the Ampeer

July The EFO Officers 2008

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The Next Meeting:
Date: July 12 & 13 (Mid-Am) **Time:** 9:00 a.m.
Place: Midwest RC Society 7 Mi. Rd. Flying Field

What's In This Issue:

An A123 Success Story

From John Houvener Midland, MI

Ken,

Another first for me, I got my first A123 battery the other day. It is the 6-cell 2300. I received it from Model Electroncs Corp (MEC). What a surprise, it comes (the cells) installed in their power tube all set to go. It weighs 17 oz. complete. The price is very good from them.

I installed the battery in my "Screapbox LT-46" which is a modified LT-25. The modifications included taking the dihedral out of the wing and increasing the aileron, rudder and elevator size. I flew this all last summer with a 4S1P 3700mAh Li-Po battery. The motor is a Himax HC 5018-530 swinging an APC 15x8E prop. Using the 6-cell A123 pack, I used an APC 13x6.5E to get the same amps as with the Li-Po setup, about 500 watts in. The plane weighs 88 oz. with the new setup. I am really pleased with this new battery. I got 8 minutes of fairly aggressive flying, using 1900mAh on the flight. The flight included big loops, verticals, etc., and they were being done at 1/2 to 3/4 throttle. I am going to put on an APC 12x6, which only uses 25 amps at WOT.

I have three Himax motors and find them to be tops for sport flying. After using this Li-ion battery, I probably will never use the Li-Po type again in my larger models. The safety and 15-minute charge time, means you can get by with just one battery per model.

Also, I blew up one of my old 4S1P 3000mAh Polyquest Li-Po batteries. This is a really scary thing. I had it in an ammo box, so there was no damage elsewhere. Anybody who does not use protection like this when charging Li-Po types is an idiot.

Thanks for sharing your experiences with us, especially your Li-Po experience. Remember that you can find the latest A123 Systems cell info at http://homepage.mac.com/kmyersefo/M1-outrunners.htm

There are links to suppliers of these cells and their current prices. I frequently update this article. KM

Some of Ken's Planes	Area Sq. in.	Weight oz.	CWL oz./cu.ft.	Prop Dia in	Pitch inches	RPM	Pitch/ Dia.	Pitch Speed	Stall Speed	Pitch/Stall ratio	Performance Factor
EasyStar, stock, 6-cell 600 NiCad or 2S A123 2.3Ah	**372**	**21.16**	**5.10**	**4.92**	**4.33**	**11600**	**0.88**	**47.56**	**10.59**	**4.49**	**0.84**
SR Batteries Bantam recommended components	210	8.3	4.71	9.00	4.70	3750	0.52	16.69	8.83	1.89	1.05
Bill Griggs Rocket Speed 400 Racer 7 NiCads 500mAh	**144**	**16**	**16.00**	**5.50**	**4.50**	**11000**	**0.82**	**46.88**	**14.80**	**3.17**	**1.10**
Senior Skyvolt, AF25 Geared 14 NiCads	580	80	9.90	12.00	8.00	6550	0.67	49.62	16.49	3.01	1.67
Goldberg Eaglet 50, brushed 035 geared 9-Nicads mine	**450**	**56**	**10.14**	**10.00**	**6.00**	**8500**	**0.60**	**48.30**	**15.66**	**3.08**	**1.99**
E-250, my low-wing sport design, AF035 direct 6 2.0Ah NiCads	250	34	14.86	7.00	4.00	13500	0.57	51.14	16.37	3.12	2.01
SR Batteries X-250, brushed Turbo 450, 7 2.0Ah NiMH, mine	**282**	**30.8**	**11.24**	**7.00**	**4.00**	**12875**	**0.57**	**48.77**	**14.67**	**3.32**	**2.15**
SR Batteries Cutie Mag. Mayhem brushed 6 2.0Ah NiCads	360	37.6	9.51	8.50	5.00	9900	0.59	46.88	14.35	3.27	2.22
TigerShark my low-wing sport design (AF 035 geared w/Nicads)	**486**	**58.6**	**9.45**	**10.00**	**6.00**	**9000**	**0.60**	**51.14**	**15.42**	**3.32**	**2.29**
ElectroFlying Fusion, AXI 4120/18 & 16 3000 NiMH	569	92.8	11.81	12.00	10.00	7700	0.83	72.92	17.93	4.07	2.69
Sportsman Aviation Sport Stik 40 ARF brushless/4S 4.0Ah Li-Po	**585**	**79.88**	**9.76**	**11.00**	**8.50**	**8610**	**0.77**	**69.30**	**16.41**	**4.22**	**2.87**
My Ryan STA conversion, brushless/ 4S 4.0Ah Li-Po	460	71	12.44	12.00	6.00	8550	0.50	48.58	17.44	2.78	2.97
Sportsman Aviation Sport Stik 40 ARF brushless/5S 4.0Ah Li-Po	**585**	**84**	**10.26**	**10.00**	**7.00**	**11224**	**0.70**	**74.40**	**16.82**	**4.42**	**3.32**
Sport Aviation Sonic 500, brushless/4S 4.0Ah Li-Po	512	66	9.84	11.00	8.50	8500	0.77	68.42	15.94	4.29	3.44
RC Dymond Flite 40 w/TP 3520-7, 6 A123 2.3Ah mine	**615**	**87.3**	**9.89**	**12.00**	**7.00**	**9120**	**0.58**	**60.45**	**16.73**	**3.61**	**3.57**
RC Dymond Flite 40 EMP 42-60 500Kv brushless	615	87.3	9.89	13.00	9.00	7600	0.69	64.77	16.73	3.87	3.66
Son of Swallow brushless, 3 A123 2.3Ah mine	**415**	**40.8**	**8.34**	**10.00**	**7.00**	**8587**	**0.70**	**56.92**	**13.92**	**4.09**	**3.69**
ElectroFlying Fusion, AXI 4120/18 & 5S 4.0Ah Li-Po/6S A123 2.3Ah	569	73.9	9.41	12.00	10.00	7800	0.83	73.86	16.00	4.62	3.94
Sport Aviation Sonic 500 brushless/5S 4.0Ah Li-Po	**512**	**69.8**	**10.41**	**10.00**	**7.00**	**11280**	**0.70**	**74.77**	**16.39**	**4.56**	**4.16**
RC Dymond Flite 40 EMP 42-60 500Kv 6 A123 2.3Ah	615	87.3	9.89	14.00	8.50	7500	0.61	60.37	16.73	3.61	4.47

