The Electronic News letter of the Chichester and District Model Aero Club

Clear Dope

November 2024

Chichester and District Model Aero Club: Committee 2024
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This is Clear Dope is the last Clear Dope that I will be editing after holding the roll of editor for some fourteen years and BMFA rep for some years longer than that.
I have always enjoyed the enjoyed the roll but now is the time for others to continue in the publication editor and BMFA rep

MORE ARTICLES PLEASE

Remembrance Sunday Glider Competition - 10 November 2024
(report by Robin Colbourne)

As with previous years CADMAC recognised Remembrance Sunday with silent flight competitions and a collection for the Royal British Legion.

As per the last few flying days, the forecast was for almost no wind. Whilst this wasn't a problem for the electric gliders, it really didn't help those launching on the bungee.

Seven pilots entered the electric glider class whilst only four flew pure gliders off the bungee. Other members came along to help with timing and bungee retrievals.

With little to no thermal activity, smooth flying was the order of the day. The winning pilots flew flew steady climbs to maximise their height gain, transitioning smoothly into the glide without height-sapping stalls. From then on it was a case of fly as slowly as possible to achieve minimum sink rate whilst keeping control movements to the absolute minimum for maximum efficiency.

In the bungee launched competition, a lightweight glider with plenty of wing area was the order of the day, as can be seen in the results.
Ken Knox flew a balsa and tissue covered Amigo that he had recently acquired. This 64 year old Graupner design was originally a free flight model, evolving through single channel into a very popular first glider for two channel radio in the 1970s. With Declan's assistance to launch, Ken managed an unbeaten 3:49 on his one and only flight.

Adrian Childs flew another classic Graupner design, the Cirrus, well the wings were, anyway. They were mated to a wooden fuselage designed and built by one of his Basingstoke club mates. The long nose on this avoided the need for excess lead to balance the model, thus ensuring it was also light and therefore ideal for the conditions.

Duke Benson's unknown glider which also bore more than a passing resemblance to a Graupner Cirrus, took third place, although the complete absence of wind by this stage resulted in only a 44 second flight. Declan's Bird of Time also managed 44 seconds. He flew a second flight, however the bungee just did not have enough grunt to get this larger and heavier model away. The short twelve second flight resulted in a cartwheel breaking the wing. Such a shame for this beautiful glider that Declan had managed to keep unblemished for several years. The wing may even have swung before the launch, it was certainly blowing from the launch point towards the bungee stake shortly after Declan's 'arrival'.

In the electric glider class, all but David Hayward's built-up wood construction Robbe Milan and Duke Benson's moulded Art Hobby Adventure EF 2.8 were EPO 'foamies'. Two 'foamie' pilots, Adrian Childs flying a Multiplex FunRay and Derek Honeysett with his Multiplex Solius, broke the five minute barrier, whilst George Gilchrist's Multiplex Easy Glider managed a very creditable 6:18 on his second flight.

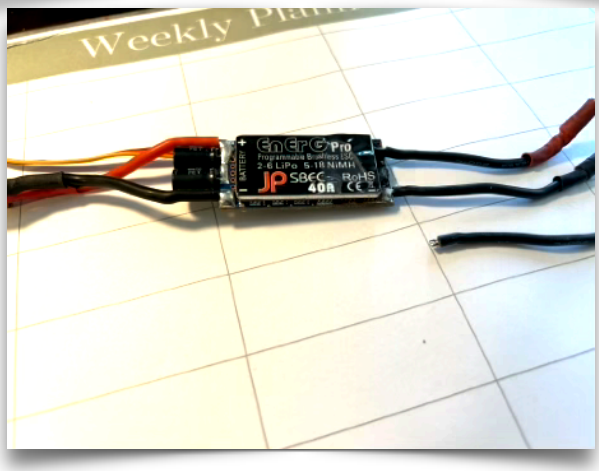
Duke's all-moulded Adventure 2.8 demonstrated what a skilled pilot flying a lightweight, low drag model could achieve, with 7:45 and 9:50 on his first and third flights respectively. Duke's second round score of 5:53 was second only to George.

