



Club Newsletter

October 2014

Here we are in October, it's been a fun year so far. For the most part the weather has been great for flying, and yes it's been hot too. Starting this month, there will be night flying the Saturday night following the meeting. The last night fly the club was a great success. There were 35 people at one point in the night. We had a representative from the Highland paper there who took pictures and did a write up in the paper. If you're interested in coming out, I highly recommend it.

There is also a new item at the field complements of Jeff. He made up a frame and put it up on the container where the old Frequency box is. It will have a flier with upcoming events or important cub info. So please give it a look.

he gave out to help you if you're looking into powering one of your models with an electric system.

Next Meeting will be on the 9th.

Review of last month

Last month we had a guest speaker from Scorpion motors. It was Lucien Miller, president & CVO of Innov8tive designs. He gave a great informative look into electric power systems. I will include the paper that



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Electric Power System Presentation

Key Points and Rules of Thumb

1. A power system consists of a Battery, Speed Controller, Motor and Propeller
2. Each component should be matched together for a good power system.
3. Li-Po Batteries have 3 ratings: Voltage (Cell count), Capacity and C-rating
4. Li-Po Batteries are 4.2 volts per cell fully charged, 3.7 volts under load, and discharged at 3.0 volts per cell
5. Li-Po batteries should be stored long-term at 3.7 to 3.8 volts per cell
6. Battery capacity is measured in mah or milli-amp-hours. 1000mah = 1 AH
7. Battery capacity is similar to fuels tank size in glow engines.
8. Discharge rate = current ÷ battery capacity. A 1C discharge will last for 1 Hour
9. To calculate flight time use 60 minutes ÷ Discharge rate
10. Speed Controllers convert DC energy into 3-phase AC to power brushless motors
11. Speed Controllers have 2 ratings: Voltage (Cell count) and Maximum Current
12. BEC's come in Linear and Switching type. Switching is most efficient
13. You cannot harm a motor by using a larger speed controller
14. Brushless Motors are 3-phase and bearings are the only wear item
15. Brushless motors have 3 ratings: Size, Power Rating (or Current Rating) and Kv
16. Different manufacturers use different numbering schemes for their motors
17. Electric Motors are basically the exact opposite of Glow Engines
18. Electric Motors are constant RPM machines, Glow Engines are constant power machines
19. Glow engines can be damaged by using too small a prop
20. Electric motors can be damaged by using too large a prop
21. Glow engines push power into the prop while the prop pulls power out of an electric motor
22. Prop selection is critical for good performance in electric motors
23. The power that an electric motor puts out is determined by the prop used
24. When selecting batteries, try to keep the Current to voltage ratio between 2 and 5
25. Always use the 80% rule when calculating power systems
26. Get the proper tools for Electrics, it will save you time and money in the long run
27. Learn how to solder! It is the most important skill needed for electric power flying
28. Never trust factory Pre-tinned leads, always re-tin them yourself prior to soldering
29. Only use rosin core solder! Never use acid core solder

1 cubic inch of 2-stroke Glow Engine is equal to 2000 watts of electrical power
Ex. A .60 Glow engine = 1200 watts and a .40 glow engine = 800 watts

1 cubic inch of 4-stroke Glow Engine is equal to 1500 watts of electrical power
Ex. A .40 glow 4-stroke = 600 watts and a .90 glow 4-stroke = 1350 watts

Power requirements for Electric: Power Gliders need 50 watts per pound, trainers need 75 watts per pound, sport models need 100 watts per pound, pattern planes and warbirds need 150 watts per pound and 3D and competition Fun-Fly planes can use 200+ watts per pound



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Selecting a Power System for a Model

A Simple 5-step Process

1. Calculate the required Watts of power needed based on the weight and type of aircraft
2. Select an appropriately sized battery to provide the desired flight time
3. Choose the correct Motor based on the number of cells you are using and prop size
4. Select a Speed Controller to match the Motor being used
5. Select the right prop to get the desired performance of the model

