worry about this bit too much.

Internal resistance can be measured with some of the high end chargers, it is an easy way to tell if a battery is becoming tired or a cell is becoming weak. Generally I prefer my batteries to have less than 2 milli ohms of resistance, in a high power helicopter you can feel a drop in performance at around 5 milli ohms and at around 15 milli ohms they're ready for disposal. You can tell a particular cell is becoming tired when its internal resistance is a lot higher than the other cells.

Parallel charging:

More than one of the same battery can be charged at once by wiring them in parallel, you can purchase a charge board that does this for you or make up your own charge lead, by wiring the batteries into parallel you could charge as many of the same battery at once as you like, if you want to charge 5 3s 2200mah batteries at once you would still charge it as a 3s battery however you would times your normal charge rate by 5, allowing you to charge your batteries much quicker.



Treasurers Notices

September/October 2014

Members Fees 2015

As many of you will be aware, membership numbers reduced significantly five years ago causing the club to radically tighten its financial belt. We now seem to have stabilised around the mid to high 60s in number. Compare this to the first 5 years of the new millennium where we regularly had over 100 members. 2014 is also the last year of our 10 year field lease, the renewal of which has been agreed with the farmer.

These two factors have caused us to look long and hard at the forecast for the next 10 years. The conclusion of this analysis is that club fees will need to rise if we are to meet the projected costs and be in a position to renew the field lease in 10 years' time. We will, of course, review this on an annual basis.

At the AGM I will be proposing the following club membership fees for 2015 and will explain the logic used to get to this position. At the time of writing the BMFA fees for 2015 were not available.

Senior £75

Junior £20

Social £20

I'd also like to thank Dave Swarbrick for negotiating the renewal of the field lease which is less than we budgeted for.

Bonfire night

Once again it's time for our annual bonfire night at the club field. This year it will be the 8th November with the fire being lit at 6:30. The amazingly successful format of a Jacobs join will be repeated this year. Many thanks for the generosity of all those who attended last year. The food was great!

The club will also be hosting a modest firework display. If you do wish to contribute to this then we would appreciate people bringing along one big firework or Rocket. Very small fireworks tend to take too long to setup and, for health and safety reasons, only nominated club officials will be allowed on the field.

September/October 2014

A VIEW FROM THE HEDGE. (By Will Sparrow)



Back in the halcyon days at the beginning of summer, my mate, Jim Sparrow, picked up on the fact that I was moaning on the paucity of anything to view from the hedge. I'm not a moaning sort of sparrow – at least, I don't think that I am – but, nonetheless, Jim had picked up a moaning sort of vibe and, being the sort of supportive bird that he is, resolved to do his best to help. Jim sat on his twig, gazed intently at the comings and goings and thought deeply and at length. The result of all his sitting, gazing and lengthy thinking was... precisely nothing! Now, Jim is not deterred by failure and, in next to no time, had instituted "Plan B".

Jim had heard that if an infinite number of monkeys were each given a typewriter then, assuming that these monkeys could type (!), at least one of them (or, perhaps, an infinite number of them?) would come up with the complete works of Will Shakespeare. So, in essence, this was Jim's "Plan B": he resolved to access the good ol' Internest and get countless numbers of sparrows, from hedges far and wide, to apply themselves in the firm belief that at least one of them would come up with the sort of idea that would really spark up the view. Give the lad credit, he put in a tremendous effort in collecting and collating the myriad of responses; the result of all his efforts proved sadly disappointing – let's be honest it was all junk! A chastened Jim has come to realize that there can be only one Will... be it Shakespeare or Sparrow!

As an after-thought, the fount of all knowledge, at the bottom end of our hedge, (the **Wise Old Owl**), later told me that Jim's big mistake was his failure to grasp the true nature of the concept of infinity. I'm not surprised; such things are way beyond small, brown birds such as us!



September/October 2014

A VIEW FROM THE HEDGE.

