Understanding Electrics…….BATTERIES

It does not matter whether you power your model by petrol, glow, turbine or electricity you are going to need a battery to power your operating systems and the battery of choice is a Lithium Polymer (LiPo).

As with any new technology coming into an already established hobby the Lipo battery has received considerable bad press especially in its ability to catch fire.

Before going any further I would like to dispel this LiPo fire myth. **ALL** battery types are potentially dangerous if mistreated (NimH and NiCd batteries both had their fair share of negative press when first introduced but this is now long forgotten). Batteries are basically a bomb that holds all that electrical energy in a chemical form and if you release this energy by mistreatment you can get explosions and possibly fire. The biggest problems with all batteries are overcharging and overloading which will produce excess heat followed by self destruction.

The percentage of "battery Incidents" compared to the number of batteries in use has probably not changed although the total number of incidents has probably increased due to the huge increase in battery powered ARF models.

Treat your battery with respect and it will give you a long safe life. PLEASE READ THE BMFA BATTERY SAFETY BOOK circulated by John Cross.

Before you can choose which LiPo you need from the hundreds on offer you need to understand the specifications stated on all batteries:-

1. The voltage:-

   Each individual LiPo cell has a nominal working voltage of 3.7 volts. All LiPo batteries from any source have the same nominal working voltage this is because they all use the same chemistry and it is this chemistry that controls the voltage

2. Number of Cells:-

   The output voltage of a battery pack can be increased by joining cells together in a line (in series). Therefore pack voltages can only increase by multiples of 3.7.

   2 cells…….7.4 volts

   3 cells……11.1volts

   4 cells……14.8volts

   5 cells……18.5volts

   6 cells……22.2volts etc

3. Capacity:-

   This is a measure of how much power each individual cell contains and is expressed in milli amp hours. Lipos are produced in a huge range of capacities. For outdoor models we usually work in the range of 800mah to 8000mah

   One of the most common batteries sizes has a capacity of 2200 mah . This means that a fully charged battery will deliver 2.2 amps for one hour before it is flat (1000 milli amps is one amp).

   The capacity claimed by the manufactuer is usually quite accurate as unlike Nickle Metal Hydride batteries they are not trying to fit more power into a fixed pack size(AA, subC etc). They have no need to exaggerate their claims as they can just make the pack bigger.

4. Maximum Continuous Discharge Rate:-

   This is quoted on the pack as a number followed by the letter C, where C stands for the capacity of the pack from section 3 above.

   Therefore a 20C 2200mah pack has a maximum discharge rate of 20 multiplied by 2.2 amps or 44 amps. Following on from that a 30C 2200mah pack has a maximum discharge rate of 30 multiplied by 2.2amps or 66amps.

If we take this further and look at a higher capacity 5000mah pack rated at 20C you can see that this will deliver 20 multiplied by 5 amps giving a total of 100 amps continuous. Therefore from these calculations you can see **that you do not need packs designed to give more than 30C for Sport/Scale flying** as in previous articles we have chosen a motor and speed controller to run at less than 60 amp continuous.

The higher the C value on your battery the more you will pay for it.

Some manufacturers are charging a fortune for batteries rated at up to 130C. If you take a 5000mah pack rated 130C it can theoretically deliver a continuous 130 x 5 amps giving a total of 650 amps. I believe a car starter motor uses about 300 amps under load for a couple of seconds. Just look at the size of the battery cable in your car required to handle this load of half of what these batteries are claimed to deliver and try and fit that in your aircraft!!

5. Pack Size:-

   Unlike previous batteries Lipos do not come in standard sizes. Most manufacturers specify dimensions. It is usually possible to find a battery of suitable size and shape for most aircraft.

6. Weight:-

   Most manufacturers quote weight. Batteries from different manufacturers but of the same capacity have a very similar weight. The use of Lipo batteries has removed the weight problem from electric flight. An ic motor plus tank and fuel weighs a similar amount to an electric motor plus battery for a similar flight time.

Next time…Choosing your battery