Removed the 0.5 from the "thrust" part Some of Ken's Planes	Area Sq. in.	Weight oz.	CWL oz./cu.ft.	Prop Dia in	Pitch inches	RPM	Pitch/ Dia.	Pitch Speed	Stall Speed	Pitch/Stall ratio	Performance Factor
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Bill Griggs Rocket Speed 400 Racer 7 NiCads 500mAh	**144**	**16**	**16.00**	**5.50**	**4.50**	**11000**	**0.82**	**46.88**	**14.80**	**3.17**	**2.19**
Senior Skyvolt, AF25 Geared 14 NiCads	580	80	9.90	12.00	8.00	6550	0.67	49.62	16.49	3.01	3.35
Goldberg Eaglet 50, brushed 035 geared 9-Nicads mine	**450**	**56**	**10.14**	**10.00**	**6.00**	**8500**	**0.60**	**48.30**	**15.66**	**3.08**	**3.98**
E-250, my low-wing sport design, AF035 direct 6 2.0Ah NiCads	250	34	14.86	7.00	4.00	13500	0.57	51.14	16.37	3.12	4.02
SR Batteries X-250, brushed Turbo 450, 7 2.0Ah NiMH, mine	**282**	**30.8**	**11.24**	**7.00**	**4.00**	**12875**	**0.57**	**48.77**	**14.67**	**3.32**	**4.29**
SR Batteries Cutie Mag. Mayhem brushed 6 2.0Ah NiCads	360	37.6	9.51	8.50	5.00	9900	0.59	46.88	14.35	3.27	4.45
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Sportsman Aviation Sport Stik 40 ARF brushless/5S 4.0Ah Li-Po	**585**	**84**	**10.26**	**10.00**	**7.00**	**11224**	**0.70**	**74.40**	**16.82**	**4.42**	**6.63**
Sport Aviation Sonic 500, brushless/4S 4.0Ah Li-Po	512	66	9.84	11.00	8.50	8500	0.77	68.42	15.94	4.29	6.88
RC Dymond Flite 40 w/TP 3520-7, 6 A123 2.3Ah mine	**615**	**87.3**	**9.89**	**12.00**	**7.00**	**9120**	**0.58**	**60.45**	**16.73**	**3.61**	**7.14**
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Son of Swallow brushless, 3 A123 2.3Ah mine	**415**	**40.8**	**8.34**	**10.00**	**7.00**	**8587**	**0.70**	**56.92**	**13.92**	**4.09**	**7.39**
ElectroFlying Fusion, AXI 4120/18 & 5S 4.0Ah Li-Po/6S A123 2.3Ah	569	73.9	9.41	12.00	10.00	7800	0.83	73.86	16.00	4.62	7.88
Sport Aviation Sonic 500 brushless/5S 4.0Ah Li-Po	**512**	**69.8**	**10.41**	**10.00**	**7.00**	**11280**	**0.70**	**74.77**	**16.39**	**4.56**	**8.31**
RC Dymond Flite 40 EMP 42-60 500Kv 6 A123 2.3Ah	615	87.3	9.89	14.00	8.50	7500	0.61	60.37	16.73	3.61	8.93

Total Performance Factor Questions

From Wade Harvey wadetharvey@hotmail.com

Ken,

As you probably know by now I am fascinated with cubic wing loading, power loading and other indicators and predictors of flight performance. Your articles on these topics are the most interesting and satisfying to me.
Thanks. ☺

In the May 2008 *Ampeer* lead article, you explain that you needed a propeller blade "form factor" to be used in the thrust formula part of your total Performance Factor. As it relates to the Mitch Poling version, you substituted the D/P ratio for the original "1" average value "form factor" but you also added a multiplier of 0.5 without explanation on page 6. The math validates this multiplier being introduced. Should your new form factor be stated as D/2P, both in inches? Does the 0.5 have anything to do with the number of prop blades?

