October 2014 Volume 25 Issue 10

TURBULATOR

Newsletter
of the Rio Rancho Radio Control Flying Club

AMA Club #2770

WATERMAN FIELD ELEVATION 5840 FEET 35° 17.2'N 106° 44.8'W

Rick Svitzers Cub at Cochiti Lake

PRESIDENTS CORNER

"Da Prez Sez"

Balloon Fiesta and indoor meetings a sure sign that cooler weather in on the way. During the summer we had a good time at Cochiti with a lot of float flying. If we don't get up their again this fall we will have to wait till next Summer. In the mean time some indoor flying at the Star Center will be fun. Several Sport Cubs have shown up at the field it looks like the next hot model all can enjoy. Get ready the Christmas Party it will be here soon, Good food and fun for all. I hope to see a good turn-out for this year's party at a new location with less work for everyone. Sit down, eat and relax with the rest of the members, and friends.

Coming Events

1. Meeting 6 Oct @ 7:00pm at the Wallen Shop
2. Christmas Party 6 December Tickets $10/Person
3. Club dues are $50 and payable to the Treasurer
4. Club Officer nominations are open

Proper Care & Charging

It's important to use a LiPo compatible charger for LiPos. As I said in the Introduction, LiPo batteries require specialized care. They charge using a system called CC/CV charging. It stands for **C**onstant **C**urrent / **C**onstant **V**oltage. Basically, the charger will keep the current, or charge rate, constant until the battery reaches its peak voltage (4.2v per cell in a battery pack). Then it will maintain that voltage, while reducing the current. On the other hand, NiMH and NiCd batteries charge best using a pulse charging method. Charging a LiPo battery in this way can have damaging effects, so it's important to have a LiPo-compatible charger.

The second reason that you need a LiPo-compatible charger is balancing. Balancing is a term we use to describe the act of equalizing the voltage of each cell in a battery pack. We balance LiPo batteries to ensure each cell discharges the same amount. This helps with the performance of the battery. It is also crucial for safety reasons - but I'll get to that in the section on discharging.

While there are stand-alone balancers on the market, I recommend purchasing a charger with built-in balancing capabilities, using a balance board like the one pictured to the right. This simplifies the process of balancing, and requires one less thing to be purchased. And with the price of chargers with built-in balancers coming down to very reasonable levels, I can't think of a reason you would not want to simplify your charging set up. We'll talk more about chargers in the next section.

Most LiPo batteries come with a connector called a **JST-XH** connector on the balance tap. One of the big problems with this connector is it's lack of surface area; namely, one's inability to get a good grip on the connector. This makes it hard to unplug from a balance board, and a user usually just ends up pulling on the wires. This can break the connector, and potentially short out the battery. A unique product, called Balance Protector Clips (or AB Clips) is a great way to solve this problem. They clip around the balance connector, and give a user more space to grab on to the it. They are usually inexpensive, and a great way to prevent balance connector fatigue. To the

left, you can see a balance connector with and without the Balance Protector Clips.
Most LiPo batteries need to be charged rather slowly, compared to NiMH or NiCd batteries. While we would routinely charge a 3000mAh NiMH battery at four or five amps, a LiPo battery of the same capacity should be charged at no more than three amps. Just as the C Rating of a battery determines what the safe continuous discharge of the battery is, there is a C Rating for charging as well. For the vast majority of LiPos, the Charge Rate is **1C**. The equation works the same way as the previous discharge rating, where 1000mAh = 1A. So, for a 3000mAh battery, we would want to charge at 3A, for a 5000mAh LiPo, we should set the charger at 5A, and for a 4500mAh pack, 4.5A is the correct charge rate.

The safest charge rate for most LiPo batteries is <u>1C</u>,
or 1 x capacity of battery in Amps.

However, more and more LiPo batteries are coming out these days that advertise faster charging capabilities, like the example battery we had above. On the battery, the label says it has a "3C Charge Rate". Given that the battery's capacity is 5000mAh, or 5 Amps, that means the battery can be safely charged at a maximum of 15 Amps! While it's best to default at a 1C charge rate, always defer to the battery's labeling itself to determine the maximum safe charge rate.

