the Ampeer

November The EFO Officers 2014

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No Mailed Ampeer Subscriptions

The Next Flying Meeting:
Nov. 1, 10 a.m., Midwest RC Society 7 Mi. Flying Field

What's In This Issue:

AMA District 7 Town Hall Meeting

From Joe Hass

Sunday, October 26, 2014
Noon to 4 p.m.

Ultimate Soccer Arenas
867 South Blvd., Pontiac, MI 48341

FEATURING AMA DISTRICT 7 VP
Tim Jesky

FREE INDOOR FLYING
Must Have Valid AMA Card

HEADQUARTERS GUEST SPEAKERS
PROGRAMS AND SURPRISES

* * * * *

Upcoming Midwest RC Society 26th Annual R/C Swap Meet

Sunday, November 2, 2014
9 a.m. to 12 p.m
location
Northville Senior Community Center
Northville, Michigan
admission charge
$5.00 per person
(active duty military, kids under 12, and women are admitted FREE)
vendor table cost
$20 - $25 per table - depending on location
The vendor table costs include one admission.
Advances table reservations are highly recommended, last year all tables were sold in advance
Vendor Set Up time is 8 a.m.
For Information
Call Rudi Reinhard at 248-631-8205 or email: therudi@icloud.com
directions
Take the 8 Mile Road exit off of I-275
Go west 2.5 miles to Center Street
Go south on Center Street 0.5 miles to Main Street
Go west on Main Street
The Northville Senior Community Center is located at 303 Main Street in downtown Northville
There is free parking in the back of the building off of Cady Street.
This is the Best and Largest Swap Meet In Southeastern Michigan!

Skymasters' Indoor Flying Starts Soon
From Fred Engleman

The Winds of November are approaching fast. Fear not, you can enjoy a full winter season of indoor flying at Ultimate Soccer Arenas **beginning Tuesday, Nov. 4**. There are 26 flying days this winter for a total of 57 hours of flying fun from November through March. **Skymasters has reduced the cost of the Season Pass to $100.** It's a great deal. How great you ask? It is $100 for 57 hours of flying time that comes to $1.75 per hour. Less per hour than a Starbucks coffee. That's a Great Deal. Soon we will have online registration available, I will keep you posted.

More information can be found at
http://www.skymasters.org/index.php?page=events&flyer=data/flyers/2014/indoorflyer2014.png

Indoor Flying in Brighton Fall/Winter 2014/2015
From Jim Young

Here is the information on Indoor flying at the Legacy Center in Brighton MI for the Fall/Winter 2014/2015 season.

When: Thursdays 12:00 noon to 2:00 pm
How Much: $5/session paid at door
Where:
Legacy Center
9299 Goble Dr
Brighton, MI 48116
810-231-9288

More information:
info@legacycentermichigan.com

It starts on November 6th, 2014, and runs through April 30th, 2015.

Follow-up from Owen Morgan via email regarding his planes at the March EFO meeting

The planes are shown in the October 2014 Ampeer.
http://www.theampeer.org/ampeer/ampoct14/ampoct14.htm

Hi Ken,

The bipe is a Sopwith Camel (Snoopy's plane). It's the Great Planes Electrifly version. I maidened her on April 19th and she flew pretty tail heavy, so I'll have to add some ballast before I fly her again.

The recommended CG in the manual is NOT good! The wood prop seems to work fine and flight time was around 12 minutes. The battery only just fits and with the short nose, most of the weight of the battery is around the CG, so one thing I might try is to use a smaller/shorter battery and place it as far forwards as possible so I can balance her better without adding more weight.

The Spitfire is a foamboard build using plans from www.flitetest.com. If you're not aware of FliteTest, you really should have a look at their site. A couple of young guys having an insane amount of fun with RC and getting paid for it. One of the videos they did was a speed challenge. The winner was a Spitfire like mine (one of the prototypes) where they'd cut off the wing tips and used a bigger motor. They clocked her at 116 mph airspeed. Mine is thankfully nowhere near that fast.

