Mid Hudson Radio Control Society

Pilot Briefing

Volume 7 Issue 1 January 2015

President's Corner

Hi Members,

I understand that a few hardy souls did make it to Red Wing field on Sunday for the Frost Fly. With the pending big snow storm coming on Monday-Tuesday I spent most of the day getting prepared for the storm. I hear that 5 people made it out and some flying was done but the wind was pretty gusty so not much flying was done and people left early. It sounds like it was a gallant attempt.

It is once again time to renew your AMA and club dues. The renewal form has been updated on the club web site. Don't forget to mail in a copy of your AMA and a Self Addressed Stamped Envelope so your membership cards can be mailed back to you.

Upcoming events: April meeting project Night. The April meeting we will have project night. Bring in any project you have been working on, finished or unfinished.

Float fly: Jerry Rohling will work on having the Taconic Lake float fly in mid May.

Aerodrome fun fly: The AMA Sanction for the Rhinebeck Aerodrome spring fun fly has been approved and things are in the works for put this event on again this spring.

See you at the meetings,

Warren Batson

MHRCS president

TWIN ELECTRICS: ELIMINATING THE LOW VOLTAGE CUTOFF SPIN

Jesse Aronstein

My two "stick-and-tissue" twin electrics (Grumman Widgeon and PBY) have both splashed at Galway Lake from time to time, spinning in towards the end of a nice flight. Usually some repairable damage, but why would I want to spend time on repairs? I had to figure out the cause and solve it.

There were many possibilities, such as pilot error, radio glitch, misplaced CG, or even some inherently evil aerodynamic characteristic of these zero-dihedral scale models. My reaction whenever a spin occurred was to throttle up and try to fly out of the situation, but that did not work with these models.

For a while, just flying a bit faster seemed to avoid the spins -- until it happened again.

Now my focus is on the ESC low voltage cutoff. I don't time my flights, since that is not very practical for variable flying style and an assortment of battery packs. I just land the model when I sense the power starting to sag. That usually works for me, and, when it doesn't, a deadstick landing is not a problem.

But I had overlooked a little quirk of twin brushless electrics. With brushless motors, you need to use one ESC for each motor. When the battery voltage goes low, one ESC is always going to activate (cut or reduce throttle) before the other. There is no practical way of assuring that the multiple ESCs (one for each motor) cut off simultaneously. So, one motor cuts out first, and the spin initiates. Once in a spin from this cause, throttling up just doesn't work to help you get out of it.

The solution is to install a single LVC (low voltage cutoff) unit that activates at a low voltage threshold higher than that of any of the ESCs and cuts power at all motors simultaneously. The LVCs that I happen to have were from FMA Direct, and they can be set to activate at any voltage I choose. The unit simply plugs into the receiver's throttle servo output, and the throttle cable connector from the (two) ESCs plugs into it (instead of directly into the receiver). There is then one red voltage sensing wire that gets spliced into the red battery power lead at any convenient place. The manufacturer's directions for setting to activate at any desired voltage are pretty clear.

For a few grams added to the overall weight, I think I've eliminated the root cause of at least some of these random spins. The units that I have are no longer available, but there are others presently on the market that will do the same job. An adjustable LVC that senses voltage at each cell in the battery pack is the "Cellshield" (dimensionengineering.com) pictured here. For those of you who are comfortable modifying electronics, you can fool any non-adjustable LVC into activating at a higher battery pack voltage by simply using a small potentiometer or a pair of resistors as a voltage divider to reduce the voltage that the unit senses. So, if the potentiometer is across a battery pack that is at 10 volts and the adjustable tap feeding the LVC sensing lead is at the 90% position, then the LVC thinks the battery is at 9 volts. Just make sure that the LVC cuts the throttle at a higher voltage than any of the ESCs do, and your multi-motor model will be a bit safer to fly.

Editor's Note: My apologies to Jesse for the missing pictures. My ignorance in Wordpad and Corel Fusion is the problem. Mea maxima culpa, J e r

ESC - Electronic Speed Control

Is the device between the electric motor that drives the prop and the battery.

The easiest method to introduce it and how it works is to refer you to a video,

so before you start, get yourself your favorite beverage, settle in and be entertained.