Tim had planned to compete with his Multiplex Heron, however an unexplained dive into the ground after the 20second motor run ended, resulted in Tim fielding his Night Radian instead. What he lacked in time airborne, he more than made up for with colourful light patterns against the grey sky.
Adrian finished the day by exhausting his stack of batteries, putting the FunRay through its paces with some very smooth aerobatic routines.

Alison Honeysett, Derek's wife, yet again treated us to one of her delicious homemade cakes. This time it was a very tasty ginger cake decorated with a red poppy to remind us of all those the day commemorates.

Dear members
Thank you to those of you who donated to the CADMAC 2024 Remembrance Day Gliding Event in aid of the British Legion Poppy Appeal. I am pleased to report that the current total raised is £225. The gliding event was blessed with no wind and zero lift meaning flight times were low although Duke Benson did manage to get over nine minutes on one flight in the electric glider event.
Once again thank you for your donations.
Kind regards
Derek

It was a bad day for the Herons that attended the afternoons event, Tim's pet Heron decided to misbehave and did it's own thing and mine had a catastrophic failure of the speed controller resulting in a long walk for David, thanks David for being my fetchamite Ken



Fun Fly Competition – Portshole Farm - 23 October 2024
By Robin Colbourne

In a week notable for wind, rain or both, the CADMAC Fun Fly Competition was blessed with a light southerly wind and clear blue skies. Unlike most club events, all but one of the four fun fly tasks were flown at low level, providing an exciting event for competitors and spectators alike. Only the climb and glide challenge took the models higher than treetop height.

Four pilots entered, Ray Shivjee, Jeff Cosford, Steve Newman and Adrian Childs. All flew specialist fun flyers, although any model with propulsion and undercarriage would have been eligible. Ray and Steve both flew SLEC Limbo Dancers, a 1998 design. Adrian's FU2 model also dated from the 1990s, whilst Jeff flew an Evolution Models Fusion 3, first released last year.

All models followed the now standard Fun Fly layout, with a 50” low aspect ratio, open-structure wing, 'barn door' control surfaces, lightweight balsa construction and a forward-mounted main undercarriage; the latter allowing the model to tip back on its wheels if nosed over. With electric power, this allowed the pilot to take off again without intervention. Previously, with glow power, this would have stalled the engine. The propellers proved remarkably resilient, breaking only in the hardest of arrivals. Some pilots flew three cell Lipos, others four cell. Servos were generally minis, but all were budget. This event does not need a massive investment. Having said this, the elevator servo in Ray's Limbo Dancer chose the day of the event to give up, so he swapped the rudder and elevator servos and lived with the lack of yaw control.

The first task was the Bomb Drop. A spray can cap was attached to each model's centre section, with the aircraft either looping or rolling inverted to drop the lentil-filled balloon 'bomb' as near to the target as possible. Steve must have had an especially twitchy elevator as his bomb twice dropped itself whilst the model was the right way up on climb out. On his third attempt, with some gentle manoeuvring, it stayed put until the desired moment. Adrian's bombing was the most accurate, landing a mere 3 ½ paces from the target, whilst the others, remarkably, all scored the same, at 6 paces.

Next came the climb, glide and spot landing. The latter was scored separately, although it was all one flight. Steve flew first, setting a very high bar, gaining plenty of height, then finding every bit of lift going on the glide down, giving him a four minute 58 second flight. Unfortunately the wind gradient was such that he came down well short of both the target and the strip, landing 28 paces away. Jeff also had a very good climb, although was not quite as fortunate as Steve with finding lift on the glide. Jeff excelled at the spot landing, arriving so close that the edge of the target caught the leg of Jeff's model bringing it to an abrupt stop. Ray and Adrian didn't find any lift to speak of, so only scored 2.05 and 2.33 respectively. Ray's was 11 ½ paces from the target, whilst Adrian's model stopped a very respectable 3 paces away.

In the Triple Thrash, pilots flew three loops, three rolls and three touch and goes. Here Jeff's BMFA Fun Fly Competition experience became evident, as he made sure that the last roll put him in position to start his touch and goes, whereas the other pilots had to fly an additional part circuit to put themselves on the approach line. Jeff completed all nine manoeuvres in just 23.82 seconds. Adrian's FU2, on one of its touch and goes, tipped up on its nose facing downwind on the downwind edge of the patch, necessitating him having to manually turn it round to continue the task. This, plus a missed approach, put him on 42.35 seconds, behind Steve (30.31) and Ray (34.27).