As the August Bank Holiday approached, I kept my wings crossed in the hope that, just for once, the weather would prove to be kind and dish up sunshine and balmy breezes for the last public holiday of summer. The Friday turned out to be not very good, Saturday was an improvement and showed a hint of promise, but the Sunday proved to be the sort of day that you modellers must dream of: the sun was shining and even the local buzzards were soaring in weak thermals. The wind – if one could call such a light zephyr a wind – was almost non-existent with just a hint of autumnal chill. Flying days do not come any better than this – even the grass had been recently mown. As the hands of the clock inched (centimetred?) towards 10am the car park started to buzz with activity. One modeller, eager to take advantage of this gift of a day, had forgotten some vital part of his model and had to return home to get it. He must not live far away because he seemed to be back in no time at all. By mid-morning the pits area was as busy as I've seen it in a long while; some of these members I hadn't seen for months, some were obviously new members. All were set on making a good day of it, which is just as it should be.

Much flying took place throughout the day with just about every kind of model from gliders to jets to foam creations, normally more at home indoors, getting a share of the sky. One recently-joined young member was flying a large, moulded aerobatic job and also a similarly specified BAe Hawk jet (paper rounds must really pay well these days!) Both were very impressive, high-energy performers and would be just as impressive when viewed at a much greater distance from the pits! There were a few incidents, two involved jets. One of those ubiquitous and fine-flying twin boom jobs got its landing approach a bit wrong and just avoided doing a cartwheel; I could hear the death rattle of fibreglass from here in the hedge, but the damage, if any, seemed slight. The other jet incident involved the previously-mentioned Hawk. This was flying really well... until it was time to land, when the left undercarriage leg refused to come down, despite valiant efforts to try to persuade it to do so. In such circumstances the pilot has two options: One option is to land and try to keep the left wing off the ground



September/October 2014

A VIEW FROM THE HEDGE.

for as long as possible with right aileron whilst endeavouring to keep the landing run straight with rudder, the other is to put the wheels up and belly land. (Just as an aside, when I was a young bird I succumbed to a challenge thrown out by a fellow fledgling "I bet that you can't land on one leg, Will" (I can still hear his voice). I rose to the bait and gave it a go; slow on the approach, a gentle flare and... touchdown. I twisted my ankle and wrenched my neck! Ah! The follies of youth.) Now, if you are faced with this kind of dilemma and you have to land on concrete, the first option is, most likely, your best bet. If, on the other hand, you are landing on grass, option two has more to recommend it. This Hawk pilot picked the correct option and pulled off an excellent belly landing which resulted in only minor damage and a round of applause from the pits (and the hedge). One seasoned member has been campaigning a rather nice little WW2 German fighter. This model has an effective camouflage paint finish but suffers from unreliable engine runs. The engine demonstrated its unreliability on its first flight when it stopped at the sort of height where the only option is to land straight ahead. Guess what lay straight ahead? Go on, have a guess... Correct! The beans! From my lowly-positioned twig, the actual landing was "over my horizon" but if the model did make the beans it can't have been (bean?) that far in and plenty of ever-helpful clubmates seemed to have a good line on it. Good stuff, camouflage.

The last Sunday in August saw me up early and alive with anticipation. You see, I had heard that the club was staging a "Scale and Aeroshow" event. Your club has so few events that I look forward to every one; this event, staged last year, produced a good entry and not a little interest for us hedge-folk – the scale event was won by a pilotless aircraft, if memory serves me correctly! This year only one member turned up for the event, no one turned up to run it and club officials seemed to be in a state of denial as to the event's existence! If any more events are scheduled I'll wait until I see the judges lined up and hear the roar of engines before I stir from my twig.

Autumn is now upon us and we, in the hedge, are embracing its golden delights. We are not alone. You modellers have been taking advantage of the beautiful



September/October 2014

A VIEW FROM THE HEDGE.

flying conditions gifted to us at the start of September – in fact, there seem to be more of you about, now that the days are on the decline, than I ever noticed in the height of summer. I'll never fully (!) understand modellers! On one such day I was pleased to see that one of your more mature members finally had some success with a pretty little electric aeroplane that I've seen him messing with on many occasions – it looked like a Grob to me. This time out the model actually felt air under its wings. It's surprising how much better models work when the esc is plugged in the right way round and the correct model memory is selected! The same day also saw an outing for a beautiful, large-scale petrol-powered aerobatic model. I was impressed by the grace and smoothness of this model; I even waved to the pilot as the model flew passed the hedge but, although he looked in my direction, he did not wave back; lost in his own miniature world of stick, throttle and rudder, no doubt.

