Silver Lining

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Radio Control Flying Club
AMA Charter #3117

Inside this issue:

Flying Field GPS location N42 48.596 W83 34.642

www.hollycloudhoppers.org

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

Behind The Flight Line

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Regular readers of this newsletter know by now that I like to keep track of stats regarding the club website and then talk about those findings here. Since the website is the main source of official HCH communication these days, I believe it's important to stay abreast of how you guys use the website. As the Newsletter Editor, I like to make sure club information is getting to the membership by the best means possible. As an example, let's assume stats showed that hardly anybody was reading newsletters. A newsletter then wouldn't be the best place to put important club information, now would it? Or more likely would show the newsletter isn't worth publishing and that you guys don't love me anymore.

As I've mentioned in previous newsletters, website stats are automatically recorded for all types of things. For instance, it's easy to see trends like which pages are the most popular, what days are the busiest, the time of day most visits occur, what search engine brought visitors to the site and which web browser visitors are using to view the site, just to name a few.

Now before you get all freaked out about information of your very own visits being cataloged, indexed and inventoried, keep in mind it only provides batch information on how many visitors did what. It does not record specifics like Joe Schmoe logged on at 2:00 am, read the Summer 2011 newsletter for 20 minutes and so on.

For this rendition of "What the website stats say" we're going to focus on the most popular web browser used by visitors to the HCH website. *Now the following isn't just page filling psycho babble. You very likely will want to pay attention here.* For the month just prior to writing this article, website stats showed the most popular browser, and by a very large margin I might add, was Microsoft's Internet Explorer 5.0.

No surprise that Internet Explorer is the most popular browser. Most people are using a PC running Microsoft Windows and that's the browser supplied with the system. The shock, however, is that it's version 5.0

So you may be wondering what's the big deal with version 5.0? If it works it works, right? Well let me share with you some basic facts about Internet Explorer 5.0

- Version 5.0 was released almost thirteen years ago in March, 1999.
- The latest version of Explorer is now 9.0. Yes ,that means their have been four new versions since 5.0.
- Microsoft ended support of 5.0 over six years ago in 2005
- In a current world wide sampling of web browser use, 5.0 doesn't even register.

Since volumes have been written on internet security I won't go into that aspect of why computer users that are running old browsers should seriously consider upgrading. I will, however, share this quote from a computer security website [1]"*An updated Web browser is one of the most important security steps you*

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On the Cover:

Manuel Santos flying an Edge540 at the 2011 XFC, Muncie IN.

Photo by Scott Rhoades

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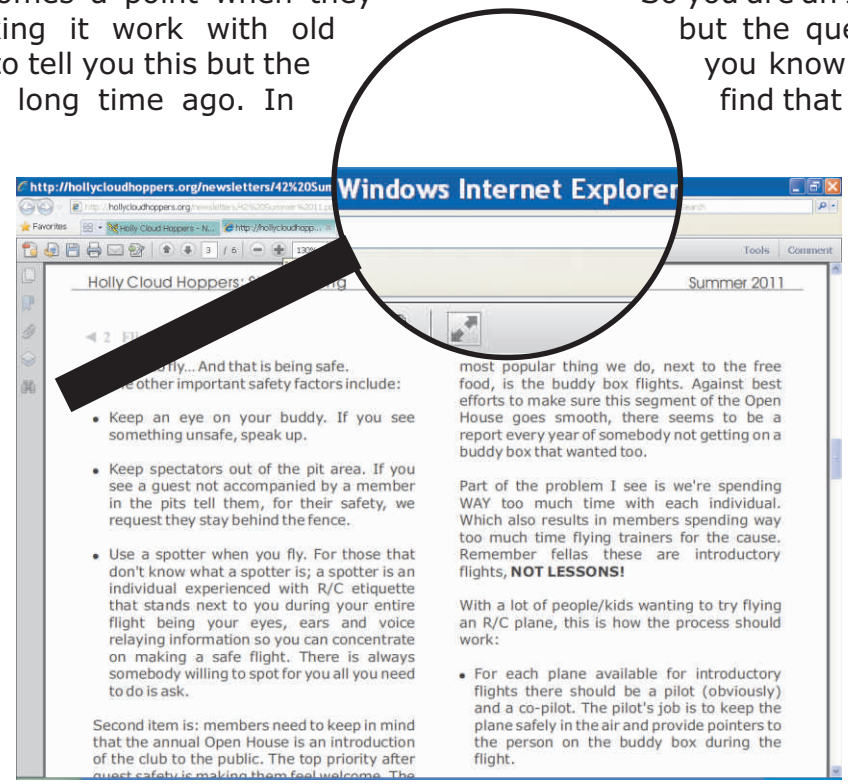
can take. It's as important as running anti-virus/anti-malware software".