Due to the potential for fire when using LiPo batteries, regardless of the likelihood, certain precautions should be taken. Always have a fire extinguisher nearby; it won't put out a LiPo fire (as I will further explain below, LiPo fires are chemical reactions and are very hard to put out). But a fire extinguisher will contain the fire and stop it from spreading. I prefer a CO2

(Carbon Dioxide) extinguisher - it helps to remove oxygen from the burn site, and will also cool down the battery and surrounding items. Another safety precaution is to charge the LiPo in a fire-resistant container. Most people opt toward the LiPo Bags on the market today, like the one pictured to the left. They are a bit pricy, but are more portable than other solutions. Finally, **never** charge your LiPo batteries unattended! If something does happen, you needs to be around to react quickly. While you don't have to always be in the same room, you shouldn't leave the house, or go mow the lawn, or anything else that will prevent you from taking action should the battery catch fire.

<u>NEVER</u> Leave a Battery Charging Unattended

Picking Out the Right Charger

The Hitec X1+ AC/DC (pictured to the left) is a multi-chemistry charger, which means it can charge NiMH, NiCd, and Lead Acid

batteries as well as LiPo batteries. It can even charge the newest LiFe batteries that some use for receiver packs in airplanes and cars. It has a built-in balancer that handles up to 6S LiPo batteries, and can charge up to six amps. It's a great charger, especially for its going price of around $70. It's not as high-power as some LiPo users may need, though, since it only operates at 50 watts. So higher cell count batteries may not charge very fast on the X1+.

If you need to charge multiple batteries at the same time, the Hitec X4+ AC/DC charger is probably the best bet. Priced around $220, it has all the capabilities of the X1+, but with four independent 50W charge ports. This means you can charge up to four batteries at one time! The X4+ is the charger we use every day at the store, and we love it.

Recently, chargers with touchscreens have come on the market. At first, I didn't think they would offer anything of value; that it was simply a gimmick to raise the price of the chargers. But after actually using one, I think the addition of the touchscreen to these chargers makes them much, much more user friendly and easier to use. Instead of the standard four button setup, a touchscreen allows there to be many buttons on the screen. Gone is the need to scroll through menus to find what you're looking for. Everything you really need to access for your charging needs is on the main screen. The Hitec X1 Touch AC/DC charger (pictured to the right) is comparable to its touchscreen-less cousin on paper, but is much more usable. I now recommend the X1 Touch over the traditional X1+. It is a bit more expensive (going price for the X1 Touch is around $100), but well worth the extra cost.

If you have large capacity batteries, large cell counts, or higher charging rates, you may want to find a charger that operates on higher wattages. As mentioned, the Hitec X1+ AC/DC charger works on 50 watts (50W). Each port on the X4+ is also 50W. The Hitec X1 Touch is 55W. What does this mean to you? Well, let's look at how watts, amps, and voltage work together.

Watts = Voltage x Amperage

See, wattage, voltage, and amperage are intertwined. You can convert voltage to amperage, and vice-versa. This is important in determining what kind of charger you need. Let me show you how.

Let's say that I have a 6S 5000mAh LiPo battery, and I want to charge it at 1C, which would be 5A. If I have a Hitec X1+ AC/DC Charger, I can set up the charger to charge at 5A for a 6S battery. But when I go to charge the battery, the most it ever charges at is around 2.25A. What gives?

If we use the formula above, we can plug in our voltage (22.2V) and our Amperage (5A) and we get this:

22.2v x 5A = 111W

So the formula is saying that if we want to charge our 6S 5000mAh LiPo pack at 5 Amps, we would need a charger that is capable of delivering at least 111 Watts of power. Our Hitec X1+ can only deliver 50 Watts.