Wheels do seem to be a bit of a problem with you modellers. I mention this because a couple of incidents occurred recently which had those round, black things at their heart. The first concerned a post-WW2 naval fighter which was doing its best to take off. I've seen this model before – it always flies well but its wheels are a bit too rearward. As a consequence, it's a bit of a "pecker" on take-off, and landings almost invariably result in a nose-over. On this occasion the prop clipped the ground, the prop nut unscrewed itself and the entire prop and spinner fell off. To add insult to injury, the prop then stuck itself into the ground, and, with a spiteful thrust, poked a hole through both sides of the starboard wing! The second wheelie story really grabbed my attention: a nice, glow-powered, semi-scale model, with fixed undercarriage, was enjoying the sky when I noticed that it only had one wheel. The modeller had noticed this too and was busy pondering his options. You already know of two options, but for this model a third was available; not being very large or heavy meant that a landing in the long grass (and it was very long) at the far side of the strip was a good bet. And so it proved, the model suffered no damage and will live to perform another day.



A VIEW FROM THE HEDGE.

September/October 2014

Over the years I've seen many different kinds of models fluttering past my twig but, despite their many differences, they all seem to have most components in common; wings, fuselages tails and the like. How refreshing it was then to observe something entirely different – an autogyro, no less. These devices are entirely different to those jellicopter thingies – the rotor is driven by the passing air and not by a motor, so there is no torque reaction and no tail rotor is needed. The model in question was a delight to watch as it flitted over the strip. Unfortunately, it tipped over on landing and broke one of its rotor blades so my delight was strictly rationed. I was fortunate enough to see this model again a week or so later; not only did it have a new rotor blade but it had been fitted with a small electric motor to spin up the blades prior to take-off. The modification seemed to work well and the little model had no trouble in overcoming the earth's gravitational pull. On the landing approach the modeller in charge thought it might be a good idea to keep the rotor speed up (I sense that you might be ahead of me here...) and flicked the rotor spin-up switch. As you all know, autogyros do not have tail rotors because their rotors are not motor-driven... It's a good job that replacement rotor blades are cheap and readily available!

Two thirds of the way through September, the time of year when we should be expecting the onslaught of gales and rain, saw you lucky modellers gifted a perfect flying day – and it was a Sunday! Peace and quiet reigned throughout the day and lots of flying was done. One model that caught my attention was a nice medium-sized Mustang having its maiden flight. This model looked really good against the pale blue sky and it had all the proper scale bits to boot; retracts with sequenced doors – even the tailwheel, four-bladed prop, flaps and lights in the wing tips. You could have knocked me down with a feather when I flew a bit nearer to have a closer look and found that it was an almost-ready-to-fly-straight-out-of-the-box model made from reconstituted ceiling tiles!

As the end of September approached I observed half a dozen members congregating in the car park preparing for their Saturday morning fun: I flew over and perched on the hut roof, just out of sight. One of their number mentioned

September/October 2014

A VIEW FROM THE HEDGE.

that the following day was to be the day of the re-scheduled “Scale and Aeroshow” event. The other five expressed surprise; one said that he had checked his email but had received no notification, two others had not checked their email recently and the final two did not have computers! If this was a typical snapshot of the lamentable state of communication within your club then I did not hold out much hope for the morrow: I vowed to keep to my original game plan with regard to scheduled club events!

I was having a lovely dream, on Sunday morning, when I was (rudely) awakened by my mate, Jim Sparrow, prodding me in the ribs. “Something seems to be happening on the field”, he exclaimed. “There’s a big bloke sitting in a chair, who looks as if he might be some sort of judge, and lots of members are milling around like headless chickens clutching little bits of paper”. Ah, I mused, whilst shaking off the silken grip of Morpheus, it looks as if the promised event is actually under way! The scale event was first out of the blocks and proceeded at a leisurely pace with members looking the other way or pretending to be deaf whenever the call for the next competitor was made. There was much good flying done and several models to be admired; I was really taken with a pretty little orange DH Beaver (if you get the chance, have a look at the excellent, home-made dummy radial engine and spinner).