Even if you dare ignore the security aspect, consider for a moment that website software developers do a very good job of making sure their products work well with all browsers. However, there comes a point when they give up on making it work with old technology. Hate to tell you this but the 5.0 ship sailed a long time ago. In other words, there is a strong likelihood that sites won't display properly with an outdated browser.



All this time you've been blaming HCH webmaster Larry Pittman for a site that doesn't work right and it wasn't his fault at all. Now don't you feel bad?

Since a large number of HCH website visitors are using the version of a browser that computer experts technically refer to as "older than dirt", I'm going to assume many of that same population don't really know what web browser they are running, let alone the version. If you don't know any of that stuff, don't panic. Simply take your eyes from what you're reading right now and very casually cast your gaze to the upper left corner of your computer screen. Does it say something like http://hollycloudhoppers and a bunch of other stuff? Good! Now look at the very end of that line do you see the words Windows Internet Explorer? Well of course you saw it in the little graphic example I put in the middle of this page. LOOK A LOT HIGHER. If you don't see the words Windows Internet Explorer, congratulations you're running a different outdated browser.

So you are an Internet Explorer user, but the question now is how do you know what version it is? To find that out is very easy. All an Explorer user needs to do is press the "ALT" and "H" keys simultaneously. That will open drop down menu and in that menu you will see "*About Internet Explorer*", Go ahead and click on that. A window will open telling you which version of Explorer your running.

If your version of Explorer isn't at least 8.0 you really should upgrade. The good news is upgrading is FREE! Just click on the available link and it will take you directly to Microsoft to download for the latest version of Internet Explorer.

We're not done yet. To actually get this newsletter to come up on your screen, your computer is using a program called a PDF reader. Why? Because this newsletter is published in PDF (Portable Document Format). Makes sense right? The most popular PDF reader in use today, by far, is the Adobe Reader. Since Adobe is constantly upgrading this program, chances are pretty good that hardly anybody reading this right now is running the latest version. So everybody

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should just go download the latest version to insure they are seeing newsletters the way they were intended to be seen.

Here's a link to the download for the latest Adobe Reader. It's free as well. .

So back to what I was saying at the very beginning of this article about the club website being the main source of official HCH communication these days. Larry and I will continue to collect information regarding the club and make sure it is delivered to you, however, if the majority of those accessing the site don't have the current tools, it's useless.

One last word about web browsers. There is a bouquet of other browsers available besides the one offered by Microsoft and they are all for free too. You may want to do an internet search or ask around what other people are using and what they like. The most popular browsers today include; Firefox, Chrome, Safari and Opera.

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
Membership renewal http://hollycloudhoppers.org/renew.html

Electric Powered Flight

Update/Rewrite by:
Scott Rhoades and Mike Wizynajtys

Part 3: Understanding the electronic speed control

Welcome to part three of the electric flight series. For a brief recap of what has been covered so far; part one, published in the Fall 2010 edition, talked about amps volts and battery C rating. In part two, published in the Winter 2011 edition, the topic was "Sizing The Power System", which introduced watts and discussed battery sizing and prop selection.

Having covered the battery, motor and prop combination already we now need to look at the piece that makes it all go and that is the Electronic Speed Control or as it's most commonly referred to as the ESC. Sometimes guys will just call it the "controller".

So what is an ESC any how and what does it do? Simply put it is the master control point for all power in our model airplanes when flying electrics. An ESC is to an electric motor as the throttle servo is to a glow or gas powered engine. They both transfer a radio signal into control of the power plant.

The first thing we want to recognize is there are two different kinds of ESCs and they are specific to the type of motor they control. There are controllers for brushed motors, such as the speed series, and then there are the controllers for brushless motors which is the inrunner and outrunner motors we talked about in part two. For this discussion we will concentrate only on ESC's for brushless motors.