Not really. The 0.5 is purely cosmetic. Odd for a math formula isn't it? The tables above show the PF with the cosmetic form factor of 0.5 in the top set of data and without it in the bottom set of data. You should be able to see that it doesn't make a bit of difference when arraigning my planes from least to greatest performance.

My PF theory does not take the number of blades into account at all. The vast majority of the data that I have collected is for two bladed props.

I hate to be a pest but these things matter to me. Could you please explain? Thanks as always for doing such a great job with the Ampeer. It is my favorite read every month.

Never a pest, and boy, do I wish more people would ask such great questions! Hopefully, I've explained it above, and the tables should also make it clearer. It is always great to know that at least some folks are reading my stuff. ☺

By the way, I was not sure of what conclusion was to be made of the data table of PF levels at various CWL levels presented at the end of page 6.

I believe you are referring to the table where I show the Performance Factors I've found over a

large range of electric and glow powered models. I've put the table below, so you can look at the data.

CWL Level	Power Type	Range	PF Avg.	PF Median	Number Examples
1	elec.	1.11 - 15.42	5.02	3.75	13
2	int.	5.92 - 8.91	7.10	7.18	3
2	elec.	0.41 - 9.41	4.34	4.22	30
3	int.	2.81 - 10.09	6.05	5.93	12
3	elec.	0.39 - 13.73	3.92	3.07	55
4	int.	1.81 - 9.50	5.14	5.10	43
4	elec.	0.81 - 8.43	3.69	3.59	79
5	int.	1.20 - 19.56	4.59	4.37	39
5	elec.	0.38 - 6.64	2.88	2.68	38
6	int.	1.06 - 8.64	3.28	2.88	11
6	elec.	1.71 - 8.73	4.21	3.90	14
7	int.	1.28 - 4.40	1.79	1.99	5
7	elec.	NA	3.09	3.09	1
int. = internal combustion elec. = electric					

Looking at the spreadsheet, available at homepage.mac.com/kmyersefo/metricnewtheory.xls should also help.

In the table, the first column shows the Cubic Wing Loading Level. Looking at the table you can see that there are no internal combustion powered planes, which I have found, in CWL Level 1. They are, for the most part, indoor types.

When you look at the level two planes, you should see that I have recorded 3 internal combustion engine types and 30 electrically powered types. This indicates that there are a lot more electrically powered types! The Range indicates the PF low to the PF high for the CWL level. With only three examples for "glow", it should not be considered very reliable, but when you look at the average or median PF, the "glow" versions have a PF over 1.5 times that of the electrically powered versions. In other words, they have considerably "better" performance.

The "glow" powered versions continue to have higher average and median performance through CWL Level 5 and then the electrically powered planes have a higher PF factor. Of course Level 7 isn't very valid because of a lack of data.

CWL Level 5 (advanced sport) has about the same number of examples; 39/38. The range indicates that the best performing internal combustion powered plane has almost three times the performance of the best performing electrically powered model at this CWL level, while they average is only slightly better than 1.5 times for the internal combustion type.

If you've not already downloaded this spreadsheet homepage.mac.com/kmyersefo/performancefactor.xls you should. It will allow you to play around with your own planes and see some that I have figured for comparison.

Thanks again for your great and thoughtful questions. KM

More on Large electrics from California

From Don Hofeldt bladerunner1955@verizon.net

Last month I gave some links to see video of these planes. I asked Don for more information, so here it is. KM

Sorry for the delay. My shop has been busy. The P-51 is a Top Flight ARF using an AXI 5345 on 12 Li-Po cells and swinging a 22x12 prop. The same power system is in the Midwest Texan too. The FW 190 is not mine but my friend Denny's. It has a 5330/24 on 10 cells and swings a 20-inch prop, The Stinson Reliant is a built up and spans100". It uses the AXI 5330/24 and swings a 22x12 prop. It flies like a trainer. The P-47 also uses the AXI 5330/24 on 10 cells but I am going to run mine on a AXI 5345 with 12 cells to speed things up some. It is a Hanger 9 ARF. The Pawnee is a nice flying plane. I over powered it with a 5320 and 10 cells to help out with the balance. On 10 cells and a 17x12 prop I can fly about 3, 7-minute flights with throttle control.