September/October 2014

A VIEW FROM THE HEDGE.

The eventual winner was a lovely Corby Starlet – complete with a scale pilot.



The Aeroshow event followed, after a brief break, and was dominated by aerobatic types – some of which seemed to be based on hyper-sonic prototypes. We were also treated (!) to a duo of WW2 types demonstrating that Mach 2 was evidently achieved in the 1940's. All in all, a good time was had. The weather was perfect too, which always helps.

The harvest moon (it was also a “super moon”; the last of 2014 – WOO) is now just a distant memory and we hedge-folk are concentrating on stuffing ourselves with berries in order to build up our reserves for the colder months, the equinox being behind us and winter fast approaching. Rest assured, however, I'll always find time to watch you modellers having fun.

WS

The Scale and Aeroshow Contest

September/October 2014

*Photographs taken and then
buggered up by
Peter.Cathrow*



Motors

September/October 2014

Article by Brian Holdsworth

The fuel consumption of a two or four-stroke engine is largely determined by its revolutions per minute (rpm) since for each cycle, a volume of air determined by the engine capacity is drawn through the carburettor which provides a uniform air-fuel ratio over a wide rpm range. If the pitch speed (propeller wash speed) is high in relationship to the airspeed, the rpm varies little as the aircraft climbs or dives. However, if the pitch speed is only a little higher than airspeed, the rpm will drop due to the increased load as the aircraft slows in a climb and increase noticeably as speed increases in a dive which means that fuel consumption also drops when climbing and increases in a dive, though the effect is generally small. The rpm and hence fuel consumption is constant for a given throttle setting throughout the flight, though if the mixture leans out as the fuel level drops, the rpm may increase slightly with little change in fuel consumption. Throttle response is non-linear with little effect over the top third of movement in contrast to the more linear response of an electric motor.

Brushed motors show some differences from brushless but these will not be covered since such motors are obsolete for electric flight purposes except for very

small sizes. The current taken by a brushless motor via a speed controller is a very complex waveform which the available meters smooth for display; the resultant errors are not insignificant but will be ignored for this purpose. The descriptions are greatly simplified to give an overview - if more detailed values are required, much more detailed analysis and measurement would be needed with little benefit for most purposes.

A current creates the rotating magnetic field driving the motor and is defined in motor data sheets as the no-load current. A propeller presents a load due to its rotational drag which varies with rpm. The thrust generated by the propeller also presents a load and, since this varies with the difference between airspeed and pitch speed, it can vary considerably between level, climbing and diving flight, so that current increases in a climb and decreases in a dive. If the airspeed exceeds the pitch speed in a dive, the airflow will drive the propeller, slowing the aircraft, with zero current for the thrust load and reducing that needed to overcome the rotational drag of the propeller. Higher drag aircraft will draw more current than sleeker types due to the additional thrust needed to overcome the greater drag - as those flying

September/October 2014

Motors continued/.....

aircraft with radial cowls may have noticed! Similarly, current increases significantly for higher flying speeds - drag increases with airspeed cubed!

The power input is determined by the product of current drawn and supply voltage. The voltage will reduce during the flight as the battery discharges so that the current needed and hence throttle position for a given output will increase during the flight. This difference can be as much as 20% and has the useful side effect that maximum power is available at the start of the flight which can help takeoff if power is marginal. Most users will notice little difference, though it can cause problems in competition aerobatics where some use throttle position to determine flight modes. In most cases, the maximum power input is during static running on the ground, which is why such usage should be minimised since maximum power dissipation occurs, with little or no cooling air so that overheating may quickly occur with consequential damage. If a high pitch speed is used, propeller blade stalling may occur so that the static consumption may be less than flight consumption; this is often the case with ducted fan implementations and is one of several reasons why they have such high power

consumption and resultant short flights. These variations mean that predicting the current consumption in flight is very difficult. Telemetry could measure instantaneous consumption but this is meaningless without considerable interpretation. Fortunately, the precise figures matter little in practice provided the components (motor, speed controller and battery) are suitably rated for the maximum and average consumption.