The final task, in which the competitors flew as many touch and goes as possible in two minutes, was saved until last, as it is the hardest on the models. How the pilots tackled the task varied. Some flew cross between a loop and a tight circuit, whilst others did elongated loops. Energy management and positioning are the key to this event. Excess power on climb out puts the model too high, resulting in wasted time getting back down. Too much speed on approach and the landing will be at the upwind end of the patch, risking going into the long grass.

Adrian, despite one or two missed approaches, still managed a commendable 17, whilst Ray, despite his model being rudderless, managed a superb 25. A little bird told me Ray had been seen practising a few days earlier, which showed, but a fantastic job nonetheless. Sadly, Steve ran out of speed, height and ideas all at the same time, resulting in his Limbo Dancer going in hard on the second 'touch', breaking the prop and front former. Jeff again demonstrated how smoothly he could fly this task, with superb elongated loops and making sure the wind didn't drift him off the patch, pipping Ray's 25 by one to give 26.

Having been timing the competitors, I did not have any action photos, so Steve fetched his reserve model, a Wot 4 Foam E, and the four pilots flew around in formation, providing much entertainment. At this point, your scribe, with his brain frazzled by the timekeeping and counting, handed the score sheet to Lorraine, who, dragged away from making the teas and coffees, totted the results up. The rankings on each task were added, so the competitor with the lowest score was the winner.

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In first place, Jeff had 7 points, in joint second were Steve and Adrian with 13 points, and in fourth place, Ray on 14.

Thank you to all the competitors for a very entertaining day and thank you to the Portshole regulars who gave up their flying to enable the event to take place.

B test thoughts By Fraser Dibden

Having recently passed my ‘B’ test, I was asked to put down some thoughts to help those of you that might be considering taking the test.

I decided to push forward with the test after a club ‘B’ test training evening last summer. Historically the test has been regarded as one’s ‘licence’ to display, but in fact it is designed to be simply the next step after the ‘A’ test demonstrating more advanced safety and flying skills. I had no desire to be a display pilot, I simply wanted to improve. Committing to the test gave me tremendous focus and, a year later, I can say with all conviction that my my flying skills and modelling knowledge have improved vastly under the challenge – far more than if I had not pushed myself.

1. Background information

Before you start, read/view the relevant documentation of what is expected from you in the test. Here, from the BMFA website:

https://online.fliphtml5.com/doorh/qgxx/#p=16

Read the description of the manoeuvres (starting page 17), and watch the videos. Consider printing out a copy of the sequence, but definitely LEARN the sequence by heart; 2 loops, 4 rolls, stall turn, spin, circuits – it’s not hard!

2. Choice of model

While one can fly the test with a Wot-4, there is no doubt that the test is easier to fly with a pure aerobatic aircraft: these tend to have mid-mounted wings with symmetrical airfoils so that they fly inverted just as easily as upright. Best of all would be a pure F3A pattern model (such as the FMS ‘Olympus’ that some of our members own) but it is not necessary to go this extreme – any model that is easy for YOU to fly upside-down is all that is needed.

I started out with the well-known MX2 (1350mm span):

This was a great aircraft to begin, but unfortunately I eventually crashed it: be very aware that you are likely to lose at least one aircraft as you practice! My backup was an E-Flite Yak 54 (1200mm span), which I used for most of my practice for the next 8 months:

As the test date approached, I began to realise that although the little Yak could do the manoeuvres handsomely, it was too small and too light in windy conditions: it tended to get blown around like a piece of paper, so that the level flight segments between manoeuvres looked really scrappy. I realised that I needed a larger model; to fly better in wind, and also ‘present’ better in the air making it easier to see when corrections are required.

In the meantime I had been building a 1.4m Edge 540 to replace the MX2 for the test, but sadly I was unable to finish it before the date of the test. A few weeks before the test I therefore bought a Votec 322 (1395mm span, 4s battery, flying weight 2050g) which I used for the test; I found this to be about the optimal size for me:

Finally there is a consideration for flight time: you want a model that can fly for at least 7-8 minutes (in case of repeat manoeuvres) without changing the battery or refuelling.

