



## Power System Selection: *The Great Planes 1/4 Scale "Patty Wagstaff" Extra 300S.*

- 1: Calculate the power required:** Because I want this airplane to have good vertical and aerobatic capability, I choose 175 W/LB. Likewise, because the airplane will weigh roughly 15LBS, I choose a power level of 2625 watts.
- 2: Select number of lipo cells:** Here are the currents (Amps) required for each number of lipo cells:
  - 8-cell=90 Amps
  - 9-cell=79 Amps.
  - 10-cell=71 Amps

Because I want to keep the current as low as possible, and my charger can charge up to a 10-cell pack, I select the 10-cell battery.

- 3: Calculate K/V:** Because I want a big slow prop to get lots of thrust, I limit the RPM to 7000. Because the motor will spin significantly slower when loaded, I increase this rpm by 20%, then calculate the kv ( $8400\text{RPM}/37\text{V}=\underline{230\text{RPM/V}}$ )
- 4: Select ESC:** This is probably the easiest step. All I need is a brushless ESC that can handle 70 (or more) amps with a 10-cell lipo pack. This ESC will not have a built-in BEC, so I choose an 8-amp external BEC to power the servos and receiver.
- 5: Select Battery:** Because I will be using power for bursts (hovering, vertical, ect..) I want a battery that will be small in capacity but high in discharge current. So, because a 20C battery is pretty cheap nowadays, I start with 3500mAH battery ( $20 \times 3500\text{mAH}=70000\text{mA}$  or 70A) However, after some searching I find that I can get a 5000mAH 20C 10-cell lipo for the same price as the 3500mah 20C 10-cell lipo, so I choose the larger one.

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## Final Setup:

- **Motor:** 2625-Watt, 230 K/V
- **ESC:** 70+Amp Brushless, that will take a 10-cell lipo
- **Battery:** 5000mAH 20C 10-cell Lipo