

the

Ampeer

June

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2017

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The Flying Next Meeting:
Sunday, June 11, 10:00 a.m., Midwest 7 Mi. Rd. Flying Field

What's In This Issue:

The April EFO Meeting - Upcoming Keith Shaw Birthday Party Electric Fly-in 2017 - Keith Shaw's New, Award Winning, 1/4-Scale Rider R6 8-Ball - Mark Rittinger's Trishula Awards at Toledo - A Change in the Stock ESC for the FMS SuperEZ - Announcing 33rd Annual Mid-America Electric Flies - Upcoming Events

The April EFO Meeting

The April EFO meeting was held at Ken Myers' house on Wednesday evening, April 12.

Bob Blau lead off the meeting by sharing and demonstrating the quad that he purchased for \$100 with an extra battery at the Toledo RC Expo.



The quad is the WonderTech Quantum with HD FPV.

It uses a 1S 3.7V 750mAh LiPo battery that can be charged in the unit due to the dual protection board that prevents over and under discharging. A quick

charging circuit and USB port are built into the aircraft.

Bob demonstrated its stability by flying it in Ken's small living room.

It takes off and lands on its own. The onboard camera sends the image to a smart phone. It can also be 'flown' using an iPhone.

Bob has been having a lot of fun with it in his living room.



EFO vice-president, **Richard Utkan**

shared a scratch-built Baby Buzzard. It was given to him with the purchase of another plane. It was built from plans in *Radio Control Modeler*. The plans were available in approximately 1975.

The plane was set up for 'old style' electric power, but Richard had to do major surgery on the nose to fit an Exceed outrunner, battery hatch and 3S 2200mAh LiPo battery. The 'large' size battery, for this plane size, was needed for balance.

He noted that it doesn't really need a lot of power to fly well. About 1/2 the throttle stick movement is required for a gentle climb using a 10x6 wood prop.

Ken Myers shared how he converted his FMS SuperEZ trainer to use a 4S 1100mAh A123 pack.

His review of this very, very good trainer plane is in the March and April 2016 *Ampeers*.

<http://theampeer.org/ampeer/ampmar16/ampmar16.htm#SUPEREZ> and

<http://theampeer.org/ampeer/ampapr16/ampapr16.htm#SUPEREZ>

There is also a thread dedicated to this plane in the Beginner Training Aircraft (Aircraft-Electric) Forum on RC Groups.

<https://www.rcgroups.com/forums/showthread.php?2647384>

The conversion project began when Keith Shaw inquired about the SuperEZ as a trainer for some new student pilots. He suggested that he might want to install A123 cells in their planes.

Ken had been using 3S 1000mAh LiPo batteries in the plane, along with about an ounce and a half of nose weight to compensate for the relatively low weight of the 3S 1000mAh LiPo packs.

The first thing he did, while figuring out the conversion, was to look at whether the battery compartment could accommodate either a 3S 2300mAh A123 or 4S 1100mAh A123.

Once he figured out how to 'fit' the packs, he spent some time testing both a 3S 2300mAh and 4S 2300mAh pack with the stock ESC, stock motor and various diameter props, including the stock 10x5 prop and several APC E (thin-electric) props.

Ken only had three 1000mAh A123 cells, so he couldn't make a pack at the time.

The tests showed that the stock motor and ESC could be used, if the battery type, recognized by the ESC, was changed to NiCad/NiMH. Changing the ESC settings is described in the manual for the

plane and involves deciphering the various beeps and tones generated by the ESC and then moving the throttle stick at the correct time.

After the tests, he decided to go with a 4S 1100mAh A123 pack.

Since he only had three 1100mAh cells, he ordered five from Radical RC to make up two packs.

<http://www.radicalrc.com/category/A123-Cells-Packs-199>

The cells arrived quickly from Radical RC and the two packs were assembled. It was interesting that the three cells of unknown vintage were at the same voltage as the five 'new' cells.



One of the two 'new' 4S A123 1000mAh packs

The new packs were cycled and ready for use.