Understanding the wires

When looking at a brushless ESC you will notice they all have three sets of wires. Typically two sets are fairly thick and the third looks like a servo wire. One set of the thick wires will be made up of just two wires, typically colored red and black; those are the wires that connect to the battery. The ESC is usually marked to tell you which are the battery wires.

The other set of thick wires on the ESC are those that connect to the motor. Again, the ESC is usually marked to show which set of wires are the motor wires. Although on a brushless ESC, it's pretty easy to tell which are the motor wires because brushless motors use three phase current, so there are three wires for the motor. Brushed ESC's on the other hand only have two motor wires so you have to be a little more careful and read the markings to tell which set goes to the battery and which go to the motor.

The three wires on a brushless ESC that connect to the motor have no standard color as they vary by manufacture. Sometimes all three motor wires are the same color but often times manufactures will make each wire a different color. Occasionally you will get an ESC with a wire color combination that will be the same as those coming off your motor. Matching these colors when making the connection MAY have the motor working as intended. However the only true test to know if it's hooked up correctly is to simply run the motor. If connection is not correct the only bad thing that will happen is the motor will spin in the wrong direction. Simply interchanging any two connections will make a brushless motor spin in the opposite direction.

The third and last set of wires on the ESC is the smaller set with the servo plug on the end. This is the set that connects to the receiver and will serve one main purpose; receiving the signal from the receiver. Just like a servo, the white wire or sometimes yellow of that group is the signal wire. This signal wire is the communication path from the receiver to the ESC telling it how to control the motor. The other two wires going to the 'servo plug' are the power supply but work the opposite on an ESC than they do in a servo application. These wires supply power TO the receiver, servos and other accessories plugged into the receiver.

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This is called a Battery Eliminator Circuit or BEC. We'll talk more about BECs later in this article.

Some ESCs have an integrated on/off switch. In most cases this will allow or prevent the motor from running and block power to the receiver. However it typically does not stop the flow of current from the battery to the ESC itself. In fact, even if there is no switch there is always current flowing to the ESC which will drain the battery. For this reason you should never leave a battery connected, when storing the plane. This small current drain will take your battery to zero charge over time and with LiPo's the pack will likely be ruined. Ask me how I know…. I ruined a very expensive set LiPo this way so, don't leave the battery connected unless you are preparing to fly.

Connectors

The connector/plug that goes to the receiver is standardized and as pointed out earlier is the same wire scheme and plug type as is used for the servos. The ESC to motor connectors are not as simple, although a somewhat standard for brushless motors has emerged. These connectors are round and are called "bullet connectors". They are somewhat universal but do come in different diameters, measured in millimeters. Bigger connectors are used for higher current draw applications. I use 3mm connectors for applications up to 30 amps, 4mm bullets up to 60 amps, and 5mm up to 80 amps. Some people will just solder the ESC leads to the motor leads. This works great and in high current applications it is the preferred method of connecting the ESC to the motor because a power loss across connectors does occur. Soldered connections however are not very convenient for changing out components or switching two wires to reverse motor direction as outlined above.


Bullet Connector

For the ESC to battery connection a connector is always used so the battery can removed for charging and storage. Whatever battery or motor connector you decide to use, make sure it's rated for a current/amperage larger than what the motor is likely to pull. If the connector can't handle the flow, it will heat up and potentially be damaged. Also, using connectors not rated for the task will act as a resistor and the motor will never develop full power.


Anderson Power Pole


Deans Ultra connector

The common suggestion for battery connections is to personally standardize to a single style of connector. This is done so once an aeromedeler's fleet expands, swapping equipment through different models will be much easier. I like to use Deans Ultra connectors on just about everything except the smallest of planes. There I use Deans micro connectors. That said, Anderson Power Poles work very well all the way up to 60 amp applications and if you use their crimping tool they do not need to be soldered. Their only drawback is that they are physically a little longer than the Deans Ultra connectors. There are others out there too that work well, just decide which ones you like and stick with it.

Sizing an ESC

ESC's are sized according to how many amps they can control and the voltage they can handle. You may see an ESC marked as 20 amps for 2-3 cell LiPo. That says it can handle a 20 amp flow using a battery pack that ranges between 7.4V and 12 volts. If you use it with a motor/battery system that is outside this range it will likely fail.

