

# Silver Lining

Winter 2012  
Published Quarterly

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Official Newsletter of the Holly Cloud Hoppers  
Radio Control Flying Club  
AMA Charter #3117



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**Flying Field GPS location N42 48.596 W83 34.642**

**[www.hollycloudhoppers.org](http://www.hollycloudhoppers.org)**

*Be Safe, Have Fun and Don't Have Too Many Rules!*

# Behind The Flight Line

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Welcome to the Winter edition of the Silver Lining. Calling this the "Winter edition" just seems odd with the 70 and 80 degree days we've already experienced this year in Michigan. It certainly doesn't help either that this newsletter is coming to you a few weeks later than planned. Let's just say some technical difficulties arose during creation, causing me to start all over, at square one in a couple areas.

For this segment of Behind the Flight Line, I thought it would be interesting to have a retrospective of the previous flying season. More specifically how it related to the predictions made in the [2011 Winter](#) edition. As some of you may recall, in that edition predictions were carefully prognosticated with a clever apparatus known as the Magic 8 Ball. What I'd like to do now is see just how accurately it foretold the 2011 R/C flying season.

I'm sure most of you know how a Magic 8 ball works. Holding it in your hand you ask it a question. Then you turn it over for it the answer. The first question I asked the Magic 8 Ball regarding the 2011 flying season was about the club's first event of

the season, the Fun Fly. I asked if it would have good weather? When I turned the 8 Ball over it told me: "Outlook Good". Reflecting back on last year's Fun Fly, it turns out the Magic 8 ball did correctly foretell the weather for that day. We had a nice sunny day with a moderate wind out of the west.

After asking about the weather for the Fun Fly, I asked if the weather would be good for the Open House too. The response of the 8 Ball was: "Don't count on it". Score another correct prediction for 8 Ball. Those that attended the Open House know that rain was factor. Plenty of flying did happen between showers but rain did manage to dampen (pun intended) things a bit, causing spectator attendance to be much lower than the numbers we're accustomed to.

For the next question I figured what good is a flying field if the grass isn't kept short, so I asked if the club tractor would operate trouble free? The response to that question was: "Outlook not so good". This obviously had me a bit worried and I wanted more specific information and asked Magic 8 Ball if it will be motor trouble. Again the response was, not very promising, as it said, "Most likely". Since I didn't hear any reports of a major malfunction of the tractor over the past year, that prediction was a miss by the 8 Ball.

The next question asked of the 8 Ball was, "Will the club see an increase in club

## On the Cover:

**Frank Robinson's Sig Senior,  
piloted by Ken Kliever at the  
2010 HCH Open House.**

*Photo by Scott Rhoades*

► **Flight Line, 3**

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membership?" The 8 Ball's answer to this question was, "Very doubtful". According to club secretary (at the time) Jim Finch, the club signed up five members in 2011. Combine this with the fact that just about every person that was a member in 2010 renewed for 2011, it's unanimous that we had ourselves a membership increase and a fairly decent one too. Another miss by the 8 Ball.

Getting a "Very Doubtful" reply to the membership question, I followed up with a related question and asked 8 Ball if the reason memberships will not increase is because the price of gasoline is going way up?" The reply from the 8 Ball was: "As I see it, yes". Even though it missed on the membership question, it sure was on the money (another intended pun). Price of gasoline spiked at \$4.20 a gallon here in Michigan during late spring, early summer of 2011. Although at the time of this writing \$4.20 doesn't seem too outrageous.

The next question I wanted to know was, "Can we expect to see some exciting new R/C related products released in 2011?" 8 Ball's reply was, "It is decidedly so". To draw a little more info out of 8 Ball, I wanted to know if this would be in the form of better batteries. The Magic 8 Ball's response was, "My reply is no". This gives another score to the 8 Ball, as nothing exciting happened in 2011 for battery technology.

Once I got the thumbs down from the Magic 8 Ball on the battery question, I kept digging to learn what this exciting new product would likely be. So then I asked if 8 Ball was referring to radio gear. The reply was a direct, "Yes".