3. Model setup

This area is crucial, and I learnt SO much about this subject over the year of my practice! My thanks to Adrian Childs and Ray Beadle for their advice and help in this area.

CG is clearly the most important variable. I flew my models in the whole range from seriously nose-heavy to tail-heavy. It taught me not to fear an out-of-balance model, but rather to appreciate the different performance that the model will yield. For me, my sweet spot ended up having the CG very close to, but just forward of, neutral. That meant that only a tiny bit of down elevator was needed to fly inverted. I found the best way to check is to fly level at cruise throttle, pull up 45 degrees, roll inverted, and let go … I want my model to continue that trajectory for at least 4-5 aircraft lengths before VERY slowly dropping the nose. An added benefit with this CG position is that the aircraft will settle into a nice glide during landing approach without dropping the nose, making it a doddle to land gracefully.
Control throws can be surprisingly low for pattern manoeuvres: you only need about 10-15 degrees of movement on the elevator and ailerons, perhaps 20-25 on the rudder. With an almost-neutral CG, most aircraft will happily spin with these throws; if she won't spin, consider using a rates switch to increase throws just for the spin. Set your aileron throws so that the roll rate that you want for the consecutive rolls is achieved at full-stick (then you only have to worry about elevator inputs!).
I normally use use considerable expo, and started out using around 55%. As my skill improved, I found that I preferred around 45-50% for slightly sharper responsiveness.

4. Practice

Firstly, realise that this is probably not something you can do in a week; I practised for 12 months!
You must also realise that the test is not just flying the manoeuvres – it is at least as much about flying them in the right place! You must fly them along your chosen line and directly in front of you; the examiners will probably have MORE focus on this than the manoeuvres themselves. So get used to this from the start, and concentrate on the POSITIONING of your manoeuvres from the beginning.
Start by practising the individual manoeuvres. Consider reading "Model Aircraft Precision Aerobatics" by Peter J Jenkins if you need help with any particular manoeuvre. For fastest improvement, practise the same manoeuvre several times without stopping; for example, do 3 or 4 loops consecutively, concentrating on keeping them all in the same position. When you can do 4 outside loops in a row, you know you have it cracked!
The most difficult manoeuvre for most is the '2 consecutive rolls in opposite direction'. First, let me point out that these are not 'slow rolls'; in fact in my test I was criticised for doing them too slowly! They simply need to be slow enough that some down elevator is needed (not 'twinkle' rolls). Set up your aileron rates/throws so that your preferred roll rate is achieved at 'full' stick, as then you need only to move the stick full over and worry about the elevator inputs. I started by doing half-rolls to get used to the elevator input whilst inverted, then single rolls starting with a bit of nose-up for safety, and finally multiple rolls. As soon as you have enough confidence, try four consecutive rolls – you quickly learn the amount of stick movement and the timing, and it will make 2 rolls seem easy!

The other issue with rolls is that most people have a preferred direction – usually to the right. The reason for this is that, for the left roll, the thumb (for a mode 2 flier) has to stretch away from the hand and has a tendency to pull back on the stick at the same time. So make sure to practise in both directions!
The second manoeuvre that sometimes gives trouble is the 'stall turn'. The aircraft often does not respond to the rudder or 'flops' out of the manoeuvre. The trick here is to keep half-throttle until after the rudder input and the model turns downward: the propwash ensures the rudder effectiveness.
Once you have a handle on the individual manoeuvres, it is time to link them up per the test schedule. Here you will suddenly find that HOW you get from one manoeuvre to the next is actually just as important as the manoeuvres themselves! For example, how is it best to climb following the inside loop to position for the outside loop: climbing procedure turn or Immelman? The advantage of purely vertical manoeuvres (Immelman, Split-S, half-cuban) is that they keep the model on your chosen flight line. For me, I found it easier just to do climbing turns, but you will have to make up your own routine in this respect.
Lastly, don't forget to practise the test! And by this I don't mean just practising the schedule, I mean getting hold of one of the club examiners and have them run through a mock test with you. Jeff Cosford was immensely helpful to me in this respect, often helping remind me of the importance of POSITIONING.
And take a break occasionally. By the time you have been practising these same manoeuvres for 6 months, they can wear a bit thin!