P-51

http://www.youtube.com/watch?v=KWs8ZfS7xbg

AT-6
http://www.youtube.com/watch?v=RNTAhicEtBU

Stinson Reliant
http://www.youtube.com/watch?v=8x0mFuR_Nz8
The other video links are:
Hangar 9 Pawnee
http://www.youtube.com/watch?v=mQ0WnGHkEdY
FW 190
http://www.youtube.com/watch?v=m3pRFtBAWVE

Electrically Powered Beginner Planes:
Three Decades With No Real Change
Editorial
By Ken Myers

Last year, at the Midwest 5 Mile Rd. flying field I had a chance to help a young man and his father with the boy's first R/C plane. The plane was the HobbyZone Firebird Freedom. They had just picked it up at Joe's Hobby and came out to the field for some instruction. That was a very wise move on their part. The plane is billed by HobbyZone and its distributor, Horizon Hobby, as a "3-channel Teach-Yourself-to-Fly RTF with Anti-Crash Technology".

I went over the plane to check it out, and then had one of my flying buddies give it a good hand launch. The initial flight was short, as the pack had not received a full charge. That was okay, as it proved to be somewhat tail-heavy and out of trim. A novice would have probably crashed the plane, even with the ACT turned on and never known the reason why.

The battery was charged and I added some weight to the nose and adjusted a push rod. I took a short flight to set the trims and get a feel for the plane.

I had already "ground schooled" the young pilot on how to move the controls and what to expect.

I once again flew the plane after a hand launch, having the student pilot watch my inputs. I handed over the controls and we flew together for a while. The ACT was not on, so he did a bit of over controlling at first, but we did okay. There is a bit of a lag between the transmitter input and the plane's response, so that took some getting used to. I landed the plane again, noting that it tends to "come in hot."

We did one more flight, and then the winds picked up to an uncomfortable level for training. He and his father thanked me for their experience, left, and I never saw them again. I do not know whether he ever successfully flew the plane.

I hadn't given that experience too much thought until I received the August 2008 issue of FlyRC. Scott and Andrew Stoops' review of this plane can be found starting on p. 100. I give Scott credit for making this "toy" sound like what it is, but still not laying it all out for the beginner.

What's wrong with this plane for a beginner?

That is what Scott and Andrew's review tends to "gloss over" but is mentioned if read carefully.

1.) The wing loading/CWL is too high to be an effective trainer; 13.8 oz./sq.ft or 10.9 oz./cu.ft. (advance sport CWL). With this type of loading the plane needs to be flown relatively "fast" to keep it from wallowing and stalling in the turns. It also lands at a higher speed than desirable for a "trainer." This type of loading also requires a forceful, correct hand launch to get it "moving", and a beginner would not know how to do that successfully.

2.) It uses a 7-cell 900mAh NiMH pack as its flight power source. Small NiMH cells, like used in this pack, are possibly the worst cells ever chosen to power an R/C aircraft. They have high internal

impedance, which reduces the power available, and they have a very, very short useful life.
3.) The radio system components are not transferable to other standard R/C planes.
4.) The landing gear is ineffective and unnecessary. On grass, the gear tends to flip the plane on every landing. If take offs are attempted from a paved or dirt surface, the plane is not steerable with its "V" tail configuration. It can be clearly seen in photos accompanying the Stoops' review that they've removed the landing gear.

The plane is marketed directly to young fliers looking for "playability." It has the ability to carry X-Port modules aloft with a "bomb" or parachutist drop, lights for night flying or a "combat" module. It is marketed directly to the young flier's parents with a price point under $150 for everything, except the X-Port modules.

This plane is a throwback to 25 or 30 years ago, when RTF beginner planes first hit the market. It is just one example of the many out there designed to separate a potential R/C pilot from their money.

I strongly urge you to discourage the purchase of this type of plane and recommend a decent, true beginner plane like the Multiplex EasyStar RTF.

Unfortunately, the reality is that there is very little we can actually do about these types of planes with their mass marketing techniques and "positive" reviews in the modeling magazines. When folks show up at the field, we just have to show them our enthusiasm for the hobby and try and help them the best that we can.

My review of the EasyStar RTF is at:
http://homepage.mac.com/kmyersefo/easystar.htm

Is Balancing 26650 Cells From A123 Systems, Inc. Necessary?

From Walt Thyng thyng@att.net

I recently received an email from Walt regarding balancing these cells. Part of that email and my response has been reproduced here. KM

WT: I've had some problems recently with my A123s going way out of balance. I was under the impression that if a pack was closely matched they didn't require as frequent balancing as Li-Pos.
KM: I've found this to be true. I went downstairs and measured my three packs of these cells. All three packs have been left uncharged since their last flights.

The CellMeter-8 was used to read all of the individual cell voltages at the same time.
Pack in Fusion: 3.262, 3.268, 3.265, 3.255, 3.274, 3.266 (pack has set for at least 3 weeks since last use)
Pack in Flite 40: 3.159, 3.178, 3.164, 3.187, 3.167, 3.177 (pack has set for at least 3 weeks since last use)
Pack in Son of Swallow: 2.895, 2.947, 2.897 (last used 5 days ago and flown to the "cliff")

I charged all three packs. Using the CellMeter-8 I took the individual cell voltage readings about 5 minutes after charge. From my previous experience with these cells, I already knew they would be "all over the place."
Pack in Fusion: 3.773, 3.684, 3.730, 3.663, 3.927, 3.942
Pack in Flite 40: 3.695, 3.685, 3.665, 3.676, 3.669, 3.705
Pack in SOS: 3.513, 3.532, 3.497