Many motor data sheets specify the rated current, together with the peak (~10 seconds) current which should be regarded as the absolute maximum before damaging overheating is likely to occur and starts from cold with an adequate airflow through the motor - not in addition to earlier running! Practical experience suggests that the maximum current should be little more than the rated current and well below the peak current to give a margin and achieve a long life. The LiPo cell count range is generally specified - if exceeded, very high transient currents will be drawn resulting in localised overheating of the windings (and the speed controller). Sometimes, only maximum power is specified which is of little practical use. Some data sheets and supplier web sites include some obviously incorrect

September/October 2014

Motors continued/.....

propeller/current draw information which raises doubts about the other values! Programs are available to calculate current draw for various propeller sizes etc. but those seen give erratic and misleading results. Actual measurement with a power meter seems to be the only reliable indication.

Inrunners typically have KV values greater than about 2400 with the windings next to the case and the magnets on the rotor inside; they are generally only used for ducted fans etc. Outrunners have KV values up to about 1400 with lower values for larger motors using higher cell counts; the windings are in the middle with the magnets epoxied inside the outer rotating can insulating it from the heat. The unloaded rpm of the motor is determined (approximately) by the product of the KV and the supply voltage; for example, a 1000KV motor on 10 volts (loaded 3 cell LiPo) would run at ~10,000 rpm, as would a 500KV motor on 6 cells. When loaded by a propeller, the rpm will be reduced by about 10-20%. The efficiency increases with increasing load up to about rated current and then drops rapidly as the motor becomes overloaded with a substantial increase in heat.

An important usage parameter is the battery capacity used. To allow a margin for overshoots etc. it is recommended that usage be kept below 70% (~1500 mAHr for a 2200 battery) noting that consumption is generally greater in windy weather. Ideally, it should be checked after flight with a meter displaying remaining charge percentage though older batteries can recover significantly in a few minutes after use. Calculation from voltage is not easy due to the non-linear relationship - 3.76 cell voltage is ~30%. Most chargers display the capacity returned to the battery which can give an indication (usage being the ratio of returned charge to specified capacity), though the specified capacity is often somewhat optimistic and the available capacity will reduce as the battery ages. This would mean that, for powered flight duration of 7 minutes, average current should be less than 6C - proportionally less for longer flights. This suggests that maximum current should be limited to about 12C (~26 amps for a 2200 battery) otherwise the available duration of maximum power usage would be too short to be useful.

The heat generated in the motor is determined by the product of the current squared and the winding resistance.

Motors continued/.....

September/October 2014

Doubling the current doubles the power but quadruples the heat! For example, a motor with a specified winding resistance of 50 milliohms drawing 30 amps at full power would dissipate up to 45 watts; half throttle applies the current for half of the time - not half current for full time! This is why high voltages via high cell counts are preferred to high currents. Significantly more capacity will be used, and hence more heat generated, during the last minute of flight than for the first due to the lower battery voltage requiring increased throttle to give greater current to maintain the output.

If the magnets get too hot, they will lose much of their magnetism permanently with obvious consequences to performance. Excessive heating and cooling cycles can loosen magnets destroying the motor when they hit the windings. If the windings get too hot, the insulation will melt with resultant short circuit and smoke! The only available cooling is from the passage of air through the windings via the motor holes provided. Unfortunately, a typical installation hides the motor in a cowling with a spinner blocking cooling air access into the motor; sometimes scoops are implemented to direct air over the side of the motor which

will have little effect. The windings represent most of the weight of the motor and act as a heat sink capable of absorbing a significant amount of heat; long flights present a problem since sufficient cooling provision would be needed to remove the heat at the same rate as it is generated. Since this stored heat can only dissipate slowly on the ground, a 5 minute delay between flights is suggested to allow cooling - longer for large motors or in hot weather.

Practical experience suggests that the motors, with some cooling provision, are sufficiently robust to withstand this abuse by absorbing the heat for an average flight (<10 minutes). For an inrunner, touching the can with a finger should give a reasonable indication of the internal temperature. However, for an outrunner, this is unlikely to be very helpful since the can is too remote from the windings - if hot to the touch, the windings will be very hot; the best access is by touching the cross mount at the rear. The finger touch rules apply - warm OK, hot marginal, too hot to hold likely to cause damage and too hot to touch probably damaged!

Jet Power 2014

(Or, How we invaded Germany Again!)