Last year Xtreme Power Systems (XPS) unveiled a 16 channel transmitter, which was on display to the public for the first time at Toledo. Features of this transmitter include voice recognition, speech output, 1000 model memory, telemetry... The works. All this for a "target price" of \$249. I would certainly call that exciting new radio technology but this just may be a fail by 8 Ball. At the time of this writing XPS has yet to release this radio to the public and I did specify "released in 2011" in my question to the 8 Ball. Although I believe XPS did first say the release date was going to be summer of 2011. So, on a technicality, I'm going to chalk up another one for the 8 Ball and call it predicted.

The next question I wanted to know from 8 Ball was more personal in nature. I wanted to know if I was going to crash a lot in 2011. That's when things got a little weird with the 8 Ball. You'll have to read it for yourself. (Available at the link at the beginning of this article) This is neither a score nor a fail by the 8 ball here, because it never gave me a straight answer. For those wanting to know how my season turned out, the Magic 8 Ball would have been correct if it had just said no.

Creating a tally of the questions it did answer directly, the Magic 8 Ball predicted correctly a respectable 5 out of 7 times. With such a high success, the club would be better off eliminating meetings and simply referring to the Magic 8 Ball for all future club decisions. *Question:* "Magic 8 Ball would this be a wise decision?" *Answer:* "As I see it, yes." †



# Electric Powered Flight

Written by:

Scott Rhoades and Mike Wizynajtys

## Part 4: Who needs a watt meter

Welcome to part four in the series of articles intended to demystify electric flight for the glow guy. First a brief recap of what has been covered in previous sections: Part one was published in the [Fall 2010](#) edition of the Silver Lining and talked about amps volts and battery C rating. Part two, published in the [Winter 2011](#) edition, was titled "Sizing The Power System". That article introduced us to watts, discussed battery sizing and touched a little on prop selection. Part three, published in the [Fall 2011](#) edition, was "Understanding the electronic speed control".

This is the fourth and final installment of the Electric flight series. Hopefully this article, combined with the previous three, provide a base of understanding to the glow pilot wanting to understand the growing world of electrics. Without further ado let's jump right to the first order of business and that is explaining:

### Prop vs. Amps

Your electric motor draws a certain amount of energy to do its job... Which is to turn the propeller. With no prop attached the motor draws very little energy. Obviously when a prop is attached the motor draws more energy. A good analogy to this would be pulling a boat trailer behind your car.

The car might get 20 mpg normally, but put a boat on a trailer behind the car and mileage will drop off to perhaps 15 mpg because the motor is using more energy just to maintain the same speed and travel the same distance. As long as the boat and

trailer are not too heavy, no real damage occurs, you just use more gas.

If you put a boat and trailer that is too big for the car, something will break. The engine or something else in the driveline is likely to fail. That is because you are asking the drive train to produce more work and use more energy than it was built to handle. The prop acts on a motor just like the boat and trailer do with your car. If you increase the pitch or diameter, without reducing the other, more stress is being placed on the motor.

Let's apply this to some hypothetical numbers. Assume for instance your motor is turning a 6 x 5 prop and it draws 6 amps of electricity using a battery that delivers 10 volts (using 10v just to keep the math simple) If we apply the formula we learned in part two of this series, that means our motor is using 60 watts of energy to turn that prop. (6 amps x 10 volts = 60 watts)

If we go to a larger prop, say 7 inches and keep the pitch the same, the draw might go up to 8 amps. At the same hypothetical 10 volts, that will be 80 watts. As you see, the harder the motor works the more electricity it draws. The increase causes the motor to generate more heat and puts additional stress on the bearings. If it is pushed too far, the motor will be unable to turn the prop fast enough to fly the plane correctly, therefore will likely cause a motor failure. Keep in mind even if the motor is designed to handle the draw the battery and/or ESC might not.

## ◀ 4 Electric Flight

It's also possible to overstress the motor from the other end as well. This can happen by too much electric pressure (volts) from a higher battery voltage, by pushing in more amps than the motor is rated for. By all appearances the motor may be fine with all that extra power but over a short time it will start to degrade, perform badly and then fail all together.

As you can see increasing the amp draw or pushing in more power into a system than it designed for will over stress one or more components and damage them. What we are striving to accomplish is the best balance of propeller and amp draw so that the motor operates efficiently without being over stressed, which leads us into the next area of discussion: How to check if a given system is operating in an acceptable range.