Keep in mind when an ESC fails not only will it no longer run the motor, instantly turning an

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airplane into a glider but it may also block power to the receiver, instantly turning the plane into a brick. ESC's are sized according to the motor and the battery being used. It is enough to say that, if a motor is going to draw 25 amps, then an ESC rated for at least 25 amps is needed. It is however recommended to always factor in at least a 20% safety margin between the amp requirements of your motor and the rating of your ESC. This means for our 25 amp draw example you would want to run at least a 30 amp ESC (25 x 1.20 = 30). This way you will know you will not be overloading the ESC.

There is no problem having an ESC that is rated for more amps than you need, but an ESC that is rated below that point is a failure waiting to happen. The same goes for the voltage… Never use a 4s pack on an ESC only rated for 3s.

Brushless BE/ESC

How the ESC controls the Motor

In part two of this article series we touched briefly on how motors are rated by Kv. For a little refresher; Kv is simply the revolutions per minute (rpm) that an electric motor will spin per volt, when under no load. So a 1200 Kv motor will spin at 12,000 rpm if you apply 10 volts. From this you could imply that the ESC changes the voltage to the motor in order to change its speed, but that would be incorrect. The ESC is not a variable resistor that adjusts the voltage to the motor, it is actually an extremely fast switch that pulses power to the motor. If you look at the specifications for your ESC you will probably see a frequency number. This might range from 2 KHz to 12 KHz or higher. This is related to how fast the ESC can pulse power to the motor.

You can think of this as a duty cycle control. How long will the ESC leave the power on till it turns it off? Then, how long will it be off before it turns it back on? There is no need for you to know this cycle time, only that with every 'on' cycle, the motor is getting the full voltage of the battery. It is important to take the time and explain this because people mistakenly believe that if they run their motor at partial throttle they are sending reduced voltage to the motor. If the motor is limited to 7.4 volts max and you connect an 11.1V battery, running the motor at ½ throttle DOES NOT reduce the voltage to the motor. It is getting 11.1V hits every time the ESC switches on.

Understanding how the ESC controls your motor will help you diagnose problems. Also note that since the ESC is switching power on and off it is also producing electromagnetic pulses, or radio waves. The electronics in the ESC will typically be designed to reduce or shield some of this radio wave noise, but it can't block it all. This is why it is recommended to keep the ESC as far away from the receiver as possible, as ESC noise can interfere with the receiver. If you are getting some "glitching" or odd pulses to your servos, it may be ESC noise affecting the receiver.

The Battery Elimination Circuit (BEC)

The battery elimination circuit is what supplies power to the receiver and the servos. The name, battery elimination circuit, comes from the fact that, in the "old days" of electric planes, you had a battery pack to power the motor and another one to power the receiver. In order to save weight, the BEC was introduced 'eliminating' the need for a separate receiver battery. Many of today's ESC's have the BEC integrated, making one nice convenient package.

In most of our radio systems, the receiver is

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designed to operate between 4 and 6 volts. To match this, the typical BEC supplies power to the receiver at about 5 volts by stepping down the motor battery voltage. Keep in mind the higher the voltage of the motor battery, the harder the BEC has to work to get the voltage down to 5 volts. As this voltage gap increases the more heat the BEC generates. Because of this ESC makers will limit the voltage of the BEC so it is important to check that the BEC doesn't have a different voltage rating than the ESC. For example your ESC may be rated for 14.8 volts but the BEC may only be rated for 12 volts and therefore must be disabled when using a battery larger than 3s (11.1 volts). In this case you will have to power the receiver separately. Many ESCs that are designed specifically for high voltage use do not have an integrated BEC.

BECs are rated by how much current/amperage they can deliver to the receiver. It goes without saying the more servos installed in the plane, the greater the demand on the BEC. When current draw on the BEC is increased, the more heat it generates in the process.

According to Dimension Engineering, a maker of BECs, "Many people don't realize the BEC amperage rating in their ESC is misleading. With the linear BEC built into most speed controls, the amp rating decreases as pack voltage increases. For example, several popular 25A ESCs with "3A" BECs may be fine with a 2s lipo pack, however it's only capable of supplying 0.5A when operating from a 3s pack". This obviously limits the number of servos that can be used and/or the workload they can impose on the BEC.