7. The Test

T**he** test requires 2 examiners, which we are very fortunate to have within CADMAC. However, given the constraints of their respective calendars plus the vagaries of weather, it is prudent to try to book them some time in advance, perhaps also with a backup date in mind. And let me tell you: there is nothing quite like having the date fixed to focus the mind on practice!
Taking any exam will test one's nerves, particularly if one has to perform in front of others. In my case I was dreadfully nervous which was a shame as it did not allow me to enjoy the experience of the exam itself. I was so nervous that I had to repeat several manoeuvres (this is allowed under the test guidelines)! Both examiners were very relaxed and clearly 'willing' me to pass. In hindsight I should have enjoyed the experience.
The examiners will probably ask other flyers to stay on the ground while the test is flown (they did so for me), but remember to lookout and make the normal calls as if other pilots were flying.

So in summary, what have I learnt? Would I recommend it?
In addition to all of the above I also learnt that how one holds the transmitter matters. Thumbs or pinching? There is no doubt in my mind that pinching allows one to fly far more accurately than thumbs only, but I appreciate that it is not comfortable for everybody. The next step is to fly using a TX tray (as almost all of the IMAC and F3A pilots do) which allows even more accuracy with hands positioned almost over the sticks – I have already started to use a tray.

I am proud of achieving the certificate, but even more so I am proud of the knowledge I gained along the way and of my huge improvement in flying skills. Without the challenge, I would not have come close to this level of improvement. So yes, definitely, give yourself the challenge.

Blue side up!
Fraser C. Dibden

Flap to Elevator Compensation, and Slow-up, Slow-down. Advice by Jeff Cosford

The Tasman, like the Timber, has a tendency to pitch up violently when you apply flap. It requires as much as 30% down elevator when you apply full flap.

This requires a Flap to Elevator mixer. In my new Frsky radio, I had to learn via YouTube how to do this – there are several ways to do it, and one utilises Flight Modes rather than a mixer. I have tried them all.

So when it came to helping Mark set up his Tasman, I knew what was required but was not sure how we would achieve it using his Spektrum NX8 - I have little experience of Spektrum.

But Mark had read the manual, and as he will tell you, we had it set in 20 minutes. Not only was it intuitive, but there was the added benefit of pre-programmed slow-up / slow-down of flap and elevator.

Slowing the flap to, say, 1 second makes the transition smoother and safer. And it is important that the elevator compensation is also delayed by a second, otherwise you get a short, violent pitch down when you apply flap, as I learned from experience. With my radio, slowing my elevator compensation involved more YouTube watching, but I am there now.

So Spektrum have gone up in my estimation: easy to use, great buddy box integration, the free upgrade to 20 channels, the very good (for Spektrum) price of the NX8, and the integrated Smart escs and lipos. (I would not swap my Frsky X18 though!)

Future articles: Can someone let us know how the NX differs from the DX. And can anyone tell us if the iX range is worth between £900 and £2000? (I think we know the answer!). And the benefit of all that Smart stuff they sell

X-Fly Tasman – by Jeff

I bought this when it came out nearly 3 years ago, and it has been one of my favourites, so this is a long term review.

It is 1500mm span and X-Fly recommend a 4s battery. I like the 2200mah for very lively performance, but 2900mah is more sensible. With a 4000mah 4 cell it still flies well. Even 5000mah will fit, and balance.

Compared to a 1500mm Timber, the Tasman is more lively and aerobatic, and will perform all the wild stunts of a low winger, with the CG moved rearward a little. The promo video shows it doing knife edge, inverted flight, and wild flicks, and when I saw that, and then the price of sub-£200, I ordered one at once. With full flaps applied it will do those ultra steep landing approaches which I know Ken likes to do with his.

Although X-Fly do not recommend it as a trainer, on 3 cells it makes a slow and forgiving first model as Mark has found in recent weeks.

It is ideal for Portshole, because the big blow-up tyres and springy undercarriage make it taxi beautifully.

Downsides? The tyres are thin! And expensive. But mine are hanging on, although one is covered in cycle repair patches. Even deflated, they still work. And the thin aluminium U/C bends on the first hard landing, so nothing like the Timber quality. I am sure it could be upgraded, but I just bend it back.

