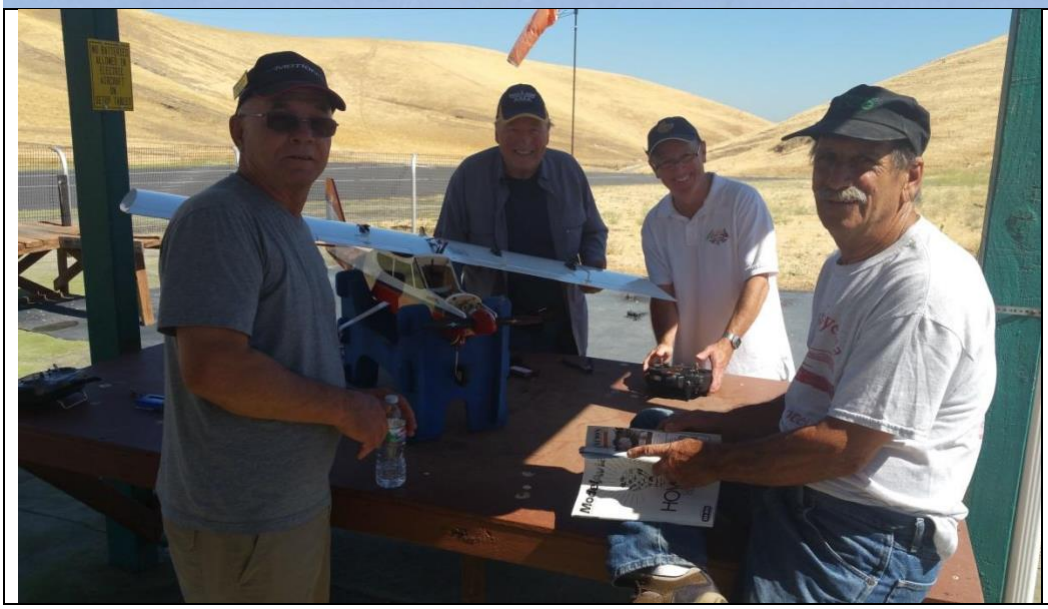
Air Currents

The Official Newsletter of Diablo Valley Radio Controllers

Werner Hoch's plane, DVRC 2017 Open House



President's Corner

It's mid-summer and it seems the south westerly winds have been relentless at our runway for a couple of months now, and may continue. Although high summer winds are a characteristic of the north east Bay Area, I can't help feeling that each year we are having progressively longer periods of high wind…global warming? Maybe?

Thankfully, at least the pandemic situation has eased as a result of available double vaccinations and booster shots. However, our club Covid restrictions remain in place, meaning that if you are not vaccinated, please wear a mask (preferably N95 or KN95) in the pits for protection of yourself, others, and socially distance yourself.

Although the 20+mph winds essentially have grounded most flyers, many have used this opportunity to build, repair, remodel, or re-engine/motor our aircraft for improved performance. I must admit, however, that I have run out of aircraft to "fix" and so I am left with other more mundane maintenance tasks around the home. These tasks, although unexciting, still need to be done and so have risen to the top of my "to do" list.

While I talk about "fixing" aircraft, I observed an issue with a couple of my planes recently whereby the servos were "browning-out" in operation. This occurred with my newer digital servos and ESCs that have 5v BEC outputs. The net result was that the servos did not respond as quickly as they should and in some instances, had delayed responses for up to a second….too long. Replacing the servos with other analog servos seemed to rectify the problem.

Researching the characteristics of digital servos, I found several differences between digital versus analog servos. These differences included faster response, excellent holding power, minimized dead-band zone, better centering, and better resolution. However, on the downside, digital servos are more expensive, have higher power consumption, and high frequency audible noise. Although the cost between digital and analog servos is progressively decreasing, the higher power consumption can be an issue when you have more than 4 standard sized servos (flaps, retracts etc.) in your aircraft, powered by a 5 volt BEC.

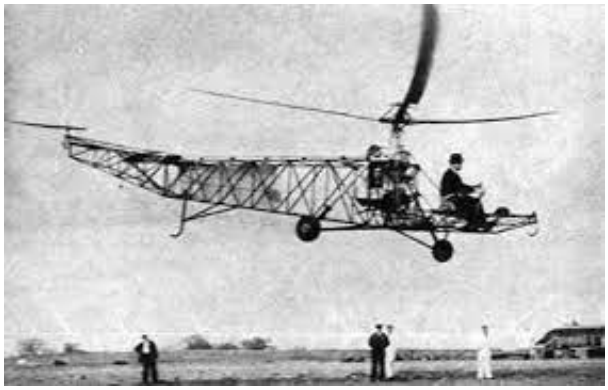
Fortunately, the ESC (w/BEC) I was using in the aircraft was fairly new and I discovered that the BEC's voltage could be increased from 5 volts to 5.5 volts, or even 6 volts within its

programming. The higher voltage essentially increases the electrical power to my receiver/servos which solved my problem of browning-out, or slow response of my servos.