For the wing area calculations I use a scale that reads max 100g. If using a scale with lower resolution, you'd need a heavier reference material. Here is the one I have, only $12:
http://www.amazon.com/American-Weigh-0-01g-Digital-Scale/dp/B0012LOQUQ#

I had a little oops the other day. I use a FlySky TH9X transmitter with a Orange RX DSM2/DSMX transmitter module and Lemon RX 6 channel (3 gram) receivers.

The other day I was running ahead of schedule at work, so decided to catch a quick flight with my TLAR camera plane on the way from one job to the next. However, I could not get any contact between the transmitter and plane. If I tried to rebind, it would work for a couple of seconds, then stop working again. I didn't have time to troubleshoot, but when I came home I discovered that the "Change ID" button on the transmitter module had somehow got pushed in and was jammed under the plastic casing on the module, so the transmitter was constantly changing it's ID. Oh, well, now I have to rebind all my planes and some of those receivers are quite well buried... I never use that button and it's

recessed in the module, so I have no idea how it got pushed.

The TLAR is a plane I scratch-built to have something to put a camera on where the plane and prop would not be visible in the picture. The name comes from the highly scientific design process. "That looks about right". The wing is from a foamy cub of some sort, the fuselage is central vacuum pipe, the tail booms are arrow shafts from Walmart and the tail feathers are Adams foam board from the Dollar Tree store. I bought that wing a long time ago planning to modify the tips and build a stand off scale (way off) model of the Spirit of St Louis, then I found the Thunder Tiger model of that plane so the project never happened.

I used a hair dryer (don't tell the wife) to reduce the dihedral and added ailerons. The plane has no rudders. She flies fine, but does a funny little tail wag at some speeds as if I was alternating a little right and left rudder. It's not a lot, but not great for a camera plane when shooting video. Do you have any ideas what may be causing it and what I might do to reduce or remove it? I haven't flown her in zero wind yet, so don't know whether it's wind induced. I did try giving her a little nose ballast as the CG is a bit aft of where the cub has it on the same wing, but don't think it changed much if anything. The tail booms are pretty stiff, so I don't think they are bending and if they were, I'd expect to see some horizontal tail wag too. One idea is that the vertical stabs may be too far apart, but it would be a royal pain to change that now, particularly as the elevator servo is build into the wing and the linkage runs inside the arrow shaft. Maybe a third vertical stab in the middle of the horizontal one. (And cut down the two others?). I'll try flying with the camera pointing backwards one day and maybe that will give some clues.

Launching this plane without loosing fingers is always interesting. I tried a discus launch, but that was a miserable failure. Thankfully, no damage. I have a throttle kill switch on the transmitter, so my method now is to engage the throttle kill, advance the throttle to 3/4, give the plane a hefty toss and then disengage the throttle kill immediately after she leaves my hand to start the motor. It works better in a bit of wind. AUW is about 25oz with battery and camera and wingspan is 48". I'm thinking of trying FPV with this plane and with the thick Clark-Y profile I think she should be able to carry a lot more weight without trouble.

I'm using the KEDA KA22.22L 85g 950Kv motor, Saker 30A ESC from www.strongrcmotors.com and an APC 10x4 slowfly prop. Not sure it's the best prop for the job. I'd bought it for the Sopwith Camel, but then found a wood prop for that plane. She has plenty of power and the motor and ESC should manage up to 11x6. I have several motors from Don and they run smooth and have never given me any trouble.

And a follow-up regarding the camera plane.

I figured out the yaw instability of the TLAR camera plane with the help of a friend. It was caused by the flat nose. I put a rounded nose on it and the plane now tracks like she's on rails.