About 22 hours later, after a nice long rest for the cells to "settle down", I once again read the voltages. I was quite sure they would all be between 3.4v and 3.5v, as this is what I've usually found them to be, but I got a surprise.
Pack in Fusion: 3.649, 3.471, 3.492, 3.550, 3.799, 3.813
Pack in Flite 40: 3.464, 3.457, 3.461, 3.461, 3.452, 3.460
Pack in SOS: 3.420, 3.421, 3.402

As you can see, the "little surprise" was the voltage differences in the 6S1P pack used in my Fusion. The other two were exactly what I expected. I plugged the Fusion pack in and ran the motor up to full throttle and back and then got the following:
Pack in Fusion after run up: 3.496, 3.409, 3.423, 3.458, 3.597, 3.610

This is the biggest variation between cells that I've ever seen. The pack was balanced using the Astro Flight Blinky for A123 cells.

Most of the time, when these cells are fully charged and left to rest, the resting voltage is between 3.4 and 3.5, and most usually 3.45ish, although I've seen them resting at about 3.6v after a recent Zip charge of my SOS pack.

Once they have rested, the cell voltages will all be very close once again. I've found that the individual cell voltage readings are best taken 24 hours after charge, or the freshly charged battery can be put into the system, motor run up quickly to full throttle and shut down and then the cell readings taken. They'll be close, like the 24 hour later readings.

K2 Energy Lithium Iron Phosphate 26650 Cells

By Ken Myers

K2 Energy provides a Lithium Iron Phosphate type cell. http://www.peakbattery.com/

Steve Hill, of Robotic Power Solutions (AKA http://www.battlepack.com/), provided some of these cells for me to compare directly against the 26650 A123 Systems, Inc. 2300mAh cells. The K2 cells are described as; LFP26650P Hi Power Rechargeable 3.2V 2500mAh. There is a thread on RC Groups about these cells. Everydayflyer is also testing them and has reported his results in the thread.
http://www.rcgroups.com/forums/showthread.php?t=868243

Here is what K2 Energy says about their 26650 cell:
"… This cell can handle 42 Amps continuous discharge with over 50 Amps 30 second pulses. The cell is rated at 3.2 nominal volts and 2500mAhrs. (snip) The internal impedance is less than 9 milliohms. This battery is 26.2mm D x 65.2mm H and weights 82.5 grams (with a card board sleeve)."

My Size and Weight Measurements

K2 diameter 27mm, length 65.1mm
A123 diameter 26.5mm, length 65.6mm
K2 individual **cell weights** with tan cardboard-like sleeve: (I have four cells.)
#1 82.7g, #2 82.2g, #3 82.8g, #4 82.8g
Resting voltages as delivered:
#1 3.28v, #2 3.28v, #3 3.28v, #4 3.27v

Note: The button end is positive on the K2 Energy cells, which is the reverse of the 26650 from A123 Systems, Inc.

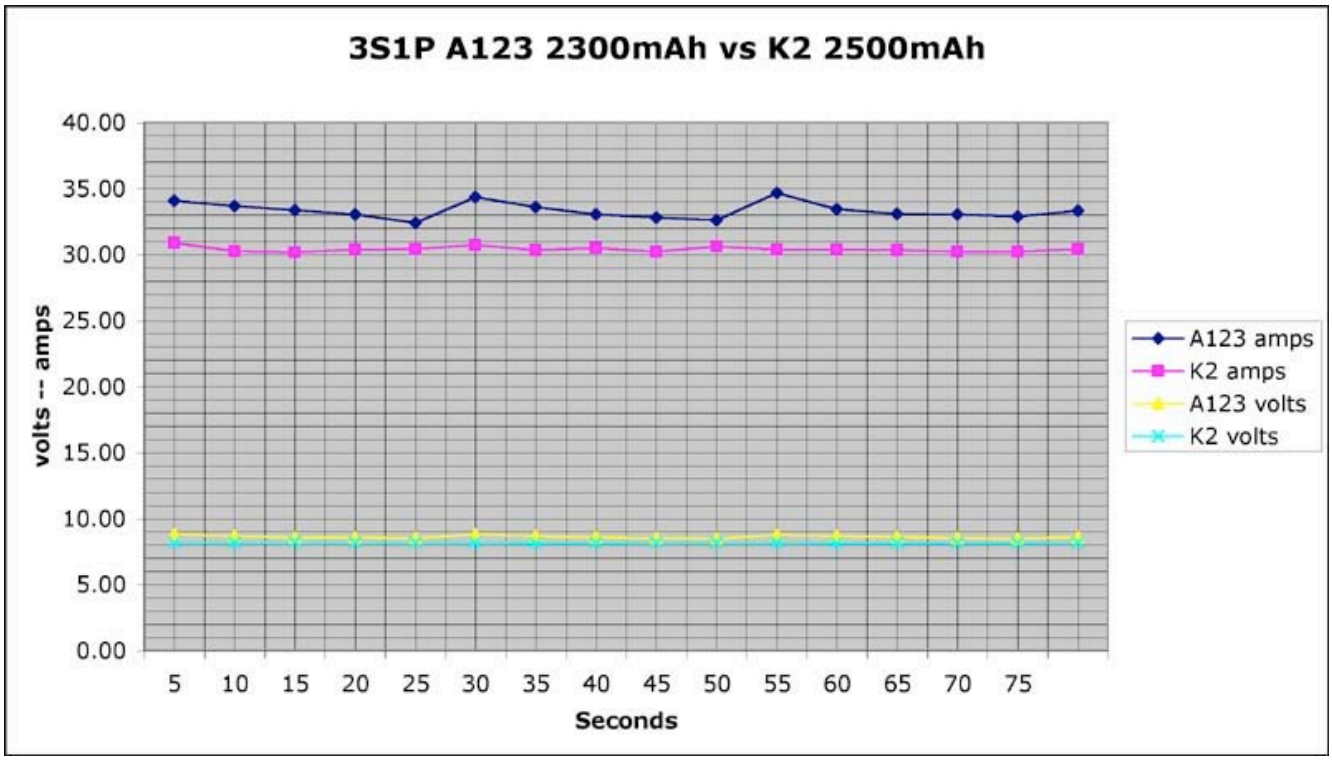
3S1P Pack weights:

Cells #1, #2, and #3 were made into a pack using 2 APP connectors, power leads, node/balance leads, tape and hook and loop fastener strips. Everything was done to duplicate, as closely as possible, the A123 pack I've been using.
A123 240.5g (8.48338 oz.) **K2** 267.85g (9.44813 oz.)
Difference: 27.35g (0.964742 oz.)

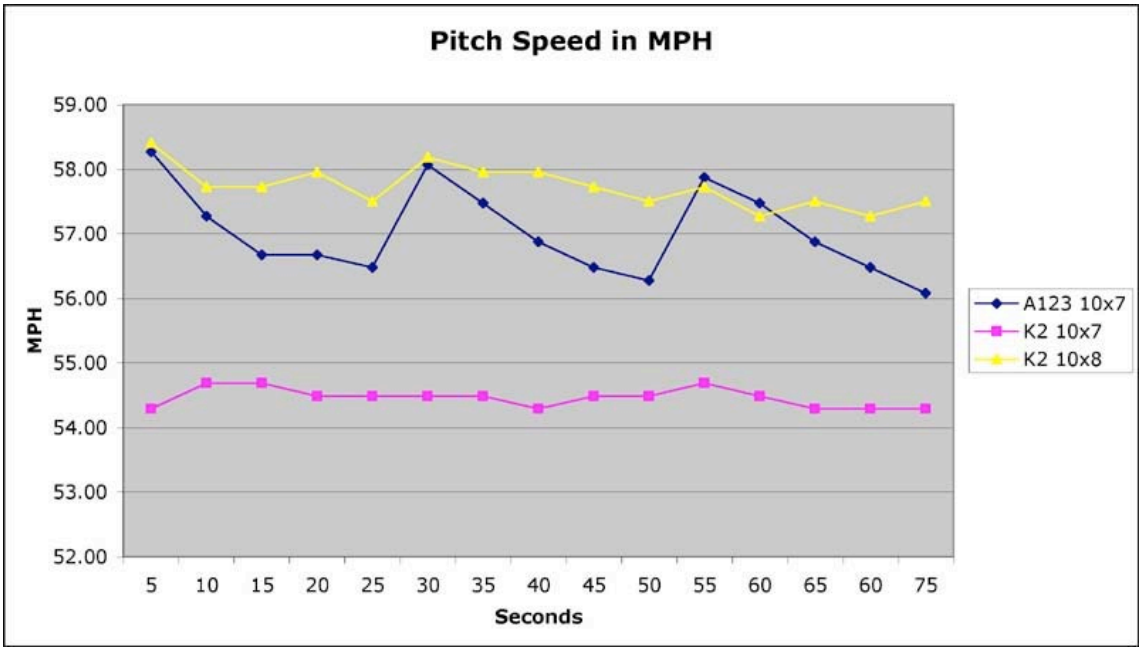
Testing and Comparing the K2 & A123

The new K2 Energy pack was first charged at 2.5 amps (1C) using an unmodified AF109 charger with termination done manually with the resting cell voltages being 3.732, 3.738, 3.719 about an hour and a half after the initial charge. The pack was discharge using the AF 109. The pack was then charged at 5 amps (2C) and 2.526AH was returned to the pack in 32 minutes, again terminating manually. The pack was discharged using the AF 109. The pack was then charged at 7.5 amps (3C) in 21 minutes with 2.492Ah returned to the pack. The pack sat overnight. In the morning, I was very surprised to see the Cellmeter-8 read all three cells' voltages exactly the same at 3.334v!

I noted one thing, while charging on the AF 109. The K2 pack gets warmer, much warmer, than my A123 pack when it is Zip charged. This indicates



higher cell impedance.