The one and a half ounces of lead was removed from the cowl area and a bit of foam at the rear of the battery compartment was removed using a Dremel Moto-tool with a sanding drum. This allowed for the proper center of gravity (CG) using the 4S 1100mAh A123 pack.



He tested the power system using the stock prop but didn't feel that it was pulling as 'hard' as he wanted. Next he checked the power using an APC

10x5E. The power level was just what he was looking for the trainer.

To use the stock spinner assembly, a 6mm inside diameter washer had to be placed behind the APC 10x5E prop.

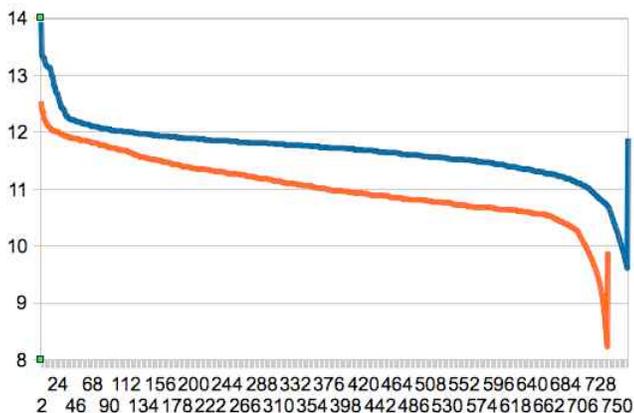
The 432 sq.in. plane, with the 4S 1000mAh A123 pack installed, had only gained 1.6 ounce. He figured that that should really make no difference to its flyability.

The initial flight, using the 4S 1100mAh A123 pack, was on April 17. Except for one loop, Ken flew the plane as he would during a training session. His Revolectrix Gt500 charger reported 562mAh returned after the 6 minute flight. There is plenty of usable capacity left for even longer flights.

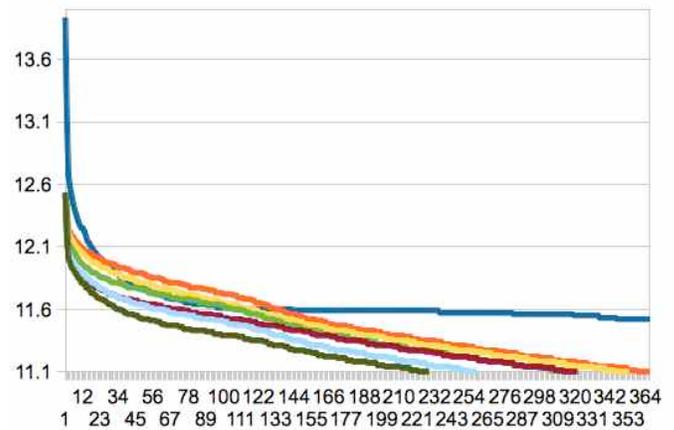
Next Ken presented a quiz, regarding lithium batteries, ready for his club mates. He showed them several graphs with no titles and no units and asked them various questions regarding the graphs. The members worked as a group to answer the questions. They were actually very good at it!!!

The graphs and questions are presented here. The answers are near the end of this article.

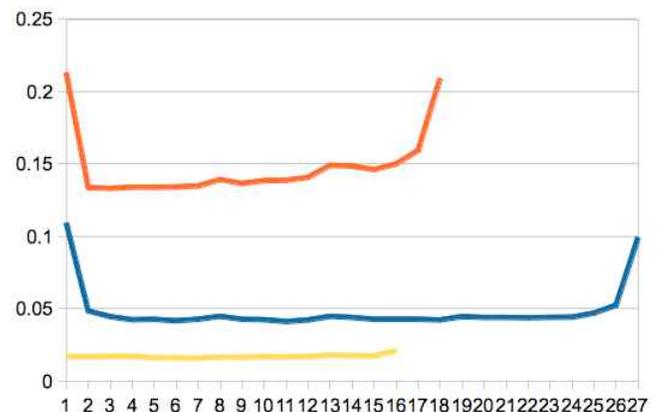
**What are the following graphs showing?
The bottom numbers are not relevant. They can be ignored.**



1. What are the units on the left side of the graph?
2. What is being illustrated by the graph?
3. What is being compared to what?
4. What is causing the near vertical lines at the right end of the graphed lines?
5. How are the two near vertical lines, at the right side of the graph, different from each other and why?