Owen

Min-E Mambo May 2014 Follow-up
By Ken Myers

The CG on the original plans was used for the less than successful first flights. I recalculated the CG using my spreadsheet and adding one ounce of nose weight behind the firewall. That set CG at my calculated ISCG. The ‘warps’ in the wing and horizontal stabilizer were corrected. On Sunday, May 25, the Min-E Mambo flew perfectly as a throttle and rudder model.

I should have paid attention to a note that I had written on my original 1963 plans. The note said that I should lower the trailing edge of the horizontal stab about 1/4". That probably would have worked and no additional nose weight would have been needed. One should never ignore oneself even if oneself was a teenager at the time.

LiPo Puffing Question

By a Regular *Ampeer* Reader & Ken Myers

Preface: I recently exchanged emails regarding this topic with a regular *Ampeer* reader. Our exchange of emails follows. Both the Reader's and my responses have be edited while keeping both the information exchange and intent intact.

11:52 AM Sept. 4

Hi Ken,

Well, I've run into a snag with the big motor and ESC I'm using on my 50" sBach.

I purchased two new 4C (*4S - KM*) 2200mAh Turnigy LiPos, thinking these would do the trick for the sBach.

After 3 flights on both of the LiPos, I have discovered that they are swollen.

The motor is the Fire Power 46 Sport and is supposed to handle these 4C (*4S - KM*) LiPos.

The ESC is a 60 amp.

Can you help me? Why did the LiPos swell?

Pictures attached.

The photos showed a profile foam 50" sBach and a Turnigy 2200mAh 4S1P 20C LiPo.

Sept. 4

Hi,

I got the Turnigy 2200mAh 4S1P 20C specifications from the Hobby King Web site.
http://www.hobbyking.com/hobbyking/store/__9270__Turnigy_2200mAh_4S1P_20C_Lipo_Pack.html

Specs:

Price: $17.65US

Capacity: 2200mAh - That means the **usable capacity is** 2.2Ah * 80% = **1.76Ah or 1760mAh**

Constant discharge: 20C - C stands for capacity in amp hours (Ah) therefore 20C is 20 times the capacity of 2.2Ah (Ah is used for this, not milliamp hours (mAh)) = 44 amps

Burst rate: 30C (15sec) - totally ignore this as it is not of any practical consequence or use in keeping LiPos from puffing

Configuration : 4S 14.8v - 4S is four cells wired in series. A LiPo's nominal voltage is 3.7V per cell thus 3.7 times 4 cells = 14.8V. That is also a somewhat typical average voltage for the pack under load when the pack is being used in its most useful range.

Pack size: 105x34x33 - in millimeters Hobby King uses LengthxWidthxHeight (the x in this instance means by) - Not all suppliers give the dimensions in the same order.

For example, the TP2700-4SPP25 lists the following:

"Dimensions (mm): 32 x 34 x 102"

http://www.thunderpowerrc.com/Products/2700-mAh_2/TP2700-4SPP25

TP also does not give a clue as to which dimension is which on that Web page.

Weight : 247g - may or may not be close

44 amps times 14.8V = 651.2 watts in

Trying to draw more amps to provide more watts in than that **could** cause the 2200mAh LiPo battery to puff because of the amp draw being over 44 amps. It is the maximum static amps that are the important measurement for selecting a LiPo battery's capacity. The LiPo's C rating also comes into play. More on that later.

You didn't note the mission of the plane. I can only assume, and you know what assuming gets you, that because it is a profile model with large control surfaces, the mission is 3D type flying. You also did not state the ready to fly weight. That is very helpful to know.

12:10 PM Sept. 4

Well to start, I used a Master Airscrew 1380 and the LiPo only lasted for 5 minutes, swollen now.

Sept. 4

You didn't state which Master Airscrew 13x8 (1380) prop you used, but it was black in the photo, so it was probably not the wood one.

My guess is that it was the K-series.