Go to: https://www.youtube.com/watch?v=DraFgiDELjI

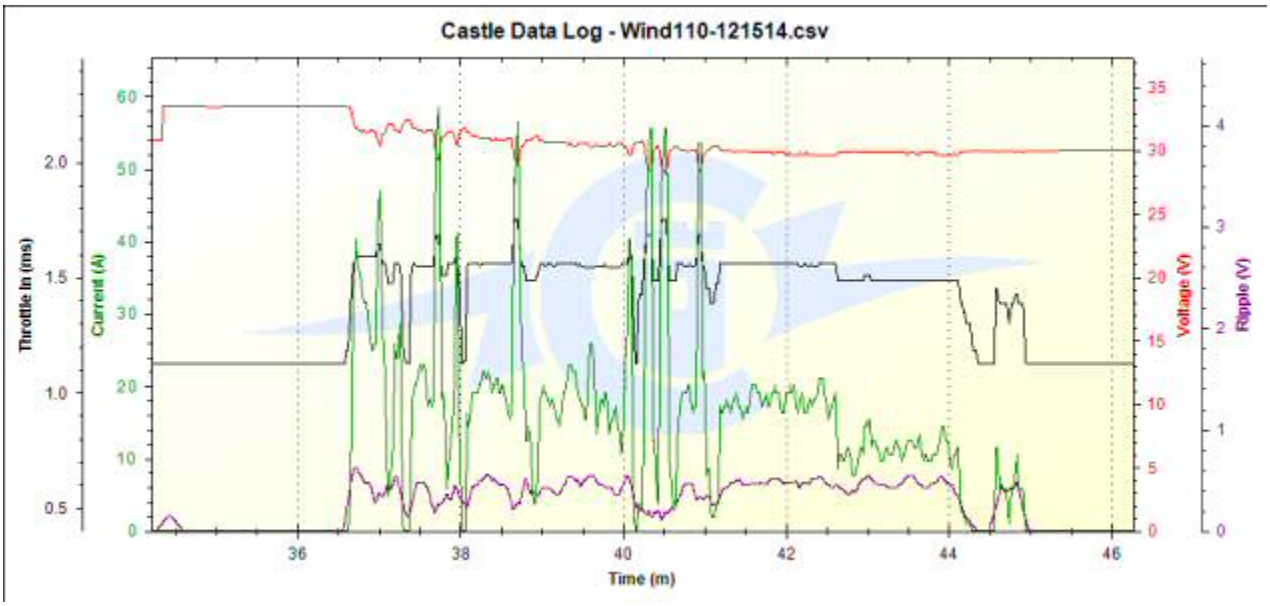
What's inside: https://www.youtube.com/watch?v=22CpRl2_TRI

Many ESC's include data logging and the ability to set operating parameters.

This discussion is specific to Castle Creations ESC's but you will find most if not all ESC's will log the same data just under a different name. The logged data are battery voltage, ripple voltage, current, input power (watts), Temp(degrees F), rpm, throttle input, output power (watts), A Hours, Gov. Gain, and BEC V.

To access this data you will need a Castle Link and PC with a USB port. The Castle Link is a cable adapter that connects the USB port to the ESC via its universal servo connector, the same connector that attaches to the receiver throttle port.

The displayed data looks like this:



I've only selected Throttle, Current, Voltage and Ripple to keep this easily seen. Notice how the Voltage (displayed in red) drops as the flight progressed, the ripple was changing and Current varied widely with changes in Throttle setting.

The health of the entire power system can be assessed using data from the log. You can set the sample rate in the ESC and what data to monitor.

The ESC also allows you to set how it will be used. Keep in mind that they are used in heli's, boats, cars, trucks and robots. Gov. Gain is used by heli's not by fixed wing aircraft. You can set the Low Voltage Cutoff, LVC, to take into account different battery chemistries. Other parameters relating to the brake, throttle end points, motor and audible alarms allow you to configure the ESC to your specific requirements. Setting the brake and throttle end points are common in precision aerobatic planes but are very specific to your model, its motor and pilot therefore beyond the scope of this introduction.

You will find adapting to the throttle of an e-power model the most difficult control to master. The absence of auditory feedback, its hard to hear the prop, makes setting the throttle more difficult. Couple that with conserving battery power and you find you can no longer go "balls to the wall" if you want to fly more than 5 minutes. You can't/shouldn't taxi especially before takeoff. Why waste the best part of your battery on the ground?

Most e-flyers cruise at 50% to 65% of full throttle to conserve the battery and only use full throttle going vertical. Electric power has a more linear throttle response i.e. each notch on the throttle stick increases rpm by the same amount from low to high. E-pilots like to flatten the transmitter throttle curve around the cruise setting to make it easier to find by increasing the cruise point from 1 to 3 notches. Its similar to using expo on the elevator.

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For the WWII warbird fans, a FW-190 Top Flite Arf bash

http://www.rcscalebuilder.com/forum/forum_posts.asp?TID=22595&PN=1&TPN=1

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59 days until Wallkill opens as of Feb. 1.