1. What are the units on the left side of the graph?
2. What is being illustrated by the graph?
3. What is being compared to what?
4. Why is the blue line so different from the others?
5. What was the ending loaded voltage for the majority of packs in the test?



1. What are the units on the left side of the graph?
2. What is being illustrated by the graph?
3. What is being compared to what?
4. Why is the yellow line so different from the other two?
5. What are the implications, relating to the state of charge, for measuring battery internal resistance?

Finally he shared two graphs. The graphs used the same scale and compared the voltage rebound after discharge between a GensAce 3S 1000mAh LiPo battery and a 4S 1100mAh A123 pack.

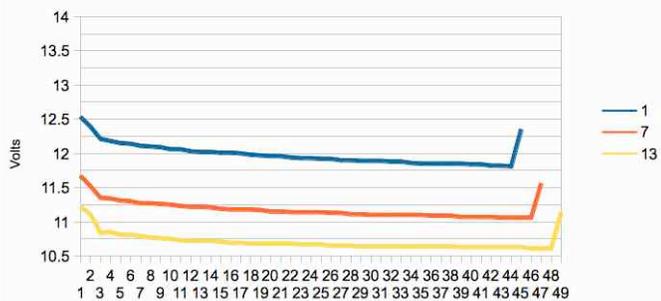
The graphs demonstrate why voltage measurements alone on A123 packs provide almost useless numbers.

The implications of this, when using A123 packs to power the onboard electronics, are discussed in an RC Groups thread titled "A123/LiFe

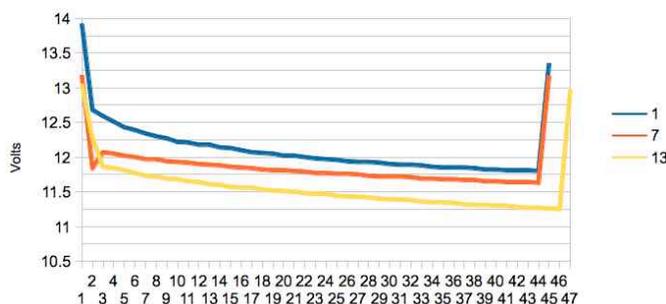
performance as Receiver Battery Packs” by RC Groups’ member vollrathd.

<https://www.rcgroups.com/forums/showthread.php?2863122>

GensAce Voltage Rebound



A123 Voltage Rebound



Mike Russell had a defective Castle Creations Phoenix Edge 50 ESC with him and asked what to do with it. It was recommended that he send it in to Castle Creations who will replace it for 1/2 the original retail price. (*Update April 23 - It was replaced by CC for free! KM*)

The group was served refreshments and the sharing and information continued.

Hank Wildman noted that the Pontiac Miniature Aircraft Club (PMAC) is holding its electric fly-in on July 15 and 16. He will be the contest director (CD) for that event.

Rick Sawicki asked for some clarification on the new ‘not conventional material’ event and award at the upcoming Mid-Am. He was thinking that composite materials might be considered.

Ken told him that composite materials are really traditional materials, and that their mention was inadvertently and unintentionally omitted on the flyer and in the April 2017 issue of the *Ampeer*.

The intent of the new class for an award and all-up-last down event was to encourage scratch or kit building as found in the Foamies (Scratchbuilt) forum on RC Groups.

<https://www.rcgroups.com/foamies-scratchbuilt-428>

The types of planes and their sources were discussed in the April 2017 *Ampeer*.

<http://theampeer.org/ampeer/ampapr17/ampapr17.htm#NEW>

Ken also stated that the Saturday morning EFO flying meetings would be scheduled on a Saturday that would not conflict with the new fun flying events for the Midwest club run by Pete Waters.