If you meant by, "lasted for 5 minutes", that you hit the low voltage cutoff (LVC) of the electronic speed control (ESC), then you flew the pack down too far. That also 'kills/puffs' packs. You should have been using only 1760mAh from the 2200mAh pack. That is 80% of the pack's stated capacity.

You can get an idea of about how many mAh you flew from the pack when you recharge the pack. A decent charger will indicate how many mAh was returned to the pack during charging.

Even if your charger doesn't indicate the mAh returned to the pack, a power meter can be placed between the charger and the pack and the mAh returned to the pack will be displayed.

If the above is true, the average amp draw for 5 minutes was only
2.2Ah times 60 minutes = 132 amp minutes
132 amp minutes divided by 5 minutes = 26.4 amps
That is the average amp draw.
That should have been okay, but...

It was putting 800 watts in on a static run.

800 watts in divided by 14.8V = 54 amps for a guesstimate.

I have found anecdotally, that with typical throttle management, the average amp draw is approximately 1/2 the full throttle static amp draw.

This does vary depending on the pilot's throttle management technique and what the pilot expects from the airframe, that's its mission.

With an average amp draw of 26.4, previously calculated, that indicates 52.8 amps as the static amp draw. That is right in line with the previous guesstimate of 54 amps.
1.76Ah * 60 minutes = 105.6 amp minutes
105.6 amp minutes divided by 26.4 amps = 4 minutes.

If you had flown for a timed 4 minutes, **MAYBE** the pack(s) might not have puffed, but the maximum amp draw was still too high.

I just tried a three blade, T1280, again MAS, and the static watts in on this was an alarming 900.

900 watts in divided by 14.8 amps = 64.3 amps.

In general, 3-blade props should only be used in situations where there are ground clearance problems relating to prop diameter or if you really, really want to be scale and are willing to accept a prop with less efficiency drawing more current.

As for the 4S confusion, I thought this was for four cells, but looking at the LiPo I see 4C as a charging rate?

You are correct that 4S means 4 cells wired in series (S). 4C is the maximum charge rate. For this 2.2Ah pack, that would mean charging 8.8 amps and the pack would charged in 15 minutes.

You might want to review the LiPo section in "Getting Started in Electric Flight -
An Introduction and Some BASICS"
http://www.theampeer.org/e-basics/e-basics.htm#LIPO

Were you able to read the LiPo picture? Is this too small for this setup??
Huh, boy am I stymied, and frustrated, ha ha.

5:24 PM Sept. 4
Something else I've done with my LiPos, they now all come with those yellow connectors so I made up jumpers with the old "T" style connector.
Added resistance???? Could this be part of the problem??

Sept. 4
Hi,

While you did add a little resistance, it is really nothing to be concerned with in this instance. It most likely didn't have anything to do with puffing the LiPo battery.

7:20 AM Sept. 6
In talking to a fellow club member yesterday, he said probably my 2200 pack just hasn't enough amperage and suggested I go with a 2700 or 3000 pack. Any comments on this?

Sept. 6

Packs do not have amperage. The current drawn depends on the load on the motor. My guess is that he said that it wasn't able to handle the amperage you were asking from it.

Looking at a Turnigy 4S 2650mAh 20C LiPo battery.
http://www.hobbyking.com/hobbyking/store/__9182__Turnigy_2650mAh_4S_20C_Lipo_Pack.html
Price: $16.40US (That is actually $1.25US cheaper than the 2200mAh packs.)
Turnigy 2650mAh 4S 20C 265g (18g/0.63 oz. heavier than the 2200mAh pack)
Max static amps: 2.65Ah * 20C = 53 amps
80% of 2650mAh = 2120mAh or 2.12Ah
2.12 Ah * 60 minutes = 127.2 amp minutes
127.2 amp minutes divided by 26.4 amps (original average amps guestimate) = approximately 4.82 minutes or 4 minutes and 49 seconds of flight time.
53 amps * 14.8V = 784.4 watts in
That is much closer to your 800 watts in for the MA 13x8, so this should have been your first choice, but you didn't know that, or did you?

