3. Voltage and Cell Count: LiPolys act differently than NiCad or NiMH batteries do when charging and discharging. Lithium batteries are fully charged when each cell has a voltage of 4.2 volts. They are fully discharged when each cell has a voltage of **3.0** volts. It is important not to exceed both the high voltage of 4.2 volts and the low voltage of 3.0 volts. Exceeding these limits can harm the battery.

The way to ensure that you do not go below 3.0 volts while flying is to set the low voltage cutoff (LVC) of your electronic speed control (ESC). It is important to use a programmable ESC since the correct voltage cutoff is critical to the life of your batteries. Use the ESC's programming mode to set the LVC to 3.0 volts per cell with a hard cutoff, or 3.3 volts per cell with a soft cutoff. If your ESC does not have hard or soft cutoff, use 3.0 volts per cell. You will know when flying that it is time to land when you experience a sudden drop in power caused by the LVC.

If your ESC has an automatic lithium mode use it. It will correctly sense the number of cells and set the auto cutoff appropriately.

If you have previously been flying with NiCad or NiMH batteries, switching over to lithium polymer will result in a different number of cells being used. If you had 6 to 7 round cells then 2 lithium polymer cells will correctly duplicate the voltage of those cells. If you had 10-11 cells then 3 lithium polymer cells would be right for you. There are a lot of 8 cell flyer's out there that are stuck between 2 and 3 cells. In my experience the best option is to determine how many watts you were using before and duplicate that with your LiPos, Motor, and Prop. For example. If you were running 8 cells (9.6volts) at 10 amps on a speed 400 airplane, then you have 9.6 x10, 96 watts. So if you went with 2 lithium polymer cells (7.2 volts nominal) then you'd need to change your prop such that you used 13 amps. If you went to 3 LiPoly's (10.8 volts nominal) then you'd need to reduce the amperage to 8.9 amps. These estimates are approximate, and some experimentation is required for best results but conserving Watts is a good way to start.

4. **10C from 3S4P? Naming conventions explained.** How fast a battery can discharge is its maximum current capacity. Current is generally rated in C's for the battery. C is how long it takes to discharge the battery in fractions of an hour. For instance 1C discharges the battery in 1/1 hours or 1 hour. 2C discharges the battery in ½ or half an hour. All RC batteries are rated in milli Amp hours. If a battery is rated at 2000 mAh and you discharge it at 2000 mA or 2 amps, (1 amp = 1000 mA) it will be completely discharged in one hour. The C rating of the battery is thus based on its capacity. A 2000 mAh cell discharged at 2 amps is being discharged at 1C (2000 mA x 1), a 2000 mAh cell discharged at 6 amps is being discharged at 3C (2000 mA x 3).

All batteries have limitations on how fast they can discharge. Because of this many LiPoly batteries are put in parallel to increase the current capacity of the battery pack. When 2 batteries are wired positive to positive and negative to negative they become like one battery with double the capacity. If you have 2 2000 mAh cells and you wire them in parallel then the result is the same as 1 4000 mAh cell. This 4000 mAh cell has the same C rating as the original 2000 mAh cells did. Thus if the 2000 mAh cells could discharge at a maximum of 5C, or 10 amps then the new 4000 mAh cell can also discharge at 5C or (4000 mA x 5) 20 amps. This method of battery pack building allows us to use LiPoly batteries at higher currents than single cells could produce.

The 'naming' convention that allows you to decipher how many cells are in parallel and how many are in series is the XSXP method. The number in front of the S represents the number of series cells in the pack so 3S means it's a 3 cell pack. The number in front of P means the number of cells in parallel. So a 3S4P pack of 2100 mAh cells has a total of 12 cells inside. It will have the voltage of any other 3S pack since the number of cells in series determines the voltage. It will have the current handling of 4 times the maximum C rating of the 12 individual cells. So say our 3S4P pack had a maximum discharge of 6C. That means that it has a nominal voltage of 10.8 volts (3x3.6) and a maximum discharge rate of 50.4 amps (2100 mAh x 6Cx4P).

5. **Which battery should you buy?** With so many choices out there it is difficult to decipher what is marketing hype, what is brand loyalty, and what is outright lies. Battery manufacturers are constantly trying to one up one another. While capitalism can drive prices down, it also can give cause to false claims about products.

One great way to find out what the best battery is, is to look at graphs of the batteries performance. Looking at how low the voltage of the cell drops at various amperages will give you a meter to compare that battery to similar size/weight batteries.

If graphs aren't your thing then simply look at what other people are using in successful setups that are similar to your application. If a lot of people are reporting long flight times and lots of