Ken also showed Hank and Roger how to set the battery capacity and generally use their new vollrathd DIY Ir meters.

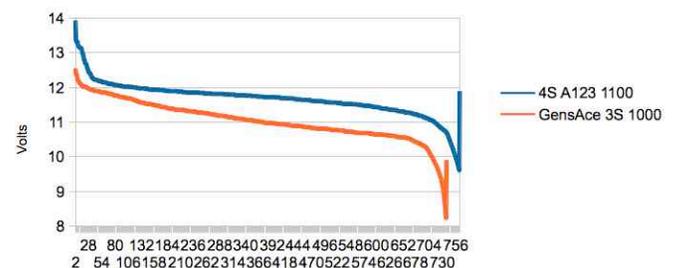
<https://www.rcgroups.com/forums/showthread.php?2809231>



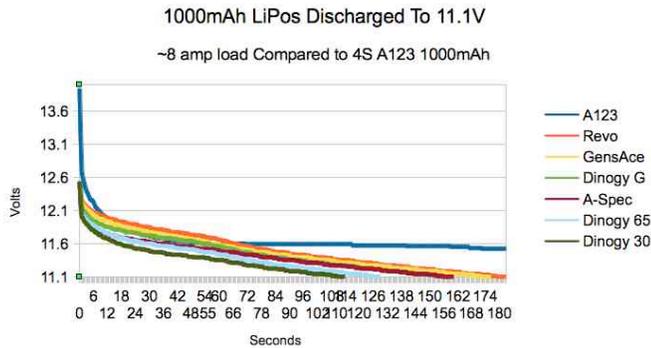
The Graphs Explained

3S 1000mAh LiPo vs 4S 1100mAh A123

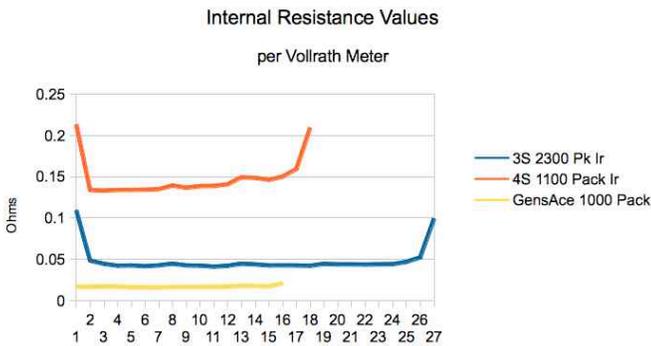
Discharged at ~8 amps



5. How are the two near vertical lines, at the right side of the graph, different and why? The GensAce LiPo vertical line is shorter with less rebound. There is a greater difference between the loaded and unloaded voltage for the A123.



1. What are the units on the left side of the graph? Volts
2. What is being illustrated by the graph? Mostly battery discharges to a specific loaded voltage
3. What is being compared to what? Various 3S 1000mAh LiPo batteries to each other and a 4S 1100mAh A123
4. Why is the blue line so different from the others? The A123 sags more initially but holds its voltage better.
5. What was the ending loaded voltage for the LiPo battery packs in the test? 11.1V



1. What are the units on the left side of the graph? Ohms
2. What is being illustrated by the graph? Battery internal resistance
3. What is being compared to what? Battery internal resistance for 3 batteries; 3S 1000mAh GensAce LiPo, 3S 2300mAh A123, 4S 1100mAh A123
4. Why is the yellow line, at the bottom of the graph, so different from the other two? It is close to horizontal from the beginning to almost the end.
5. What are the implications, relating to the state of

charge, for measuring battery internal resistance? For LiPo batteries, it doesn't really matter too much when the battery internal resistance is calculated. A123 battery internal resistance should not be calculated when the battery is near 'full' or 'empty'.

