CHOOSING ELECTRIC FLIGHT POWER SYSTEM FOR GLOW AIRCRAFT
WRAM SEMINAR 2006

- **Choose the Mission**
  - **Trainer**
  - **Sport**
  - **Sport aerobatic**
  - **Aggressive aerobatic**
  - **scale**
  - **3D**

- **Choose the power loading (watts/lb)**
  - **Trainer 40-50**
  - **Sport 50-60**
  - **Sport aerobatic 60-80**
  - **Aggressive aerobatic 80-100**
  - **Scale 50-100**
  - **3D 100+**

- **Estimate weight of model**
  - **Li-poly battery……. same or only slightly more than glow weight**

- NiCd/NiMh…. ½ lb more for 20-30 glow, 1 lb more for 40 glow, 2 lbs more for 60 glow

- **Compute watts required**
  - **Power loading(Watts/lb) X weight (lbs)**
- **Compute voltage**
  - **Watts ÷ 20 amps (.15-.25 glow)**
  - **Watts ÷ 30 amps (.30-.60 glow)**
  - **Watts ÷ 40 amps (.90-1.20 glow)**
- **Determine battery needs**
  - **Use 1.0 v/cell for NiCd/NiMh chemistry up to 40 amps**
  - **Use 3.7 v/cell for li-poly chemistry up to 20 amps**
  - **Use 3.5 v/cell for li-poly chemistry up to 40 amps.**
- **Choose propeller (Pitch/Diameter (P/D)ratio)**
  - **Trainer (.4-.6)**
  - **Sport (.5-.7)**
  - **aerobatic (.6-.75)**
  - **scale (depends on drag)**
    - **WW1/Golden age .4-.6**
    - **WW2 fighter .6-.75**
    - **WW2 bomber .5-.6**

        - General Aviation WW2-Present (.5-.75)
    - 3D (.4-.5)
    - Racer (.9-1.2)
- Choose propeller (all except racers)
    - Measure propeller clearance
        - With model level, measure from centerline of prop shaft to ground.
        - Subtract 1-1.5”
        - Multiply by 2 to get maximum diameter permissible.
        - Multiply by P/D ratio to get pitch.
    - Search though motor manufacturers for motor that will deliver the required watts (amps x volts) using the battery size (voltage), swinging the chosen prop.

- REMEMBER!
    - Size does matter!
    - Big motors and big props for big models!
    - It is better to underutilize a big motor than overburden a small motor!

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Example 3D-Aerobatic

- **Choose the mission = aerobatic-aggressive**
  - **Giles 3D (www.giantscaleplanes.com)**

- **Choose the power loading (watts/lb)**
  - **Aerobatic-aggressive = 80-100 (use 100)**

- **Estimate weight of model – li-poly cells**
  - **Same as for 40 glow = 5 LBS**

- **Compute watts required**
  - **Power loading(Watts/lb) x weight (lbs)= 100 x 5 = 500 watts**
- **Compute voltage**
  - **Watts ÷ 30 amps (.30-.60 glow)= 500÷30= 16.67 Volts**
- **Determine battery needs**
  - **Use 3.5 v/cell for li-poly chemistry up to 40 amps**
  - **= approx 5 cells**
- **Choose propeller (Pitch/Diameter (P/D)ratio)**

- aerobatic (.6-.75) use .7

- **Choose propeller (all except racers)**
  - **Measure propeller clearance**
    - **With model level, measure from centerline of prop shaft to ground = 8.5”**
    - **Subtract 1-1.5” (use 1.5) = 7.0”**
    - **Multiply by 2 to get maximum diameter permissible = 14” diameter**
    - **Multiply by P/D ratio (.7) to get pitch = 10” of pitch**

  - **Search though motor manufacturers for motor that will deliver the required watts (amps x volts) using the battery size (voltage), swinging the chosen prop.**

Axi 4130/16 would be a good choice
Possibly the new Eflite BL60 outrunner (unconfirmed)

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Example – 40 size trainer

- **Choose the mission = Trainer/sport**
  - **Hobby Lobby Telemaster 40**
- **Choose the power loading (watts/lb)**
  - **Trainer = 40-50 (use 50)**
- **Estimate weight of model – NIMH cells**
  - **1 lb more for 40 glow = 7 LBS**
- **Compute watts required**
  - **Power loading(Watts/lb) x weight (lbs)= 50 x 7 = 350 watts**

- **Compute voltage**
  - **Watts ÷ 30 amps (.30-.60 glow)= 350÷30= 11.66 Volts**

- **Determine battery needs**
  - **Use 1.0 v/cell for NiCd/NiMh = approx 12 cells**

- **Choose propeller (Pitch/Diameter (P/D)ratio)**
  - **Trainer (.4-.6) use .5**

- **Choose propeller (all except racers)**
  - **Measure propeller clearance**
    - **With model level, measure from centerline of prop shaft to ground = 8”**
    - **Subtract 1-1.5” (use 1.5) = 6.5”**
    - **Multiply by 2 to get maximum diameter permissible = 13” diameter**
    - **Multiply by P/D ratio to get pitch = 6.5” of pitch**

  - **Search though motor manufacturers for motor that will deliver the required watts (amps x volts) using the battery size (voltage), swinging the chosen prop.**

Axi 2826/12 would be a good choice
Possibly the new Eflite BL46 outrunner (unconfirmed)