And the lovely orange paint comes off, so I bought Valspar colour-matched touch up paint at B&Q, perfect.

If you have to disassemble the wings to fit the car, or for storage, they are a pain to fit! I only have to remove one wing, so only half the faff.

In summary, a nice-looking, well-designed sports model, for a budget price.

Electric Flyers – A little more detailed LIPO info;
I start with credit for the following info is largely from one of a few experts in this field Bzfrank's expert level Lithium Polymer Technology publication which covers most all major issues in the care of our Lipo packs. The bullet points represents **BEST CASE PRACTICES**. Take what you can use and ignore the rest understanding the Trade-offs. A good charger is money well spent for charging our batteries safely and often offers many safe parameter features are often provided straight out of the box. As for our Lipo's;

To Maximize Cycle Life and Performance:
1. Never fast charge cold packs, it causes permanent damage
*restrict charging temperature to between 70F/21C - 86F/30C degrees
*reduce charging rates to1C or less when near bottom of this temperature range (regardless of label specs)
*optimum charging temperature is > 77F/25C degrees
2. Never discharge at high amps when packs are at low temperature, it causes permanent damage
* optimum discharging temperature is > 77F/25C degrees
* real "C" maximum discharge levels should be avoided until pack temperature is > 86F/30C degrees
3. To enhance life even more, charge below 4.20v/cell and limit depth of discharge (DOD) as much as possible
* charging at 4.10v/cell doubles cycle life
* limiting DOD <70% doubles life
4. Maintain pack running temperature below ~131F/55C if you wish to avoid accelerating the aging process
5. Immediately charge a pack to 3.7v if any cell has been discharged to 3.0v (or near)

Storage Facts:
1. Regarding maximum cycle life there is little difference storing packs between 3.7v/cell - 3.9v/cell if kept within 32F/0C - 68F/20C degrees
2. Regarding reducing age related capacity reduction store at 3.7v-3.75v/cell and maintain temperature between 32F/0C - 68F/20C degrees
3. Long term storage above 77F/25C degrees accelerates aging which becomes more pronounced the higher the storage charge is
4. Storing packs at 3.7v-3.75v/cell avoids the possibility of thermal runaway due to accumulated effects of abuse and/or aging which produce dendrites (Dendrites: microscopic crystallized mineral treelike whiskers or protrusions responsible for non-crash related internal short circuits)
5. Always place packs in Lipo bags or other flame proof containers when not in use

Fun Facts:
1. **To obtain accurate comparison data,** IR must be measured at the same temperature (ideally ~72F/22C) AND at the same state of charge (SOC)
2. All other things being equal, the reason **heavier packs typically generate higher real C output** is because cells are constructed using thin layers, wrapped and stacked for maximum surface area. The greater the surface area the greater the output the greater the weight.
3. Some manufacturers indicate ~158F/70C to be the maximum temperature for their packs.
However **damage begins at any temperature over 140F/60C** due to chemical decomposition forming harmful by products which adhere to the SEI layer.
However **damage begins at any temperature over 140F/60C** due to chemical decomposition forming harmful by products which adhere to the SEI layer.
Temperature
High temperature is the most common reason Lipo's degrade prematurely. Excessive heat can result from low voltage operation, extreme load and extended high energy flight times. The balance requirement between weight, C and strong voltage is application specific. Much above 150 amps and heavier high C or high mAh packs become the logical choice. The good ones bring a considerable weight penalty and unfortunately not all heavy packs are good. Heavy or light, many Lipos are marginal at best and cost has zero bearing on what you get. The comprehensive testing and comparisons provided below can help sort it out. All things being equal, packs which maintain higher voltage under load provide a better flying experience then those which don't. The data was acquired during full throttle discharges down to 3.5v/cell with no active cooling so all temperature readings are reduced by 5 degrees to better reflect field use.

A good rule of thumb for controlling temperature is to maintain in flight voltage above ~3.56v/cell. *(I set my audible voltage sensor to either 3.7v or 3.6v when I fly*) Real C shows itself by maintaining voltage levels up against the load so the power produced often has a lower temperature component. Cell manufacturers tend to ignore temperature considerations when rating their cells.