Ken also noted that the graphed battery internal resistance values are consistent with the A123 the graph that he presented in the April 2017 Ampeer. <http://theampeer.org/ampeer/ampfeb17/ampfeb17.htm#JAN>

During the conversations and answers, **Rick Sawicki**, noted that the 4S A123 1000mAh pack has much greater mass than the 3S 1000mAh LiPo batteries and that it might be interesting to compare values for a 3S LiPo with equivalent weights.

Upcoming Keith Shaw Birthday Party Electric Fly-in 2017

From CD Dave Grife via Email

The Balsa Butchers are hosting the "Keith Shaw Birthday Party Electric Fly-In", for the 16th year, at their field near Coldwater, MI. The event takes place on Saturday, June 3, 2017. It is a one day event again this year.

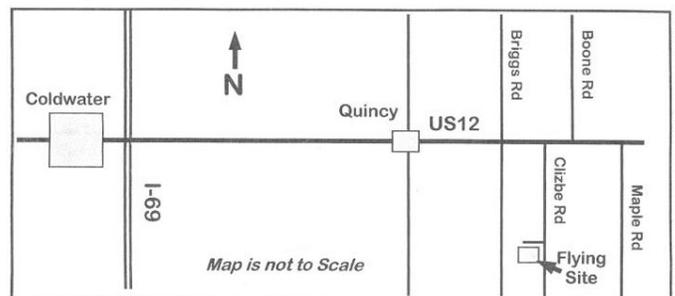
The event consists of Open Electric Flying with a "Special Guest of Honor Theme".

Enjoy a day with the "Pioneering Master of Electric R/C Flight". 8 am - 5 pm Saturday, \$15 landing fee.

For additional information contact; Dave Watson 517-250-6190 or flybuddy619@yahoo.com

Contest Director: Dave Grife - E-mail: grifesd@yahoo.com or Phone: 517-279-8445 Please e-mail or call with any questions.

The field will be open for guests to fly on Sunday as well.



Directions: Quincy is approximately 4.5 miles east of I-69. Clizbe Road is approximately 1.6 miles east

of Quincy. The Flying site is approximately 1.5 miles south of US-12 on the west side of Clizbe Road.

Keith Shaw's New, Award Winning, 1/4-Scale Rider R6 8-Ball

Full Scale History:

https://en.wikipedia.org/wiki/Rider_R-6

The Rider R-6 was the last of the Keith Rider designed racing aircraft of the 1930s. The R-6 eightball had smooth plywood skins painted light blue with a large eight ball on each side.

General characteristics

Length: 19 ft (5.8 m)

Wingspan: 18 ft 5 in (5.61 m)

Powerplant: Menasco Buccaneer

Propellers: 2-bladed Hamilton Standard adjustable

Performance

Maximum speed: 190 kn; 352 km/h (218.478 mph)

Operational history

1938 - Louis W. Greve Trophy Race - The Eight Ball competed against two other Rider designs, the "Firecracker" and the "Jackrabbit". Pilot Joe Jacobson placed third with a speed of 218.478 mph.
1938 - Thompson Trophy - The Eight Ball dropped out in the 27th lap.

1939 - National Air Races. Pilot George Byers dropped out after a lean mixture burned through a cylinder on tryouts.

The Model



Model Specifications: 1/4-Scale

Wing Span: 61.25"

Length: 63.5"

Wing Area: 630 sq.in.

Weight: 7.75 lbs. (124 oz.)

Motor: Scorpion 4020

Battery: 8S A123

The plane received 1st place in Non-Military Sport Scale at the Toledo RC Expo in April 2017. The plaque he won is shown above.



I was able to get some photos in the lobby of the Seagate Center before it was placed on the judging table. The photos do not have the best lighting, but show it from many angles.



After the Toledo RC Expo, I received some more information about this plane from Keith.

* * * * *

I rarely get the insides of my Toledo projects finished except for servos and mounted motor. My first estimate that I gave you (7 pounds KM) came from weighing all the rest of the stuff, and adding in a fudge factor for mounting plates, wiring, etc.

I must report with chagrin that there were a couple of errors in my estimates and assumptions that have significantly changed the total weight.