Comparative testing was done using the Son of Swallow power system; Hyperion Z3019-10, Master Airscrew standard wood 10x7 prop and a Castle Creations Phoenix-45 with low timing.

My Hyperion Emeter can store 5 data points at a time. For each static motor run, at full throttle, I collected data every 5 seconds with shut downs and run-ups between each one. I did three data gathering runs for each pack so that 15 data points were gathered, recording the data to a spreadsheet for each 5 gatherings, and then I captured the next 5 data points. The graphs show the behavior of the packs with the slight resting between each 5-point collection. When viewing the graph, it is easy to spot the "break" between the data collection runs.

RPM is not on the graph because, when RPM is changed to RPM/1000, the KRPM is approximately the same as the voltage and does not present well.

I did a second test after doing several cycles and some prop testing. That data is presented in the graph.

Averages for 5 through 75 seconds:

A123: 8.61v, 33.33 amps, 8602 RPM
K2: 8.14v, 30.39 amps, 8216 RPM

For a plane that flies on the wing, like the Son of Swallow, pitch speed is a good indicator of relative performance. The average pitch speed for the 10x7 was using the A123 cells is 57 mph, while for the K2 pack it is 54.5 mph.

Getting the Performance Up for the K2 Cells

I statically evaluated a 10x8 Master Airscrew standard wood prop. With the K2 pack, the average numbers are: 7.96v, 34.7 amps, 7620 RPM The 10x8 has an average pitch speed of 57.7 mph. These numbers indicate similar performance to the SOS using the 10x7 and the A123 pack.

Subjective Flight Testing

I do not have any onboard data gathering system. I first flew the SOS using the A123 pack to "get the feel" of the plane again fresh in my mind. I landed, immediately changed the pack, and flew the K2 pack. The K2 pack required a higher throttle setting in level flight to feel the same and was just a little off in the vertical, yet still good, just not quite as good as the A123 pack. The K2 pack was charged and the prop changed to the Master Airscrew 10x8 standard wood. The plane felt very much the same in the air. The speed and vertical "felt" at least as good as with the A123 pack and 10x7 prop.

When the K2 pack is used with the 10x8 and the A123 pack with the 10x7, there is about 30 watts in difference in favor of the A123 pack. (A123 avg. watts in 294, K2 avg. watts in 264) I could not really tell the difference in the air.

I found that both the A123 pack and K2 pack "put out more" when warm, this is very similar to what I found and presented in my article "Effects of Temperature On the Battery". http://homepage.mac.com/kmyersefo/temperature.htm

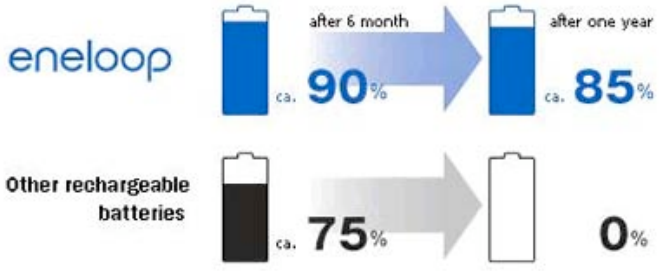
I will continue to fly the SOS using the K2 3S1P pack and Master Airscrew 10x8 standard wood prop to check the life of the K2 cells. I will also be charging them at 7.5 amps, as waiting longer than 20 minutes is "just too long", when at the field! This should provide a good "torture test" for them as well.

I have complete data and more graphs available in my article about the K2 Energy Cells at http://homepage.mac.com/kmyersefo/K2/K2.htm.

Sanyo Eneloop NiMH Cells
By Ken Myers

Sanyo has a cell they call the eneloop. It is a NiMH type cell with some very interesting characteristics.
http://www.eneloopusa.com/eneloop.html

Its main advantages are extremely low self-discharge and high capacity.



Graphic from Sanyo Site noted above

I have replaced the 8-cell Sanyo NiCad 700mAh pack in my Hitec Eclipse 7 transmitter with an 8-cell eneloop pack that I purchased from Robotic Power Solutions, (AKA http://www.battlepack.com). I now have almost three times the capacity, and I can charge when convenient, and not worry if my transmitter is ready to go.

I know that some folks are using Li-Po batteries, but I feel these are much safer and more convenient. I charge them in the transmitter with the standard "wallwart" charger, but for a longer period of time.

Mid-America Electric Flies 2008

At the 7 Mile Road MRCS Field

Note the new field location!