There's no formal industry standard on how real C values are determined and claims have become so wildly exaggerated they've become little more than marketing ploys.

The ‘Techie stuff’

Solid-Electrolyte Interphase (SEI) layer:
* a **necessary ~0.00004"/.001mm thick layer** which forms on the Anode during the first charge cycle (or after a few break in cycles with lower quality products)
* it acts as an **"interface"** between the electrolyte and the electrodes
* in it's best condition it **allows free rein flow of ions** between the Anode and Cathode during charging or discharging.
* battery **performance is highly dependent** on it's condition
* as a cell ages or sustains damage the SEI thickens **increasing resistance (~IR)** and reduces capacity

Thermal Runaway:
1. Plating is a form of Dendrite that can develop when excessive quantities of Li+ ions are pressed into the Anode during charging, influenced by:
* over voltage
* excessive charging current
* low cell temperature during charging
* old/mistreated (over heated, over amped) cells having a thickened SEI layer
* imperfections due to lower quality Anode material

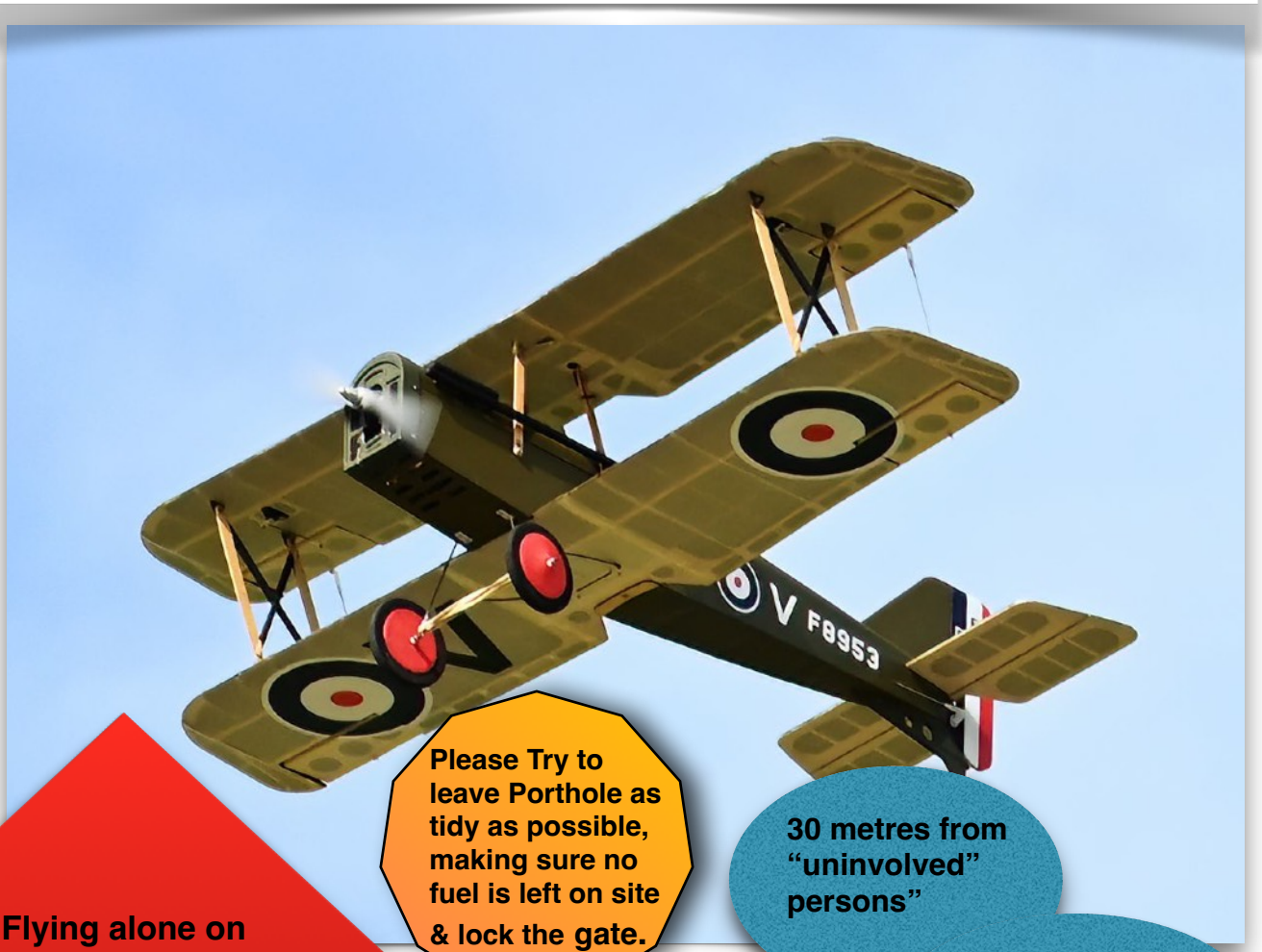
2. **Dendrites cause internal "Micro Shorts"** which bridge the separator between the Anode and Cathode and grow over time into "Macro Shorts". Macro shorts damage electrode separation and breakdown the SEI layer **which generates extra heat**, furthering the vicious cycle which increases plating. At some point (called "onset") this **damage begins to "self- heat"**. When self-heating increases to a 10C/Minute rate and **reaches ~150C combustion begins**. This process can take **minutes or hours** and is only evidenced by difficult to detect, minute increases in self-discharging (see Storage Facts, #5). To **protect against this possibility** store packs empty (3.7v-3.75v/cell) and cool (< 68F/20C)