- 1) Forgot that I was planning on using a separate radio battery, so add that plus switch harness.
- 2) Forgot how much extra 12ga wire is needed to get power to the motor wayyyy up in that long nose.
- 3) Forgot that I will be using the newer 2.5 Ah (A123 KM) cells, which are somewhat heavier.

Well the bottom line is that it more like 7.75# Ouch, a far cry from the 6.5# goal.

As a curiosity I brought the Crosby down and checked its stats. In the real world both racers used the same Super Buccaneer engine. Amazing how similar the size/shape of the two planes are side-to-side.

I thought you might be interested in the comparison. Both are 1/4-scale. Both use similar Scorpion motors, but with slightly different K_v . The Crosby uses 8 (A123) cells. The EightBall may use 8 or 9 cells depending on prop tests yet to be done. Weights listed are for an 8 cell (A123 of course).



Keith Shaw's Crosby from 2008

	Crosby	EightBall
Wingspan:	48"	61"
Length:	65"	63"
Wing Area:	576 sq.in.	627 sq.in.
Fuselage Wt.:	66 oz.	66 oz. (really)
Wing Wt.:	42 oz.	36 oz.
Battery:	23 oz.	23 oz.
RTF Wt.:	131 oz.	125 oz.
Wing Area Loading:	32.75 oz./sq.ft.	28.7 oz./sq.ft.
Wing Cube Loading Factor:	16.4	13.75
@ Peak 1200W out from battery:	146 W per lb.	154W per lb.

About the only major difference is that the Crosby has flaps while the Eight Ball doesn't. The split flaps were really quite small on the Eight Ball, and would have made installation into the thin wing a real nightmare, so I did not design them in.

I was feeling very pessimistic about the higher weight until I measured the Crosby. For some reason I thought it was about 6.5lb., and was very surprised at that it was over 8lb. The Crosby takesoff and flies well, and might be able to land without flaps given a long enough approach. I now think the Eight Ball should be fine.

The test flight will tell. But I have many airplanes to check-ride and much practice before it gets its chance.

Mark Rittinger's Trishula Awards at Toledo

Mark Rittinger's *Trishula* won two awards at the 2017 Toledo RC Expo. This plane is a very unique, swept-forward sport plane. The information presented here is from his build thread on RC Groups.

<https://www.rcgroups.com/forums/showthread.php?2771105>

The photos are by Mark and presented in the build thread as well.

Trishula is Sanskrit for "Trident", which is how the wing and fuselage look from a top view. KM



Mark received 3rd in the Sport design class, and Best Film Finish.

Last year he got 2nd in Sport with his Pharaoh and Best Film Finish.

The year before was a 2nd in Sport for the Omen 3 and Best Film Finish for LM-1.



	Trishula
Wingspan:	About 54"
Wing Area:	576 sq.in.
Bare Airframe Weight w/retracts:	48.5 oz.
RTF Wt.:	87 oz.
Wing Area Loading:	21.75 oz./sq.ft.
Wing Cube Loading Factor:	10.9
@ Peak 600W out from battery:	110 W per lb.

By Ken Myers

While working with a new student pilot recently, I noticed that the power wire gauge to the motor from the 20A ESC had been changed from 14 AWG to 20 AWG. The part number remains the same. This **should not** be a problem for the stock power system.

Both the 20-amp rated ESC and 20 gauge wire could be a real problem with the new upgrade motor. I do not know this to be a fact, but just something to check carefully with your power meter if upgrading the motor and continuing to use the stock prop and stock ESC.