The motor is rated by the supplier, Heads Up RC Hobby shop at 45 amps.
http://www.headsuphobby.com/Firepower-46-Sport-5045-07-Outrunner-Brushless-Electric-Motor-E-285.htm

45 amps, give or take a few amps, should have been your target maximum amp draw for this motor in a 3D application. Using the 53 amps math from the previous calculation, it is apparent that you could have figured out that a 2600mAh pack would have been a more appropriate pack capacity, while sill 'over-amping' the motor.

The table at the bottom of the page shows the Turnigy brand 20C LiPo packs available in September 2014.

If the the amp draw noted by capacity in Ah times 20 is used for the maximum target amp draw, i.e. 44 amps for the 2200mAh pack, then the approximate flight time will be just shy of 5 minutes. Actually it is 4.8 minutes if you do the math.
1.76Ah (usable capacity of 2200mAh pack) times 60 = 105.6 amp minutes
105.6 amp minutes divided by 44 amps = 2.4 minutes of continuous run time
2.4 minutes times MY factor of 2 = 4.8 minutes

That is true for every pack capacity when that amp draw is the noted C-rate times the Ah capacity.
80% of 5000mAh is 4000mAh or 4Ah
4Ah times 60 minutes = 240 amp minutes
240 amp minutes divided by 100 amps = 2.4 minutes of continuous run time

If the amp draw noted in the table as 80% Maximum C-rate Amps is used as the maximum target amps, then the estimated flight time will be 6 minutes.
For the 4S 2650mAh 20C LiPo
80% of 2.65Ah = 2.12Ah

Turnigy 4S1P 20C LiPos						
mAh:	**1000**	**1300**	**1600**	**1800**	**2200**	**2650**
Price (US dollars):	$8.75	$9.99	$14.55	$16.40	$17.65	$16.40
Usable mAh (80% stated capacity):	**800**	**1040**	**1280**	**1440**	**1760**	**2120**
Pack weight in grams:	107	136	179	173	247	265
LengthxHeightxWidth mm:	**74x35x23**	**77x34x29**	**94x34x29**	**110x34x23**	**105x34x33**	**137x44x22**
Amps at Noted C rate & mAh:	20	26	32	36	44	53
Watts in Above Amps x 14.8V	**296**	**384.8**	**473.6**	**532.8**	**651.2**	**784.4**
80% Maximum C-rate Amps:	16	20.8	25.6	28.8	35.2	42.4
Watts in using 80% amps x 14.8V:	**236.8**	**307.84**	**378.88**	**426.24**	**520.96**	**627.52**
mAh:	**3000**	**3300**	**3600**	**4000**	**5000**	
Price (US dollars):	$19.95	$28.59	$29.99	$28.60	$32.99	
Usable mAh (80% stated capacity):	**2400**	**2640**	**2880**	**3200**	**4000**	
Pack weight in grams:	337	358	389	437	536	
LengthxHeightxWidth mm:	**138x44x27**	**137x42x26**	**137x43x29**	**142x50x28**	**148x49x33**	
Amps at Noted C rate & mAh:	60	66	72	80	100	
Watts in Above Amps x 14.8V	**888**	**976.8**	**1065.6**	**1184**	**1480**	
80% Maximum C-rate Amps:	48	52.8	57.6	64	80	
Watts in using 80% amps x 14.8V:	**710.4**	**781.44**	**852.48**	**947.2**	**1184**	

2.12 * 60 minutes = 127.2 amp minutes
127.2 amp minutes divided by 42.4 amps (from the table and is 80% of the maximum 53 amps) = 3 minutes of continuous run time.

Approximate flight time for **ME**, **my planes** and **the way I fly**: 3 minutes times 2 = 6 minutes

There is a lot of other useful information in the tables, if you look closely.