### **Why measure watts?**

If you remember from part two of this series we told you that Watts serve the same purpose as the horsepower rating of your car's engine. In fact 746 watts = 1 HP. Watts = Amps times Volts ( $A \times V = W$ ). A single Watt is a unit of electrical power.

### **What is a watt meter?**

A watt meter is a device that connects inline to your electrical system and will measure in real-time how much power is being used. It will not only reveal a system that is being over worked but one that is falling short of its potential. There are a few watt meters on the market today and start in price from \$20 and go up from there. Many watt meters will do other functions too and often worth the extra cost.

### **Who needs a watt meter?**

To answer the question of who needs a watt meter it's easier to address who doesn't need one. Well the first obvious answer would be somebody that never intends to fly electrics. The other might be the modeler that who will fly ARF's or RTF aircraft and only use the suggested components, never trying different props or battery sizes. As you will see later even this individual should consider using a watt meter.

Mixing and matching, motors, props, ESC's, battery packs in an electric airplane is simply working in the blind. Nobody can tell by ear, like some guys can with a glow engine, if an electric system is operating within the small window margin. Not measuring the energy flow is just asking for component failure or a sub performing aircraft.

### **How to use a watt meter to test a power system**

A watt meter is simply plugged into the electrical system between the battery and ESC. I like to use the one made by Astroflight. It displays Volts, Amps and Watts simultaneously on the same screen. It's pretty cool. The minute you plug in the battery it will tell you its voltage. The voltage you get on the screen should be pretty close to the voltage rating on the battery pack. If it's not, you have a tired old battery or one that's not fully charged. For the purposes of testing, always use a fully charged battery and one that is in good condition.

With your plane restrained and sure that no loose objects will be pulled into the

► **Electric flight, 6**

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spinning prop, open up the throttle. Do this slowly and watch the watts and amps go up and that the voltage will go down. You may wonder why the voltage is going down? There are two reasons. As the battery works, it loses some of its ability to push out the volts. Remember volts is pressure. The more amps the battery is pushing the harder it is for it to keep up that pressure. This is the key for C ratings on a battery. The higher the C rating of a battery the better it can keep up its volts under load.

The second reason for the voltage drop is that we are draining the batteries capacity, which in turn reduces its ability to maintain the pressure. Basically your running the battery down and it starts the moment the throttle is cracked. Again a higher C rated battery makes this less of a concern.

Keeping a watchful eye on the watt meter as it reaches full throttle, we can see the full effect our power system. It's important at this point to know the current limit (AMPS) of the system components, so that as we increase the throttle we don't exceed it and smoke something.

When you get to full throttle write down the three key numbers, Volts, Amps and Watts. Now compare them to the ratings on our battery, ESC and motor. Is everything within the components ratings? If it is then we're good to go, right? Well, at least from a safety standpoint we are but, is it generating the power we said our plane needed way back in part one of this series? Let's assume, we have a sport plane that we want to fly at 100 watts per pound and our plane actually weighs 5.2 pounds ( $100 \times 5.2 = 520$ ). Our watt meter says our power system is creating 575 watts. Yep! We got a little more power than we said we wanted so we're good to go there too.

There is one more thing you need to be mindful of when testing, and that is the voltage drop under load. When analyzing the volts at full throttle you want to make sure they did not drop below 3.4 volts per cell? For example a 3S pack this would be below 10.2v ( $3 \times 3.4 = 10.2$ ) or a 4S pack that magic number is 13.6v ( $4 \times 3.4 = 13.6$ ). If the voltage drops below those numbers, the pack is being over worked and is not up to the job you're asking it to do.

Keep in mind most ESCs are set to have the LVC (low voltage cutoff) that kicks in when voltage drops below 3.2v per cell. If your packs are dropping below that point you could have a deadstick induced by a full throttle burst, even when the battery is still mostly full.

The likely causes of your packs dropping below 3.2v per cell is that you're battery is old and tired and its time for a new one. Or maybe you choose a battery that is too small to begin with. In that case you need one of higher capacity, higher C rating or both. Do not get one with more cells! That changes the voltage and you will need to start all over at the very beginning of sizing our power system.

As a safety measure, it's a good idea to monitor the condition of your battery by checking it with a watt meter at the beginning of every season and every 20 flights or so after. Doing so will keep you abreast of the condition of your packs and it will also be an eye opener regarding the difference between the cheaper batteries out there and some of the more expensive ones.