<http://www.fmsmodel.com/fms-1220mm-super-ez-v2-pnp-with-floats>

33rd Annual Mid-America Electric Flies 2017

AMA Sanctioned Event

Saturday, July 8 & Sunday, July 9

Hosted by the:

Ann Arbor Falcons and Electric Flyers Only

The 7 Mile Rd. Flying Site, Salem Twp., MI, is

Provided by the:

Midwest R/C Society

Contest Directors are:

Ken Myers phone (248) 669-8124 or

kmyersefo@theampeer.org

<http://www.theampeer.org> for updates & info

Keith Shaw (734) 973-6309

Flying both days at the Midwest R/C Society Flying Field - 7 Mile Rd., Salem Twp., MI

Registration: 9 A.M. both days

Flying from 10 A.M. to 4 P.M. Sat. & 10 A.M. to 3 P.M. Sunday

Pilot Entry Fee: 18 and over, \$15 Sat. - \$10, Sunday, (ask about the family rate), Under 18, FREE

Parking Donation Requested from Spectators

Saturday's Awards

Best Scale

Most Beautiful

Best Ducted Fan

Best Sport Plane

New Foam Flurry for NCM Aircraft

CD's Choice

Sunday's Awards

Best Scale

Most Beautiful

Best Mini-Electric

Best Multi-motor

A Change in the Stock ESC for the FMS SuperEZ

New Most Unique NCM Aircraft CD's Choice

Planes Must Fly To Be Considered for Any Award
Saturday's & Sunday's Awards:
Plaques for 1st in each category

Open Flying Possible on Friday Night Flying Possible, Weather Permitting, Friday & Saturday Nights

Refreshments 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!

Merchandise drawing for ALL entrants

New Events for this year for NCM (Not Conventional Materials) aircraft.

Traditionally, model aircraft airframes have been mostly constructed from balsa wood, plywood, spruce, and fiberglass. For the purposes of this meet, NCM airframes are mostly constructed from not conventional materials i.e.; sheet foam, foam board, cardboard, block foam, foam insulation material, etc.

Foam Flurry for NCM aircraft: This is a true event. It is based upon the all up/last down event of

early electric meets. Any NCM aircraft may be used (no ARF types). Power systems are limited to a maximum of 3S (no paralleling) LiPo batteries or 4S maximum, no paralleling, for A123 packs. All planes qualifying for this event will launch at the same time, and the last one to land will be declared the winner.

Most Unique NCM Aircraft Award: A new award will be given on Sunday to an aircraft in the NCM category that is judged as 'most unique' by the Mid-Am panel of judges.

* * * * *

To locate the Midwest R/C Society 7 Mile Rd. flying field, site of the Mid-America Electric Flies, look near top left corner of the map, 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, Salem Twp, MI 48167 - numbers are on the fence.

Because of their convenient location and the easy drive to the flying field, the Comfort Suites and Holiday Inn Express in Wixom, MI have been added to the hotels' listing. They are only 10 miles northwest of the field and located near I-96 and Wixom Road. See the map-hotel .pdf for more details.

<http://www.theampeer.org/map-hotels.pdf>



Upcoming E-vents

May 20 & 21, Sat. & Sunday, Radio Control Club of Detroit's 12th Annual All Electric Fly-In, Watts over Wetzel (WOW) (Wetzel State Park), large number of pilots, awesome flying site, Great food, Raffles and prizes, email the contest director, John McCormick (jpmccormick@live.com), for more details or visit the RCCD Web site (<http://rccd.org/>). (details in this issue)

May 28 "John's Jets", at Pontiac Miniature Aircraft Club (No further info available)

June 3, Saturday, 16th Annual Keith Shaw Birthday Electric Fly-in, Balsa Butcher's flying field near Coldwater, MI (full details in this issue)

June 11, Sunday, EFO flying meeting, 10 a.m., Midwest 7 Mi. Flying Field

July 8 & 9, 33rd Annual Mid-America Electric Flies - (full details in this issue - also considered EFO July Flying Meetings)



See "Change in the Stock ESC" in this issue. Note the power wire size compared to the servo connector wire size. Original Above - New Below



The Ampeer/Ken Myers
1911 Bradshaw Ct.
Commerce Twp., MI 48390

<http://www.theampeer.org>

The Next Monthly Meeting:

Date: Sunday, June 11, 2017 **Time:** 10:00 a.m.

Place: MRCS 7 Mi. Rd. Flying Field, The Mid-Am