We also have the variable of which type of servos are being used. Different servos draw different amounts of current. If the current draw gets too high for the BEC, it will get too hot and cause a thermal shutdown of the BEC. This protects the BEC and prevents a fire, but cuts power to the receiver. In the case of an overheated BEC, if there is enough cooling air going through the plane, the BEC may come back quickly as it cools. This could look like a radio glitch, but instead is the BEC operating on the edge of total failure. If you're experiencing what appears to be a "glitch" check your ESC to see if it's very hot when you land. If it is, it's likely the BEC is operating at the edge of its capacity. Other results of heat build up in a BEC can the simple result of binding of a servo and/or binding controls, thus causing more amp draw than normal. It's vital to make sure that all of the controls are free moving.

It is not uncommon to need more power than the integrated BEC can supply. In this case you will need to use either a separate receiver pack or a separate stand alone BEC. Many companies make stand alone BECs that can handle higher voltages and higher servo loads. Keep in mind if you do decide to power the receiver with another source besides the BEC that is built into an ESC, that BEC must be disabled. Disabling the integrated BEC is as simple as cutting only the positive line of the receiver wire. Although permanently disabling the BEC is not very favorable since it may work well in another application later. So there are other options to disabling the positive wire and one is to use a servo extension between the BEC plug and receiver, then cutting the positive wire on the extension. Another simple solution is to bend the tab on the BEC connector, take out the middle socket and insulate it. Then it's just a matter of reinserting the socket if you need the BEC again. Here is a Youtube video showing how to do that. http://www.youtube.com/watch?v=clNvfjhMQ5w

The Low Voltage Cutoff Feature of your ESC

Many electronic speed controls include a feature called the low voltage cutoff circuit (LVC). The LVC watches the voltage that is being delivered by the battery. When it gets below a certain level, it will cut power to the

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motor leaving enough battery power for the receiver and servos to still operate. This will allow you to keep control of the plane and land it in a glide.

Some ESCs have an LVC setting for how the power is cutoff. This function is usually just called "Cutoff" and the settings are Hard or Soft. A hard cutoff is just what you might imagine. When the voltage in the battery gets too low it shuts off all power to the motor. Soft cutoff however works a little differently. It cuts the power level to something like half, thereby giving you enough power to limp back to a landing position. I always have my LVC set to soft cutoff, particularly with a helicopter. However I also time my flights and land well before the LVC level is reached as I dislike having to abruptly land any of my models. You never know when the traffic in the pattern will cooperate and you also don't want to be way down wind when the LVC kicks in either. Better to play it safe and land with plenty of gas in the tank, if you know what I mean. (see "Sizing the Battery" in part two for more info.)

These days and particularly with quality ESCs like those made by Castle Creations, there is automatic detection of your battery type and voltage. They have pre programmed LVC settings that are appropriate for your battery. Also, Castle Creations has a neat little device that allows you to program them from your PC with a USB connector. This device also lets you download the latest firmware for your ESC and make program changes to other functions of the ESC. Many Speed control makers have also come up with simple programming cards that also allow users to easily program their ESC's.

Castle Creations Castle link and USB connector

Keeping it all cool

ESC's and BEC's generate a lot of heat so make sure you have enough cooling air going through your electric plane. This is especially true of foam planes as the foam acts as an insulator. You may have a cooling air vent in the front somewhere, but the heat can't get out unless there is an exit air hole large enough to allow good airflow. If you are pushing the limit on any part of your power or radio system, not enough cooling air can cause damage or failure to your motor, ESC, BEC or battery packs.

Summary

The ESC and BEC is the electric power system controller (brains) for your airplane. Its various components distribute power to the receiver and control the speed of the motor. Understanding how it works will give you the ability to properly size and install correct ESC and BEC in your model. Don't be shy about asking questions of a fellow modeler. There is nothing better for one's confidence than getting an answer from a knowledgeable person that backs what you thought was right.

ESC programming card

This article is an rewrite from the e-book Everything You Wanted To Know About Electric Powered Flight, by Ed Anderson

In The Know

By Scott Rhoades

- The long time readers of the Silver Lining will see the first few messages here as very familiar. Almost a déjà vu. Yes, these are the messages members can count on to be a part of every fall newsletter. The only thing that changes about them are the dates. Without further ado let's start with the annual fall disclaimer… *Since this newsletter is the last one until the after annual meeting in February, it is the last opportunity to publish some reminders and notices, so they may seem quite premature.*

- The first notice is for the annual HCH meeting. As usual, it has been scheduled for last Sunday in February 26th at 2:00 pm at the Holly VFW Hall on Airport Dr. Holly, MI. Keep in mind, this is somewhat tentative because it's too early to schedule anything with the fine folks at the VFW. So be sure to monitor the HCH website and your email inbox for any changes as the meeting date approaches. Every HCH member, prospective member and guest is welcome and encouraged to attend. As always, be sure to bring the plane you worked on all winter for the Winter Project Contest.