► **Electric flight, 7**

## ◀ 6 Electric Flight

### **A real world example**

The other day a friend and fellow club member was having a problem with one of his electric planes. He felt the plane wasn't making as much power he thought it should. Upon examination he had all the right components for the size of plane and the manner in which he wanted to fly it, except one. He was using too small of a prop.

Actually, the prop was sized correctly for the plane, had he been using a glow engine. The impression most glow guys have is that the electric motor should spin the small prop faster just like glow engine would. Well that's not the way an electric power system works. Remember, an electric motor's ability to spin at a certain RPM is tied to the volts, which is a function of number of cells in our battery. Remember in part two where we talked about Kv? Well, this is where it comes in. Kv is the RPM a motor will spin per volt. The motor is only going to spin so fast based on battery voltage and in this case it was simply not fast enough.

The solution here was to simply use a larger prop and spin it at the same (relatively same) RPM to get our power. Of course, the bigger prop will draw more current/amps. We can't get more power at the prop for free. Running the numbers through Motocalc predicts he should have a good performing plane using a prop that is two inches larger in diameter and one inch deeper in pitch, than the one he originally had.

At the time of the writing of this article a bigger prop had not been tested with the watt meter. When the new prop is

installed I'll still want to hook it up and check things just to be sure we're still within our limits. I'm confident that when we do test with the watt meter it will show many more watts are being generated now, which should transform into the sprightly performance he's hoping for in the air.

### **Testing different props**

Hooking up a watt meter and testing may sound time consuming but it's really not. As long as you have the props on hand it happens quite quickly. It certainly happens a heck of a lot faster than breaking in a brand new glow engine. When setting up a new system many modelers will purchase their "target prop" along with a couple other sizes that are close, just to make sure going up or down a size doesn't yield better results against the watt meter.

In general, don't bother trying to use your glow props on an electric power system. They are generally too shallow in pitch and the blade shape is too fat to be efficient at the slower speeds of electrics. You'll find that diameter and pitch adjustments are more pronounced with props designed for electric power systems than those designed for glow engines. That's because large props turning at lower RPMs are more efficient than small ones spinning very fast. The small fast props cavitate the air to some extent, while large slow props are just slicing through the air. We can equate this to tire traction. You can spin that bald little tire fast enough and eventually get out of the mud but the big tire with a deep tread turning slowly is more efficient and will get you out of the mud a lot quicker.

▶ **Electric flight, 8**

## ◀ 7 Electric flight

What I tend to do is fly planes of similar size and type. Doing so I'm able to correlate planes I'm considering to a power system that I've used in a previous plane. It's not much different than guys that are familiar with glow and being able to predict what plane will work well in a certain engine. Just like glow I may have to adjust the prop size or pitch a little one way or the other. Just because an electrical system worked well in one plane with a certain prop doesn't mean that same system in another plane will like the same prop.

## To sum it all up

Everyone that flies electric power should have a watt meter. Every power system should be connected to the watt meter once and checked before its maiden flight. Doing so may very likely protect you from either damaging something or having an underperforming aircraft. †

*Parts of article are a rewrite/update of material taken from the e-book "Everything You Wanted To Know About Electric Powered Flight", by Ed Anderson. Most however is original material written by Mike Wizynajts.*

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# 2012 Chili Fly



Photo by Joe Savine

# In The Know

By Scott Rhoades



- The club begins this year with a few changing of the guards. It's not uncommon for club officers such as President, Vice President, and Safety officer to change, which did happen to all those positions at this year's meeting. However, getting a new club Secretary/Treasurer is a big deal because it just doesn't happen very often. Jim Finch decided that it was time for him to step down and pass those duties on someone else. Thank you, Jim, for doing a great job with Secretary/Treasurer duties for the past five years.

Jim's successor was voted in at the annual meeting in February and that position will be filled by Stephen Rivette (known to most of you as Steph). Steph becomes only the 4<sup>th</sup> person in club history to hold the Secretary/Treasurer position. Knowing Steph, I'm sure he will do a fine job just like his predecessors. Please be patient with Steph while he learns the ropes of being the HCH Secretary/Treasurer.