Turnigy 2200mAh 4S1P					
C rating:	**20C**	**30C**	**35C**	**40C**	**60C**
Price (US dollars):	$17.65	$23.99	$26.60	$24.30	$25.02
Pack weight in grams:	**247**	**258**	**257**	**260**	**255**
LengthxHeightxWidth mm:	105x 34x33	105x34x35	106x34x33	110x34x34	107x34x35
Amps at Noted C rate:	**44**	**66**	**77**	**88**	**132**
Watts in Above Amps x 14.8V	651.2	976.8	1139.6	1302.4	1953.6

You could also have used a higher C rated battery if you wanted to keep the amp draw in the middle 50's to suit your flying. (See the table above.) The flight time would not increase. The flight time might actually go down a little if the higher C-rated pack allows more current to pass. Most likely though, the LiPo might not have swollen.

If you desire to increase your flight time over 6 minutes, without going to a larger than 3300mAh LiPo, you'll need to change the load, which will decrease the average amp draw. That means a prop that will draw less current but one that will still allow you to fly the plane the way you want it to fly.

He also suggested I use a larger prop than the 13/8 that I have on it so picked up a 14/7 APC to try.

An APC 14x7 is going in the wrong direction, although it will most likely draw slightly less, or equal, current compared to the Master Airscrew 13x8, it is not a good move. MA props tend to draw more amps than similarly sized APC E props.

Even if the APC 14x7E draws about the same amps as the MA 13x8, it would not alleviate the 'puffing problem' or help with extending the flight time of the 2200mAh pack.

A profile 3D type plane does not need a lot of pitch speed. An APC 13x6.5E probably draws a few amps less than the Master Airscrew 13x8 that you are using. That's based on my past experience with MA props.

The 13x6.5E would only increase your flight time slightly, but it would PROBABLY not puff either the 3000mAh or 3300mAh LiPo battery.

I also contacted the HeadsUp RC in Florida, the place were I got the motor originally, he suggested using smaller props, 11" and or 12".

That is solid information on reducing the amp draw. Reducing the amp draw is what is needed on the 20C 2.2Ah battery to both increase the flight time and reduce the chance of 'puffing'.

Gad, wish I had studied more in my younger days.
Can you shed anymore light one this for me??

Most suppliers of LiPo batteries are in the dark about their use and care. The suppliers tend to 'parrot' any information that was supplied to them by the original equipment manufacturer (OEM).

There is really no empirical data to support any of the following statements. The statements are based on anecdotal information from various sources.

Some, and or all, of the following might help elevate the puffing of Lithium Polymer type batteries and lengthen their useful lifespan.

To Keep the Chance of 'Puffing' to a Minimum:
1.) Select a capacity with a C-rate that will match or exceed your chosen motor's maximum amp draw.
2.) Don't use more than 80% of the LiPo battery's capacity. Learn your battery's relationship to your airframe, your flying style and expected duration using a timer.

3.) Always balance charge
4.) Store LiPo batteries at a storage charge. A storage charge is typically considered 3.8V to 3.85V. Don't leave them 'empty' or 'full' for long periods of time.

Could they still 'puff' if you do all that? Maybe, but the chances of 'puffing' will be greatly reduced.

Can Adding a Cell to an A123 Pack Increase Flight Time?

I Already Knew the Answer, But, Duh, I forgot.

By Ken Myers

Preface: I received an email from Willie McMath requesting some information on going from a 6-cell "A123" pack to a 7-cell "A123".

Before responding to Willie, I thought about the obvious; just adding a cell and changing nothing else will increase the amp draw and shorten the flight time. That would change the way the plane flies.

Then I thought; adding a cell and dropping the prop size would also change the way the plane flies.

Changing the capacity of a LiPo pack can increase the flight time, but "A123" cells, of the type used here, have a 'fixed' capacity.

I ended up surprising myself with my answer to Willie.