3. The Cathode (+ electrode) determines the other portion of a cell's power equation and is made using Cobalt or lower cost Magnesium which provides ~65% the Wh/Kg as Cobalt. The Li+ ion exchange during **discharge mechanically stresses the Cathode**. The higher the current the higher the stress. Too high discharge rates, especially at low temperatures **causes cracks in the cathode** material. High temp and voltage above 4.1v cause the electrolyte to disintegrate (oxidize) and migrate by products through the cell to the anode which **increases SEI thickness (~IR)** and costs lithium (capacity). These reactions generate gases which can lead to **irreversible "puffing" through overload** or fully charged storage. Younger cells are more resilient to this process then aged/abused or high cycle cells. Puffing due to over discharging causes copper dendrites which lead to fire risk during charging. **Irreversible (room temperature) Puffing can be indicative of SEI disintegration which can lead to thermal runaway**.

If you’re still awake after reading that great! Those little cheap lipo voltage testers (that connect to the balance port are way more useful and many more ways than I first thought.
As I charge my Lipo’s at home I’m particularly careful when charging and storing. I like a good number of others charge in a fireproofed and vented ammo box (at 1C most always e.g. 2200mah battery charge at 2.2amps and I commonly get over 24months 300+ charges plus from even the cheapest of batteries). I store at 3.8volts per cell as the chances of any combustion is almost near nil.
I record the Internal Resistance at full charge when first purchased and each time when fully charged. If, say new, my 4 cell I read new 6-5--5-4 on my charger or tester for each cell, after many charges when I see over 25 per cell (or one cell very different from the others for me the battery is done. However it may still work when needed but I ask for the smallish price is it really worth the risk?
Forgetting the Turkey cooking in the oven you are unlikely to forget the result. Same too Lipo Batteries, so please do not leave them unattended whilst charging. A quality charger is money well spent (pop one on your Xmas list). Merry Xmas all!

Lee Seaman

Planed Event dates for 2024



Please Try to leave Porthole as tidy as possible, making sure no fuel is left on site & lock the gate.

30 metres from "uninvolved" persons"

15 metres when taking off & landing, subject to mitigations

Flying alone on Thorney is now not allowed on the grounds of safety

From 1 Jan 21 BMFA Article 16 is law: know the separation minima!

When driving around Thorney be aware of young children on bikes and 20mph speed limit

When flying at Thorney please keep an eye out for traffic(all kinds walkers, horses, bikes, runners, and low flying aircraft) coming from behind the flyers and inform them accordingly

The club Facebook page is now in its fifth year. It has over one hundred members. It contains many contemporary site reports, and has a wealth of photos in its archives. Administered by Nick Gates. David Hayward & Ken Knox

Here is the link:-

https://www.facebook.com/groups/Chichesteraeromodellers/