September/October 2014

Photos & Article by Dave Swarbrick

Paul, Jim, Jason and myself decided to make the trip to Jet Power, this event has the reputation of being the best Jet only event in the world. We started to organise the trip last January and really it is a good job as we only managed to find a hotel with 2 rooms left in a region of 50 miles radius from the event. The flights were booked with German Wings and a reasonably sized car was also arranged, in the end we were only about a 15-20 minute drive from the flying site and approx. one hour from the airport.



We went out on the Thursday afternoon flight, and despite securities best attempts to hold us up with searches of our bodily parts, we arrived in Cologne on time, got the car from a girl who was born in Glossop but left when she was 4 years old. We eventually got the Satnav. to work but as Paul had luckily set off in the right direction the machine finally caught up. (The hardest part was finding our way out of the car park.) Paul did a great job

as everyone was putting in their two pen 'worth and Jason and Jim insisted on looking at the Sat Nav. This meant Paul was driving blind for most of the journey.

We got to the hotel at approx.. 8.45pm. and



September/October 2014

Jet Power 2014 Continued/.....

went straight into the adjoining restaurant where we had some of the best steak I have had in a long time, after a few beers and a perusal of the local town we finally got to bed at about midnight. Paul and Jim went off to bed holding hands and Jason tucked me in. After breakfast we set off for the flying field. The site is on the top of quite a high hill with vineyards all the way up, a full size gliding strip with a tarmac runway at the side runs along the wide ridge, we arrived at about 8.45am and because of our disabled badge were allowed right inside the exhibitors area and only about 50 yds. from the runway.

The show is unlike anything you will see here in England, the organization is brilliant, the local councils subsidise the show because it brings in modellers from all across Europe to spend money in the local hostels, also American and Australian voices could be picked out among the visitors.

The show line was set up in a different way to our shows in that high (15-20ft) plastic netting was erected about 10 yds. from the take off/ landing strip and then a low fence about 5 yds. from that, this is where models were parked ready for flying. Every single model was taken to the start-up area where it



was weighed and checked for being overweight. The Germans have a strict weight limit of 25kgs. including fuel, quite a few were caught out with this ruling including the Bishops with their Hawks from the UK, quite a few complained but it was pointed out to them that this ruling was in force last year and was on the pilots registration form when they applied for flying this year.

After a look down the flight line we decided to have a gander at the trade stands, the first thing that hits you is the sheer size of the marquees, these were about 100 yds. long and 30 yds. wide with proper suspended floors and totally weatherproof. There were two of these and some outdoor stands of equal quality, the other thing you notice is that no one

September/October 2014

Jet Power 2014 Continued/.....

was selling toys or cheap foamy models, foam models were there but fairly high quality DF Jets.

You saw very few children or women, the whole show seems to be designed for dedicated jet model flyers who want a weekend away with like-minded blokes looking at the latest technology on the jet scene. Every major European and far eastern manufacturer was there showing off the latest product and in most cases selling a lot of models. We saw people carrying out huge boxes containing the latest jets, in fact the manufacturers did not want to take them home so some good bargains could



be had. Some British companies made the trip and had some good stands, but really it was about seeing things that we do not get in this country.

All of the European engine manufacturers were present both in the trade stands and on the flight line showing off their wares. Aviation Design (Philip Avons) was showing off his new Diamond jet, this is a very futuristic looking model more akin to Star Wars than anything that is flying today. Tomahawk jets had a 1/4 scale F86 Sabre this is a gorgeous model with a price tag to match, (10,000 Euro without the engine) it flew like it was on rails and landed so slowly, it was perfect.

September/October 2014

Jet Power 2014 Continued/.....

This show is definitely aimed at the manufacturers/distributors of high quality all composite models and gas turbine engines, I think that most of the models we have heard of were represented and demonstrated on the flight line.



On the Saturday night at 9.00 pm a night flying show and firework display was organized. We left the site at about 5.00pm and drove into the local town for some food, finally replenished we headed back to the show site, we got slightly lost and went up the wrong side of the hill, we were climbing like an homesick eagle and heading for the snowline before we decided we were going in the wrong direction, suddenly we were overcome by a smell that I can only refer to as being from a long time dead animal. I think you might be in front of me here, yes it was Jim, he had been on some sauerkraut fritters, with all the windows open and everyone cursing poor Jim we headed at great speed down the hill, luckily Paul was not overcome by the fumes and we got back to the site with no more problems. It was however noticeable how we all keep away from Jim for the rest of the evening.