- The combination for the front gate has been changed. If you do not know this code you can get it by accessing the Members Only section of the HCH website. <http://hollycloudhoppers.org/members.html>
- Unfortunately, we have a continuation of a previous news item that was published in the [Fall 2011](#) edition. This is in regards to items being stolen from one of the containers. A second break-in has occurred over the winter and happened just prior to the Chili fly. This time they broke in to the small shed where items such as the weed trimmer are stored.
- If that wasn't enough, vandalism has just recently been added to the list of troubles at the field. Chuck Beach visited the field and discovered that someone used an axe to destroy one of the starting benches and a section of the safety fence. Chuck also said they tried to chop their way through the roof of one of the containers, with very little success.
- Club officers have come up with a couple plans, in addition to the one approved at the meeting, which should help deter future incidents. These require the help of the membership to be effective. The first plan is to vastly increase field visibility from Macky Rd. To make this happen a large initiative is being formed to remove all of the brush and weeds between the field and Macky Rd. as well as making it easy to maintain through out the year. By making the field more visible and keeping it that way, destruction is less likely to happen.

► In the know, 8

## ◀ 7 In the Know

- The brush removal initiative will take place during the field prep party on **Saturday April, 21 @ 10:00am**. A lot of man power will be needed to make this a success and thus the vast majority of HCH membership will need to come out to lend a hand. If you have a chainsaw, please bring it. If you don't own a chainsaw bring a sturdy pair of gloves. If you don't own a sturdy pair of gloves, bring a shovel. If you don't own a shovel bring a rake. If you don't own any of those items bring water (to drink). This is the first undertaking in club history that was formed not to make the flying field better but to hopefully keep it from being slowly destroyed.
- The second plan involves having the membership simply keep an eye on things. If you find yourself near the field or just looking for something to do, simply drive by. Just make sure nothing is out of the ordinary. If you do happen to find suspicious activity at the field, call 911 immediately. When you speak to the 911 operator identify yourself as a member and be sure to explain that we've had break-ins and vandalism recently. Whatever you do, do not confront or approach anyone. Drive up to the gas station and wait there for the police to arrive. †

## Links to key HCH web pages

### Home page

<http://hollycloudhoppers.org>

Officer contacts, Announcements, Weather, Club Dates, Club document links, Etc

### Members Only (password protected) <http://hollycloudhoppers.org/members.html>

Financial report, Meeting minutes, Club roster, Gate code

### Classifieds

<http://hollycloudhoppers.org/classifieds.html>

### Field Operation Rules

<http://hollycloudhoppers.org/documents/Field%20Operational%20Rules.pdf>

### Newsletter Archives

<http://hollycloudhoppers.org/newsletters.html>

### Club Frequency Usage

<http://hollycloudhoppers.org/documents/clubfreq.pdf>

### Web page help

[http://hollycloudhoppers.org/help\\_faq.html](http://hollycloudhoppers.org/help_faq.html)

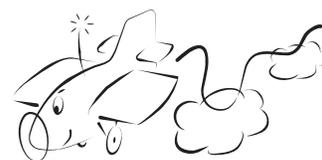
### Membership renewal

<http://hollycloudhoppers.org/renew.html>

### **Things to ponder**

Can we all just agree to ignore whatever comes after Blue Ray? I don't want to have to restart my collection...again.

# Events Calendar



## April 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	★13	★14
★15	16	17	18	19	20	★21
22	23	24	25	26	27	28
29	30					

## May 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

## June 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1 2
3	4	5	6	7	8	★9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

## July

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	★4	5	6	7
8	9	10	11	12	13	★14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

## August

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	★4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

## September

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

### Important HCH dates

### Events around the area

Date	Event	Host Club/location/Link	Time
★ April 12,13,14	Toledo R/C Exposition	<a href="#">Seagate Center</a>	
★ April 15	<b>Final date for membership renewals before late fee</b>		
★ April 21	<b>Field Prep Party</b>	<b>HCH Club Field</b>	<b>10:00am</b>
★ June 9	<b>HCH Fun Fly</b>	<b>HCH Club Field</b>	<b>10:00am</b>
★ July 4	<b>Fenton Freedom Festival Parade</b>	<b>TBA</b>	
★ July 14	Mid Michigan Fun Fly	<a href="#">Midland R/C club</a>	10:00am
★ Aug 4	<b>Open House</b>	<b>HCH Club Field</b>	<b>12:00pm</b>

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