Certified Electric Aircraft Pilot Seminar Syllabus

V.3 9/1/2013

This information will be covered and questions answered by a qualified Weedwacker Electric Aircraft Safety Technician (EAST). Upon successfully attending a short 30 minute presentation on the items detailed in this document you will be a “certified electric aircraft pilot” (CEAP) authorized to fly electric powered models at Cactus Park or supervising a guest[1] flying electric powered models at Cactus Park.

The Weedwackers want you to have a safe and fun experience flying electric model aircraft. If you need assistance or wish to ask a question related to electric aircraft, please contact one of the clubs Electric Aircraft Safety Techs.

<u>The Syllabus will cover the following information;</u>

Lithium Polymer Battery Overview
Battery Care
- Charging
- Weedwacker Battery Charging Policy
- Transporting and Storage
- Using Lithium Polymer Batteries

Fire Safety
- In the event of a crash

The importance of matching batteries, speed controls, motors and props to your airplane
- Current draw
- RF Interference considerations

Use of the installed solar system

Fill out and return the attached signature page to the seminar host at the completion of the seminar. You will receive a club membership card with a Circle-E symbol indicating completion. This certifies you to fly with LiPo’s at Cactus Park and to supervise a non-member guest flying with LiPo’s at Cactus Park.

Lithium Polymer Battery Overview

Lithium Polymer batteries, unlike traditional batteries have a soft, aluminum “shell” resulting in an undeniably higher risk inherent to their use in model aircraft. To mitigate this risk, the following information is shared with you so you can become aware of factors that influence the safety of the property we fly on and over.

[1] Non-CEAP club members are *not* permitted to fly electric powered models at any time.

Battery Care

Charging

The following is the lithium polymer battery charging protocol to be followed when charging lithium polymer batteries at Cactus Park

Weedwacker Lithium Battery Charging Policy

1. Any individual wishing to charge a lithium polymer battery at Cactus Park must be a Weedwacker Club member and be a Certified Electric Airplane Pilot (CEAP), or be a guest of a CEAP and under their supervision.

2. All lithium polymer based batteries must be charged on the designated charging tables in a fireproof container. A commercially available container is preferred[2]. If table space is limited, charging may be conducted on the asphalt surface of the pit area, provided the LiPo container is at least ten feet from any flammable materials (models, fuel, work benches).

3. Modelers must use chargers designed specifically for charging lithium polymer based batteries.

4. Power source connections shall be secure and properly insulated. Charging from an automotive battery installed in a vehicle is strictly prohibited.

5. Each person who is charging a lithium polymer based battery shall periodically monitor their battery while it is charging.

Transporting and Storage

Batteries should be transported and stored in a fireproof container such as a commercially available LIPOSACK.

Use

Care should be taken with the installation of Lipo's in the airframe so as to avoid and possibility of cell puncture. Cooling is also of concern when using high current demand systems.

[2] LiPo Sack as an example.

Fire Safety

In the event of a crash

In the event of a crash it is wise to follow the following protocol:

1. Pay attention! Use landmarks to identify where the plane went down.
2. Without delay, go to the scene of the crash and evaluate the potential for battery failure and possible fire hazard.
3. Care is to be taken with any battery involved in a crash. Inspect it visually for damage and let it set away from anything flammable for 30 minutes before transporting or attempting to charge or use it again.
4. Never use a compromised battery. Dispose of it according to local rules and regulations.
5. Call 911 should any fire event occur[3]
6. Providing is safe to do so, attempt to knock down the fire with extinguishers and shovels of sand until fire professionals arrive.

The importance of matching batteries, speed controls, motors and propellers to your airplane

Current draw

All components are rated for optimum and maximum current draw. Do not exceed this rating or you risk catastrophic failure of one or more components. It is critical to be sure all major components of your aircraft's electric propulsion package are matched for safe and efficient operation. To ensure the safe operation of your electric plane it is highly recommended you test your electric propulsion system with an amp meter. This is the best way to ensure you are not stressing the battery, ESC[4] or motor. Heat is the enemy. Overheating any one component just once can ruin it beyond repair.

Battery

All batteries have a "C" rating. This is the rating related to the discharge current draw.
1C is always equal to the capacity of the pack.

Example:
A 1000mAh, or 1 amp pack with a 20C rating can be discharged safely up to 20 amps. Exceed the safe C rating and the battery will get hot and can fail.

Prop

Prop choice is key in any electric airplane propulsion system. Follow the motor provider's guidelines to match the proper prop to the motor and cell count (battery voltage) you intend to use.

Wires and Connectors

Use a wire size and connector type that is big enough to get the current safely to the ESC and motor. Using wires too small is a common mistake and can result in a wire meltdown and even cause solder to melt.

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[3] Discretion may be used when calling 911 for battery fires on hard pavement, gravel or in a contained sand bucket. Emergency services MUST be called for any fire in brush areas, the pits or structures.

[4] Electronic Speed Controller

RF Interference Considerations
The model's power leads, battery and ESC should be installed as far as practicable from receivers and antennas.[5]

Solar Charging System

Description:

A set of deep cycle 12v batteries are in the shed (in parallel) and feed the charging stations. Solar panels are tied into the system through a controller installed in our Safety/Pin box. The solar panels recover the charge we pull out at about 3 amps. CEAP certified members can tap into the POS and NEG terminals at the charging stations and charge at will.
The charging station posts are marked to indicate which is (+) and (-). The (+) post is gold in color while (-) is silver. The stations have simple posts to accept alligator clips which work for 90% of the chargers on the market. If your charger requires banana plugs, you'll need to adapt.
The system should easily handle the normal charging duty we expect from our e-flyers. Should we draw too much instantaneous current, an automatic-reset fuse at the battery will trip, then reset after a cool-down period.
An access screen on the side wall of the shed is provided directly above the batteries should it be necessary to direct a fire extinguisher onto the batteries.

Operation:
In order for the solar panels to charge the system, the POWER switch on the controller (in the Safety/Pin box) needs to be ON. Battery voltage can be checked by turning the DISPLAY ON.
IMPORTANT - leave the POWER switch ON to ensure the panels keep the batteries charged.
IMPORTANT - *don't* leave the display on. You can tell that the POWER switch is ON by turning the DISPLAY ON and seeing numbers (then turn the DISPLAY OFF).
On occasion, system voltage may drop below 12v and the "Low vol" LED will light on the panel. This is usually seen early in the day when multiple LiPos are under charge and before the solar panels are receiving direct sunlight. In this case, reduce the number of chargers in use until voltage recovers to 12v or higher.

[5] While current technology and designs preclude RF interference by use of proper EMI/RF shielding, it's a good practice to avoid direct contact between power components and receiver components.

Certified Electric Aircraft Pilot Seminar Attendee

I, _____have attended a safe Lipo battery use seminar

given on this date, _____.

I understand there are additional risks in using lipo batteries at Cactus Park and will operate my aircraft and charge my Lipo's according to the procedures outlined at the seminar, in the syllabus and prescribed in the Weedwacker club rules.

Sign name_____

EAST (print/sign) _____