Before making any program changes to your ESC/BEC output, check to make sure your servos can handle 6 volts (most can) and if so, make the change to a 6 volt output. Your servos will move briskly without hesitation.

If any of you have also observed this issue in your aircraft, the solution is at hand. That's all I have, but I will leave you with an aviator joke I found on the internet:

If helicopters are so safe, how come there are no vintage/classic helicopter fly-ins?

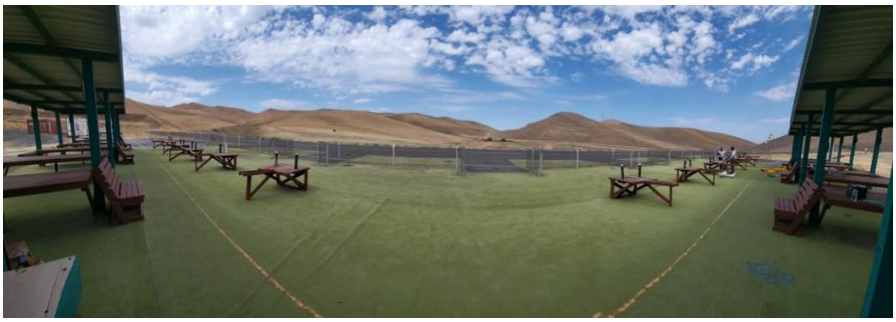


Happy Flying,
Nigel Watson, President, DVRC

Upcoming Events (weather permitting)

DAY	DATE	TIME	EVENT
Saturday	8/6/2022	9am	Work Party (first Sat of each month)
Saturday	8/13/2022	9:45am	General Club Meeting (outside, in the pits)
Saturday	9/3/2022	9am	Work Party (first Sat of each month)
Saturday	9/10/2022	9:45am	General Club Meeting (outside, in the pits)
Saturday	10/1/2022	9am	Work Party (first Sat of each month)
Saturday	10/8/2022	9:45am	General Club Meeting (outside, in the pits)

Volunteers and Leadership in Action



Thanks to the volunteer effort of our members, we can enjoy a clean and weed-free pits area and runway.

Notes From The Membership Coordinator

This has been a very good year for Membership at DVRC! As of today we have 94 members. Some of the new members are re-joining our ranks after being away for 30 years and some new members are just beginning flying RC airplanes.

Please welcome or new members and those returning:

Douglas McNabb
John Hudgens
Chris Huang
Bruce Courtemanche
Brandon Breining
Bryan Brasesco
David Brown

There are some members that have not received the YELLOW Pilot's badge yet.
For whatever reason, if you need an instructor or just a check flight Please contact me by text, EMAIL or a phone call and I will see what I arrange for whatever is needed.

Again…Welcome aboard all!

Gordon LaPorte
925 997 0709, Gordon@K1VHR.US
Gordon LaPorte, DVRC Membership Chairman

Notes From The Safety Officer

Hello DVRC Members:

The membership continues to be accident-free.

We are experiencing a very windy fire season. Which requires that we be careful with our electric and gas operated models. There is firefighting equipment located under the counter in the impound area. It is also recommended that each member carry a fire extinguisher in their vehicle to aid in firefighting if needed.

If a fire were to start close to the runway, west of the fence, we would attempt to put out. A fire that is farther away from the runway area would require that we immediately notify the fire department for assistance. With the winds that we are experiencing at the field this season, a fire could get out of control very quickly. So when in doubt, call 911. Contra Costa Fire Station 87 is located at 800 W Leland Road, across the street from the entrance to the flying field and the number is (925) 941-3300. Our location is at the end of Ripple Rouge Road, which is off of John Henry Johnson Parkway. Our fire safety procedures are published on the DVRC website.

Stay safe and I'll see you at the field.

Ron Penn
DVRC Safety Officer

Member Contributed Content

DVRC Former Member Takes 1st Place in F3F US Team Selection Event

DVRC sponsored our former member, **Miguel Navarro**, to compete for a seat on the F3F World Champion Team – and he took 1st place at the selection event in Fort Ross, California! Now he's off to Denmark to represent the US in the world championship. Turn to the back of this issue to read Miguel's description of F3F, the selection competition, and the upcoming world event.

Electric Misconceptions

by Nigel Watson

In the April and June 2022 editions of Model Aviation magazine, Terry Dunn authored a couple of interesting articles dispelling some misconceptions concerning the use of electrics in our hobby. I have taken the liberty of including some to these misconceptions below, hoping that they will be useful to you. Some of them are safety related and others will help to ensure success in your future electric aircraft.

The Proper Propeller

Misconception: You cannot use sport propellers intended for glow or gasoline engines on electric motors.