Hello Ken,

I have a question regarding my Morrisey Bravo that I fly with a Turnigy 42-60-500Kv motor with an APC 14x10E using a 6s A123 battery. It flies really well.

What happens to the performance of the plane if I add one more 2300mAh cell to the pack?

Would it increase the flight time?

Willie McMath

KM: What is your static amp draw now with the APC 14x10E prop?

WM: Here are my readings. Watts: 599.9, Amps: 35.10, volts:19.88

KM: Your numbers do not 'jive'. 599.9 watts / 35.1 amps = 17.09 volts. 17.1 volts is exactly the voltage I would expect of A123 cells under a '35' amp load.

IF you are drawing 35 amps with either a 6 or 7 cell pack, the flight time will basically be the same.

One way to increase flight time would be to use a larger capacity battery, but that is not practical with "A123" cells.

The other way to increase flight time is to reduce the amp draw.

If you are using 600 watts in with a 6 cell pack, and the power is fine at 600 watts in, then dropping to 29 amps and using a 7 cell pack would still give about 600 watts in. That would mean using an APC 12x8E with the 7 cell pack and this motor.

The 6 cell pack at 35 amps should give a flight time of
2Ah (about the real capacity of 2300mAh 123 cells) times 60 minutes = 120 amp minutes
120 amp minutes divided by 35 amps = 3.43 minutes of motor run time at full throttle.
That should yield about 5 to 6 minutes of flight time. For me, my planes and the way I fly them, I actually get 6 to 7 minutes at that 35ish amp maximum static draw.

For the proposed 7 cell pack at 29 amps
120 amp minutes divided by 29 amps = 4.14 minutes of motor run time at full throttle.
That should yield about 6 to 8 minutes of flight time. For me, my planes and the way I fly them, I actually get 7 to 8 minutes at that amp draw.

The big problem would be going from a 14x10E to a 12x8E prop. The plane would certainly fly very differently, even though both setups would still have about 600 watts in.

(I was incorrect in that statement. KM)

WM: I have a question on what you mean by fly differently.
I used a Turnigy watt meter model# 130 A watt meter and power analyzer.

KM: The Volts, Amps and Watts all need to be captured at the same time, like a snapshot.

Obviously the 19.88 volts was not captured at the same time as the 600 watts and 35 amps.

At first, I believed that your power meter was reading maximums. Obviously, maximum voltage is reached when the power meter is plugged in and there is no load on it.

19.88V divided by 6 cells = 3.31V per cell, so I'm not even sure what that voltage reading means, as 3.31V per cell is almost empty for "A123" cells under no load. That voltage is also too high for "A123" cells with a 35 amp draw.

Here is an approximation of what will be happening when going from 6 to 7 "A123" cells and from a 14x10E to a 12x8E
6S & 14x10E 598 watts in, 6500 RPM, pitch speed 62 mph, static thrust 87 oz.
7S & 12x8E 598 watts in, 8600 RPM, pitch speed 65 mph, static thrust 83 oz.

I surprised myself with those numbers. It looks to me, by the numbers, that the plane should fly similarly. As I said, I was a little surprised.

It looks like you can pick up a couple of minutes of flight time by going to a 7S pack, with the reduced amp draw of the 12x8E prop. Only flying it will tell if it is really equal in flight performance while increasing the flying time.

Ken reflects on his comments.

I had to change the motor in my Hitec Weekender Extra 300. The stock motor was about 610 Kv and the replacement about 810 Kv. The pack is a 4S "A123" 2300mAh. To get the amp draw to where I wanted it with new motor, I had to change to an APC 12x8E.

From the July 2014 *Ampeer*,
"Using the Ice 50, and Tactic radio, a freshly charged battery, and APC 14x10E prop yielded; 11.7v, 30.2 amps, 5880 RPM and 360 watts in. The calculated pitch speed is 55.7 mph."