We had an idea what was going to happen at the night show but in no way could we have visualised the quality of flying or the lighting on the models, it all kicked off with a helicopter, with full lighting, and phased colours on the rotors, flying to music. This was followed by a large 3D extra towing up 3 gliders at once, fully lit, one of the glider pilots got a bit carried away and started doing rolls on the line which got



September/October 2014

Jet Power 2014 Continued/.....

wrapped around the other models so they had to abort very quickly. They flew fun jets with rocket assisted launch and strobes that made it flash across the sky like a UFO. This all went on nonstop for over an hour and was finished off by the best firework display I have seen in years. The commentary and the thousands of people in the crowd made this a memorable night.



The venue being in the hills gave rise to some sharp showers that came and went very quickly, we had a few showers like this on the Saturday but in general it was warm and sunny until Sunday when the rain set in and did not stop, so we had a final look around the trade stands and left at approx. 1.00pm. We had a couple of hours spare so we headed for Cologne and had a pleasant look around the cathedral and town centre, taking in an excellent lunch. We arrived back at the airport at the allotted time. After getting rid of the car and clearing security and passport control we headed for the lounge and some coffee. With Jim and Jason guarding the bags Paul and I went to get some drinks after



mistaking salt for sweet and low we made our way back to the others without mentioning the mistake to Jim, Jason was OK as he does not take sugar, we assured Jim that this was the way to take coffee in Germany, this caused much humour with the German passengers. We made our way to the gate only to find that the flight

September/October 2014

Jet Power 2014 Continued/.....

had been cancelled, so we had to make our way out of the airport and re-enter at the checking in desk. After much deliberation we got a flight the following morning from Dusseldorf.

German Wings put us in a hotel and gave us more steak, and after a few beers we finally got to bed late. The problem was that we had to get up at 3.00am to be ferried to the other airport approx. one hour away, this all went smoothly and we finally got the plane at 6.00am. to find that we had all been upgraded to first class, this meant we had all got double seats and a free breakfast. Very civilised.

In conclusion we had a great weekend, I'm glad we went for the full 3 days. The things that we all commented on was the organisation, the cleanliness of the site and the toilets, the quality of the food at the show was first class and very reasonably priced, the lack of drunks druggies and general rowdiness when you are in the towns.

Are we going again.?? You bet we are if only to find the biggest town in Germany every motorway junction had it signposted, it was called Ausfahrt. Jim looked for it for 3 days and couldn't understand why all the signs were in German!





September/October 2014

Hi Guys,

Liverpool and District Model Aircraft Society (LADMAS), would like to inform you that the club will be holding its annual Wright Memorial Scale meet on Sunday December 14th at the clubs Halsall Flying Site.

<http://ladmas.webs.com/eventscalendar.htm>
For information please see the events calendar.

This is a very informal and relaxed event open to scale type aircraft.
There is no judging involved but trophies will be presented on the day to modelers who have been voted for by their fellow modelers taking into account scale looks and flying performance.
The website contains the necessary details.

Minimum 'A' certificate required and 'B' certificate for over 7kg.

As always we are of course dependant upon weather conditions.

The location of the Halsall field is :-

From Halsall from A5147 New Street, turn into Carr Moss Lane. After 2.1 miles and immediately after blind left hand bend, turn right through metal gate onto track in field. Left at T after 100 yards and follow to model flying field.

From Ainsdale from Mill Road, turn into Segars Lane. After 1.5 miles and immediately before blind right hand bend, turn left through metal gate onto track in field. Left at T after 100 yards and follow to model flying field.

Nearest landmark, private dwelling: Barn House, Carr Moss Lane, **L39 8RZ**

(within 100 yards of field)

Regards

Richie Robinson
LADMAS Secretary

Hi Guys,

LADMAS will be hosting a Warbird flying event on **Sunday 2nd November 2014**.

The event is not a competitive event but is designed to be a fun and friendly flying for all those who are interested in Military / Warbird types of models.