AMA Sanctioned
Saturday, July 12 & Sunday, July 13, 2008
Hosted by the:
Ann Arbor Falcons and **Electric Flyers Only**
Site Provided by the:
Midwest R/C Society

Your Contest Directors are:
Ken Myers phone (248) 669-8124 or KMyersEFO@aol.com – http://members.aol.com/kmyersefo/
Keith Shaw (734) 973-6309
Flying both days is at the Midwest R/C Society Flying Field - 7 Mile Rd., Northville Twp., MI
(see map on map-hotels flyer)

Registration: 9 A.M. both days
Flying from 10 A.M. to 5 P.M. Sat. & 10 A.M. to 3 P.M. Sunday

Channels 00 through 60, the six 27Mhz frequencies, & eight 53MHz frequencies, will be in use. Flying on five 49 MHz frequencies may be accommodated on request - Narrowband receivers are recommended for flying on Channels 00 - 60 - Very Wideband 27, 49, & 53 MHz, receivers may be accommodated on request – 2.4Ghz controlled at impound

Pilot Entry Fee $15 a day or $25 both days - - - -
Parking Donation Requested from Spectators

Saturday's Events
All Up - Last Down
(No Li ion, Li-Po, etc.– NiCads or NiMH only in AULD – any size motor)
Best Scale
Most Beautiful
Best Ducted Fan
Best Sport Plane
CD's Choice

Sunday's Events
Best Scale
Most Beautiful
Best Mini-Electric
Best Multi-motor
CD's Choice

Planes Must Fly To Be Considered for Any Award

Open Flying Possible on Friday
Night Flying Possible, Weather Permitting, Friday & Saturday Nights
Refreshments will be available at the field both days.

Potluck picnic at the field on Saturday evening.

Come and join us for two days of fun and relaxed electric flying.

Come, Look, Listen, Learn - Fly Electric - Fly the Future!
Saturday's & Sunday's Awards:
Plaques for 1st in each category
Merchandise drawing for ALL entrants

Photo of Entrance to New Site off 7 Mile Rd.

To locate the Midwest R/C Society 7 Mile Rd. flying field, site of the 2008 Mid -America Electric Flies, look near top left corner, where the star marks the spot, near Seven Mile Road and Currie Rd. The field entrance is on the north side of Seven Mile Road about 1.6 Miles west of Currie Rd.

Address: 7419 Seven Mile Road, Northville Twp, MI 48167-9126 - numbers on the fence

Mid-America Flies Hotel List – 2008 Please call the hotels for current rates

Novi Hilton
21111 Haggerty Rd.
236 rooms
800-445-8667
248-349-4000

Sheraton Oaks
27000 Sheraton Dr.
206 rooms
248-348-5000

Travelodge Detroit
21100 Haggerty Rd.
124 rooms
800-578-7878

Detroit Marriott Livonia
17100 Laurel Park Dr. N.
227 rooms
800-228-9290

Hampton Inn Northville
20600 Haggerty Rd.
125 rooms
800-426-7866
313-462-1119

Wyndham Garden Hotel
42100 Crescent Blvd.
152 rooms
800-222-4200
248-344-8800

Holiday Inn Livonia
17123 Laurel Park Dr. N.
225 rooms
800-465-4329
313-464-1300

Hotel Baronette
27790 Novi Rd.
149 rooms
248-349-7800

Days Inn Livonia
36655 Plymouth Rd.
72 rooms
800-325-2525
313-427-1300

Comfort Inn Livonia
29235 Buckingham Ave.
112 rooms
800-221-2222
313-458-7111

Ampeer Paper Subscriber Reminder

When subscribing to or renewing the paper version of the *Ampeer*, please make the check payable to Ken Myers. We do not have a DBA for the *Ampeer* or EFO. Thanks, Ken

Upcoming E-vents:

June 21 EFO Flying meeting, 10:00 a.m., Midwest RC Society 7 Mile Rd. Flying Field (EFO meeting)

July 5 5th Annual Norm Hils Memorial Electric Fly-In hosted by the Jersey Coast Sport Fliers, Dorbrook Park, Colts Neck, NJ. info at www.jcsportfliers.org. CD Rob Kallok, phone: 732-263-1561 or rob.kallok@comcast.net

July 12 & 13 Mid-America Electric Flies (the Mid-Am), hosted by the Ann Arbor Falcons and EFO of southeastern Michigan, Keith Shaw and Ken Myers CD's. (info in this issue)

August 17 PMAC (Pontiac Miniature Aircraft Club) Electric Fly-in, PMAC field on White Lake Rd. east of Teggerdine, CD Sterling Smith 248-673-2883 smitty559@comcast.net

Sept. 6 & 7 E-FLI-OWA 08, Davenport RC Society Field, Seven Cities Sod Farm, Davenport, IA CD: Orville Shields 309-236-7167 osrs73@yahoo.com

Porterfield Collegiate For Sale

Complete except for Speed control and receiver battery.
Includes Astro Flight 25G, 7ch Transmitter & receiver
Covered with Micafilm and finished with dope

Asking $100
Richard Fleming
408 Cottage St.
Olivet, MI 49076
269-749-9024

The Ampeer/Ken Myers
1911 Bradshaw Ct.
Walled Lake, MI 48390
http://members.aol.com/kmyersefo

The Next Flying Meeting:
Date: July 12 & 13 (Mid-Am) **Time:** 9:00 a.m.
Place: Midwest RC Society 7 Mile Rd. Flying Field
Please NOTE the PLACE!