From the September 2014 *Ampeer*,
"I decided to go with an APC 12x8E for the Extra 300S as the Emeter II captured; 11.65V, 30.6A, 7809 RPM, 356.5 watts in. That yields a pitch speed of about 59 mph."

Both setups give the plane the same perceived performance in the air. The 'speed' and 'vertical height' seemed to be extremely similar.

I really didn't understand that at the time, as I expected slightly less performance from the APC 12x8E.

I used static thrust data from Drive Calculator (DC) in my comments to Willie. **Normally, I pay absolutely NO attention to that bit of info.**

According to Drive Calculator an APC 14x10E at 5880 RPM produces 66.5 ounces of static thrust and an APC 12x8E at 7810 RPM produces 66.6 ounces of static thrust.

Ah, head slap.

Not only is this information useful in changing cell count but also motor Kv.

Thinking About Going LiPo
By Ken Myers

After doing a lot of research to answer the question about LiPo puffing in this issue, and seeing the prices, I was seriously thinking about trying LiPo batteries once again.

When thinking of my "A123" packs, I always try to use 100 watts in per cell. That gives a 35 amp draw for estimating purposes.

For me, a 4 lb. (64 oz.) sport plane would use a 4S "A123" pack. Using a wing cube loading (WCL) factor of 9, that a typical sport plane would have, yields a wing area of 543.5 sq.in.
Area Loading: 16.96 oz./sq.ft.
4S New "A123" usable 2.2Ah (for the 2500mAh)
Wt. about 320g with wire and connectors for a homebuilt pack, about $50US
2.2Ah * 60 min. = 132 amp min. / 35 = 3.77 min. static run time for the "A123" pack.
400 watts in / 11.1V = 36 amps for a 3S LiPo
400 watts in / 14.8V = 27 amps for a 4S LiPo
Capacity for a 20C LiPo
1.25 in following formulas is the inverse of 0.8 or 80%. This allows for usable capacity from the LiPo.
3S 3.77 min. * 36 amps = 135.72 amp min. / 60 min. = 2.262Ah * 1.25 = 2.8275Ah
Turnigy 3S 3000mAh 20C, Wt. 253g, $14.65US

Upcoming E-vents

Oct. 18, Saturday, EFO Monthly Flying Meeting, everyone with an interest is welcome, proof of AMA membership required to fly. Hope to see you then

Oct. 26, Sunday, AMA District 7 Town Hall Meeting, details in this issue

Nov. 1, Saturday, EFO Monthly Flying Meeting, everyone with an interest is welcome, proof of AMA membership required to fly. Hope to see you then

Nov. 2, Sunday, Midwest RC Society Swap Shop, Northville, MI, 9 a.m. to noon (details in this issue)

Nov. 4, Tuesday, Skymasters' Indoor flying starts at the Ultimate Soccer Arenas, Pontiac, MI, 11 a.m. to 1 p.m. (details in this issue)

Nov. 6, Thursday, Indoor flying starts at the Legacy Center, Brighton, MI, noon to 2 p.m. (details in this issue)

Thinking About Going LiPo (cont. from p. 9)

4S 3.77 min. * 27 amps = 101.79 amp min. / 60 min. = 1.6965Ah * 1.25 = 2.12Ah
Turnigy 4S 2200mAh 20C, Wt. 247g, $17.65US

The weight savings for approximately the same flight time is about 70g or about 2.5 ounces.

The WCL factor for the example plane changes to 8.4 and area loading to 16.28 oz./sq.ft. That is very little weight savings and probably not a perceptible change in how the plane flies.

The price savings is approximately $35 per pack. That is significant.

With two personal flying buddies with LiPo 'events' while charging and one with an unexplainable 'event' while transporting in a fire safe, I think I'll stick with "A123" packs for a bit longer.

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The Next Monthly Flying Meeting:
Date: November 1, 2014 **Time:** 10 a.m.
Place: Midwest RC Society 7 Mi. Rd. Flying Field