The event will take place at the LADMAS Halsall field which has a large smooth grass runway, on site toilets and refreshments will be on offer.

Some prizes will be presented to pilots of models as voted for by their fellow pilots.

A 'B' Certificate will be required for models over 7kg.

So if you have any type of military plane then come along and join us.

The location of the Halsall field is :-

From Halsall – from A5147 New Street, turn into Carr Moss Lane. After 2.1 miles and immediately after blind left hand bend, turn right through metal gate onto track in field. Left at 'T' after 100 yards and follow to model flying field.

From Ainsdale – from Mill Road, turn into Segars Lane. After 1.5 miles and immediately before blind right hand bend, turn left through metal gate onto track in field. Left at 'T' after 100 yards and follow to model flying field.

Nearest landmark, private dwelling: Barn House, Carr Moss Lane, **L39 8RZ**

(within 100 yards of field)



Indoor Flying Rochdale

September/October 2014

Hello all!

You might like to know about the dates for the indoor meetings at Rochdale run by the BMFA North West Area!

They are as follows . . .

16 November 2014
14 December 2014
11 January 2015
15 February 2015
15 March 2015
12 April 2015

Further details of event structure can be seen at www.bmfa-nw.org and go to "events" page.

A map etc. can be seen on this page.

Remember it is only £4 for the day - regardless of number of models you bring to fly!

No food available - bring your own.

No helicopters or land craft allowed.

Pre--booking not needed . . .just turn up!



September/October 2014

Swap Meet

TAKE "THE ROAD TO WIGAN SWAP MEET" Saturday 29 November 2014 AFTERNOON Setup from 12.00 Noon Public/buyers 1.00 till 4.00 St. Aidan's Parish Centre, Highfield Grange Ave, Winstanley, Wigan, WN3 6TB Simple to find - only 1.5 miles from Junction 25 on M6(coming from South) Ample free parking on doorstep, flat loading, quality function room, licenced bar, tea and coffee. Admission £2-00 Ladies and kids FREE Tables : small @£2-00 , large @£3-00 Limit of one complete airframe per large table. Show more in car park. Sellers should have goods that bear some relevance to aeromodelling. For more details, directions, bookings, etc. contact :-

John O'Donnell 01942 211742 john@odonnell3737.co.uk
20 Manderville Close, Winstanley, Wigan, WN3 6HL

Directions : Unless you are local, or know the area, it is best to start from the M6. This avoids going through the centre of Wigan. If travelling from the South leave at junction 25. This is the one after 23. From the North leave at junction 24, loop over the motorway back onto the M6 heading North, and leave (after a mile or so) at junction 25. At the end of the slip road there is a roundabout with a large metal sculpture. Turn LEFT (first exit) onto A49 (signed Wigan). This is a dual-carriageway, soon with a 30 mph limit, then traffic lights (continue straight on), prior to another roundabout. Turn LEFT at the first roundabout (first exit) into Highfield Grange Avenue (signed Winstanley). After about ¾ mile this ends in a mini-roundabout and T junction. JUST before this, on the Right are St. Aidan's Parish Centre and Church. The (only) entrance to the car park is in front of the Parish Centre. NOTE: If returning to the North after the event, it is suggested that you go to J24 and go South for about 1 mile and loop round to go North.



Shows/Events for 2014

September/October 2014

Bonfire Night at the Field

Our annual Bonfire Night will be held 8th November. Guests will be welcome up to a maximum of four guests per family.

AGM

The AGM will be held on the evening of 3rd December at the South Shore Tennis Club commencing 8pm.

Christmas Quiz

This is to be held at the South Shore Tennis Club on the evening of 17th December

In Conclusion

September/October 2014

Well, that's it for this month. Sorry it's been such a long wait but personal matters came into the picture as I said previously. I am indebted once more to John Higgins, Brian Holdsworth, Arran Turner, Mark Conlin and the highly amusing article by Dave Swarbrick. You and Paul brought back some excellent pictures.

Please gentlemen (and ladies) I am always looking for interesting stuff to put in this newsletter. It seems to me that the same people continue to support the contents each month. I leave you with a couple of pictures from the Scale/Aeroshow.