So you can see why a higher wattage charger might be important if you want to charge larger batteries quickly. For these kinds of chargers, right now I'd have to recommend the Hitec X1-200 Touch (pictured left). Like the regular X1+ Touch, it's a single-port, multi-chemistry charger. Unlike the original, though, it is capable of a whopping 200-Watt output, and a charge rate of up to 12A. The one downside to larger chargers like this is that they are usually sold without an AC/DC power supply, meaning it will only work off of DC current. To plug it into the wall, you have to purchase a 12V power supply, which dramatically adds to the cost. But if you need to charge big batteries, it's worth spending the money on a charger that fits your needs well. The Hitec X1-200 Touch goes for around $120. My preferred power supply is from TrakPower (TKPP5500) and runs

around $90. Like I said, not cheap, but a great charging set up for large batteries.

As always, it's best to talk to your local hobby shop and have them set you up with a charger that will fit your needs. Local support is always a handy thing!

Parallel vs. Series Charging

A wonderful gentleman from the Netherlands contacted me recently asking about parallel charging verses series charging. He wanted to know how best to charge six of his single-cell LiPo batteries at the same time. Parallel charging can be *very* dangerous. The problem with parallel charging (or even *using* your batteries in parallel) is that, when hooking up batteries in parallel, you are doubling the capacity of the batteries while, and this is important, **maintaining the voltage of <u>one</u> of the individual batteries**. What this means is that your charger, which normally monitors the battery while charging to prevent overcharging, cannot see all of the individual batteries' voltages - it can only see one. This can allow severe overcharging and possibly fires. Please, *please*, don't use parallel

charging cords. There is a reason most manufacturers of these cords have warnings on them requiring the voltage of each battery be pretty much identical. There is a way to safely use these charge cables, but most people won't be that careful. So please abstain from parallel charging!

Series charging, on the other hand, is perfectly safe if you set up your charger the right way. If you want to charge six single-cell LiPo batteries, you can wire them up in series, set up your charger as if it were a six-cell LiPo, and balance charge your Li-Pos. The act of balance charging them is essentially making the charger individually charge each cell, making sure they are all kept at safe levels. If you only have a single-port charger, series charging is the only safe way to charge multiple batteries at the same time.

One of the the **safest ways** to charge multiple batteries at the same time is to have a mutli-port charger, like the Hitec X4 mentioned above. If you find yourself needing to charge many batteries at once, do the smart thing and purchase a charger (or chargers) that will fit your needs.

The new parallel chargers on the market offer significant safety improvements. Two of the best are the FMA series of Chargers like the 10XP and the iCharger series of Chargers. Both are pictured below.

We have club members who use these chargers and are very familiar with parallel charging. Before you buy a new charger speak with our club members to make sure you're getting the capabilities in a charger that you are looking for. It may save you quite a bit of money and definitely significant amounts of time.

Christmas Party

6 December 2014
Joe's Pasta House
Starts @ 5:00pm
Dinner and Soft Drinks
Gift Exchange
Great Raffle Prizes
Tickets $10.00 per Person

MEETING MINUTES

Minutes from the September 2014 Club Meeting

The meeting started at 10:00am with 14 Members Present.
Minutes were accepted as published.
Treasurers Report was accepted as presented.
Membership Report: We currently have 43 members on the roster.
Field Report: 1. There will be a working party to clean the remaining weeds at the field. Don will email the membership with the date and time.
Safety: Remember when more than 2 planes are on the air we need to use spotters.
Unfinished Business. 1. Mike is looking for a cChristmas Party Location. We are looking at either the 6th or 13th of December. More information to follow.
2. The Club finished discussion and voted unanimously on a senior life member By-Law Change. The Senior Member free club membership age was lowered from 90 to 85. Don will make the change to the By-Laws.
New Business:1. Nominations for Club Officers will open at the October meeting.
2. There was a discussion of FAA rules and the relation of the FAA and the AMA concerning the negotiations between the two earlier this year and the ignoring of those negotiations by the FAA. There was no decisions to be made and the discussion was tabled.
The meeting adjourned @ 1042 am.

Raffle Results
1. Tom Kendrick
2. Garry Wallen
3. George Bliss

Turbulator:
Editor Don McClelland
We are always looking for articles, pictures and your input!

For comments, or suggestions
Please Email Don at
macmoke1@gmail.com

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(505) 332-3797

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Next Club Meeting
October 6th, 7:00pm at the Wallen Club House. 5545 Lilac Pl.