- This second notice is for membership renewals. 2012 renewals are now being accepted by HCH Secretary/Treasurer, Jim Finch. Dues are due by March 1st, 2012. Renewals have once again been reduced across the board by $10 ($25 for full members, $35 for family). Although keep in mind any renewals paid after April 15th will be assessed a late fee of $15. Here is a link to the renewal page to either pay your renewal dues online or print the membership renewal application form for mailing in your dues. Keep in mind that the renewal page is accessible from the homepage of the website. If by chance you go the homepage and don't see it, you may need to refresh the page. Also keep in mind Jim cannot process your HCH membership until your AMA has been renewed.

- With those annual 'must mentions' out of the way, let's talk a little bit about the initiative that went into place last year, which is being able to renew your HCH dues online with a credit card, debit card or Paypal. The inaugural run of this system was a huge success. According to Jim Finch about 1/3 of the membership choose to renew their 2011 membership online. Not only is this a major convenience for members by eliminating the need to fill out the renewal application, write out a check, drop it in the mail, etc, it also makes Jim's job a bit easier too. Looks like online renewal for the HCH is here to stay.

- Those that attended the open house in August saw what was probably the lowest visitor turnout of recent open house history. Weather was the factor as it threatened rain most of the day. Fortunately, it rained only briefly during the event and came again later to cut the whole thing a little short. The rest of the time though was great for flying. Thanks to all the members that came together to make this event happen.

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- For the open house two contests were planned. One was for HCH guests only, while the other was a flying competition amongst the pilots. With the rain ultimately cutting things shorter than normal, the flying competition never took place. The prize that was intended for the winner of that event was instead given to club president Doug Pickett in appreciation for all the hard work he put in organizing this and other past open houses.

  The guest/spectator event, however, did take place and went very well. The object of this years contest was for people to guess how high a model plane was flying. The way this worked is, once a plane was piloted to a nice high flight level, guests we're prompted to make a guess (in feet) and write it along with their name one of the pieces of paper that were handed out by club members. At the same instant the height was recorded with an onboard "How High" altimeter made by Winged Shadow Systems. The guest with the guess closest to the actual recorded number won an excellent prize donated by Hartland Hobby Shop.

- Many thanks go out to Michael Beckman and the rest of the crew at the Hartland Hobby Shop for their generous donation. If you have not had a chance to stop by Hartland Hobby Shop yet, be sure to do so because they cater very well to the aeromodeler. When you do stop in, please be sure to tell them you're a HCH member and thank them for the donation. Also check out their ad on page four of this newsletter.

- Most members have probably heard by now that a few club owned items have come up missing from one of the containers. Since the combination lock was not physically compromised, as has happened in the past, a hand full of theories exists on how this occurred. Regardless of what the primary theory is, modifications have been made to cover all of the possibilities.

  The modifications that members should know about are the elimination of the combination lock on container #2 and the installation of a keyed lock and hasp system, identical to the extremely durable one on the original container. Also, a key will no longer be "hidden" on site as it was in the past. Keys will be retained by each club officer and other members that perform regular field maintenance.

Things to ponder

If ignorance is bliss, why aren't more people happy?

Events Calendar

January 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				

February 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			

March 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

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

Importaint HCH dates

Events around the area

Date	Event	Host Club/location/Link	Time
★ **Jan 1**	**Chili Fly**	**HCH Club Field**	**11:00am**
★ Feb 12	Cheasaning Swap Meet	Saginaw County Fairgrounds	9:00am
★ **Feb 26**	**Annual HCH Meeting**	**Holly VFW Hall**	**2:00pm**
★ **March 1**	**HCH Membership renewals due**	**On line renewal**	
★ March 4	Flying Aces Swap Meet	Lake Fenton High School	9:00am
★ April 13,14,15	Toledo R/C Show	Seagate Center Toledo, OH	9:00am