Step by Step example from the presentation, a 6 pound, .45 size Ugly Stick power system

Determining Power Required: A .45 glow engine = 900 watts (2000 x 0.45), alternately a 6-pound model with pattern performance needs 150 watts per pound x 6 pounds or 900 watts

Selecting the proper size battery: From the chart below, 900 watts can be done with a 4 or 5-cell Li-Po battery. Higher voltage equals higher efficiency so we will use a 5-cell pack (18.5 volts under load). To get 900 watts from 18.5 volts requires $900 \div 18.5$ or 48.6 amps. Since 2/3 throttle is typically 1/2 max current, we will use 24 amps for calculating battery size. Battery capacity is determined by flight time at power load. For 10 minutes we need a 6C discharge rate. 24 amps at 6C is a 4000mah battery pack. For 80% rule we increase battery size to 5000mah.

2-cell Battery – 100 to 300 Watts	6-cell Battery – 1,000 to 2,500 Watts
3-cell Battery – 250 to 600 Watts	8-cell Battery – 1,800 to 4,000 Watts
4-cell Battery – 450 to 1,100 Watts	10-cell Battery – 2,800 to 6,500 Watts
5-cell Battery – 700 to 1,700 Watts	12-cell Battery – 4,000 to 10,000 Watts

Selecting the proper Motor: Find a motor that will deliver 900 watts on a 5-cell pack at 48 amps. Remember the 80% rule and get a motor rated for 1125 watts if you need 900 watts. Do not forget to take prop size into consideration. Prop charts make this easy if they are available.

Select a matching Speed Controller: The speed controller should handle the full rated current of the motor, even if you are not pulling that much current. When in doubt, always go up one size larger.

Selecting the correct prop: In many cases, several props will pull similar current, but give different results. For example, a 10x10, 11x8 and 12x6 prop will all pull about the same current, but give dramatically different results. The 10x10 prop will give the highest speed, but the least thrust and would be suitable for a pylon racer type plane. The 12x6 prop will give a lot of thrust but greatly reduced top speed. This prop would be good for a slow plane like a Piper Cub. The 11x8 prop would provide a good compromise between speed and thrust, and would work best on a sport model such as an Ugly Stick.

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Pic's from the last night fly

A big thank you to Sanford for setting up the pits with lights and hosting the event. A big thank you to Jim for cooking up the great food. I am sure we all look forward to having some more.





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Pic's of Members Planes





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Fun Fly Information

Balloon Bust- Pilot attempts to pop helium Balloon suspended by a string. Pilot has 6 tries. Winner was Jeff. Did not hit balloon but hit string on fifth try.

Sudden Death - Pilot fly's in a pattern. When horn sounds pilot lands. Shortest time to ground wins. Mike was the winner at 3.54 seconds.

Streamer Eliminator- Pilot has 2 minutes to chase a plane with a streamer being towed out back of plane. Mike won the event by hitting the tow plane and causing it to crash in 38 seconds.

Target Drop - Pilot drops a plastic egg filled with powder placed in plastic cup attached to airplane. Pilot attempts to drop egg from cup and hitting a circle in middle of flying field. Winner was Mike with a distance of 42' away from target.

Limbo- Pilots attempt to fly under a streamer that is 6' above the runway. 4 out of 5 pilots were able to do it so streamer was lowered to 4' and tried again. 3 pilots were able to do that so it was lowered to 2'. Jeff was the winner in this round.

Spot Landing- Pilots will take off and land on spot in middle of runway. Mike was the winner with a distance of 2' 7" from spot on runway.

Of course we had to eat so our resident cook Jim again did a fabulous job preparing BBQ hot dogs and hamburgers.

Sorry but I don't have any pictures from the fun fly. But it was a great day of flying and great weather. If you think you have the skills to win the events, then come on out and take part in the fun.