Reality: Yes, you can use sport propellers on electric motors. However, electric propellers (sometimes designated E after the prop size) are lighter than sport propellers and will, therefore,

provide better performance. Do not use slow-flyer-type electric propellers on a fast-spinning (high Kv) motor since they could break-up and throw a blade. Most manufacturers of propellers list the rpm limits for different types of propellers. Obey those limits!

Alternatively, you should never use an electric propeller on a glow engine. The hubs of sport propellers are stronger and are designed to withstand the high vibrational stresses which are generated by IC engines in operation. They will also eventually throw a blade.

Redline RPM

Misconception: Running an electric motor (brushless or brushed) without a propeller will cause it to "over-rev" and become damaged.

Reality: Not true. You can run an electric motor without a propeller to maximum RPM without damage (assuming that it has adequate airflow for cooling).

The RPM of an electric motor is dictated by its Kv and the applied voltage, with the maximum RPM (without a propeller), calculated by the Kv multiplied by the Voltage.

When you add a propeller to the motor and apply the same voltage as before, the RPM will be less than the unloaded motor and the current draw will be more. As you progressively increase the prop size, more current will be drawn from the battery and the motor will begin to overheat until it fails. Always stay within the recommended current limits of the motor.

ESC Sizing

Misconception: If my power system pulls 40 amps at full throttle, I can use a 30-amp ESC if I don't exceed 75% throttle on my transmitter.

Reality: No! The ESC does not vary the voltage based on the amount of throttle applied.

The ESC components include electronic switches (FETs) that cycle on and off thousands of times per second. The percentage of the time during each cycle reflects the throttle setting (e.g., 65% throttle means the FET is on during 65% of each cycle and off for 35%). The FET always provides the full battery voltage whenever it turns on, so the ESC experiences the full-throttle current (40amps) during each pulse.

Therefore, you should always size your ESC based on the full throttle current demand, which, in the above case, is 40amps. Better yet, give yourself at least a 20% margin above that maximum current demand which, in this example, would be a 50amp ESC.

Running 40-amp pulses through an ESC that is rated for 30 amps will eventually cause the ESC to fail. Subsequently, the motor and receiver/servos will also be without power; not a good situation.

Lengthening Electrical Wires

Misconception: If the battery must be a long distance from the motor, you should extend the battery wires on the ESC.

Reality: No, it is always best to extend the 3 motor wires on the ESC—not the battery wires. Brushless ESCs essentially convert the battery power from direct current (DC) into three-phase alternating current (AC) to run the motor.

Voltage ripples occur in the DC voltage at the input end of the ESC. These ripples typically happen thousands of times per second! Capacitors are used within the ESC to diminish the effects of this constantly changing voltage. If you increase the length of wire between the ESC and the battery, you will also increase the amount of voltage ripples, because of the resistance of the extra wire. Under high-current loads, these ripples can exceed the capacitor's ability to function and will overheat and potentially fail. A failed ESC will result in a brown-out, or worse yet, a dead stick and a crash.

Since the output voltage of the ESC has been converted to three-phase AC, it is unaffected by wire length and can be easily transmitted over long distances. Therefore, always lengthen the motor wires of an ESC rather than the battery wires.

Power Struggle

Misconception: In multi-motor airplanes with two or more ESCs, you must disable the battery eliminator circuit (BEC) of all but one ESC.

Reality: This is actually true—sometimes. The answer depends on what kind of BEC you are using. The BEC allows an ESC to power your 5-volt radio equipment with the same high-voltage battery that powers the motor. This "eliminates" the need for a separate 5-volt receiver battery. Smaller ESCs with linear-type BEC circuits use common voltage regulators to drop the battery voltage to the 5-volt level that is required for the receiver and servos. These devices take a portion of the input voltage and reduces it to 5 volts for the receiver, with the generation of waste heat. One voltage regulator is typically able to handle about 1 amp of current in the BEC, so an ESC with a 2-amp BEC rating will have two voltage regulators. One with a 3-amp BEC will have three voltage regulators, and so on. Because linear BECs consist of multiple voltage regulators in parallel, it does not hurt to use two (or more) ESCs with linear BECs in the same aircraft. Doing so simply adds more voltage regulators in parallel and effectively increases the load capacity of the overall BEC circuit. One important caveat though is that **all of the ESCs must be of the same make and model**. This will ensure that all of the voltage regulators are the same as well. One manufacturer might use 5.1-volt regulators, while another uses 5.5-volt regulators. This mismatch will create a crosscurrent between the ESCs that can cause problems.

The other kind of BEC is a Switching BEC (SBEC). In SBECs, a high-speed switching regulator is used to power a small field-effect transistor (FET) that turns the battery voltage on and off at nearly 150,000 times per second. SBECs are very efficient and so don't produce much heat. Most ESCs that feature an SBEC will say so on the label. While SBEC circuits have components that manage the output voltage, this voltage will vary slightly as the load on the circuit changes (because of servo movement and aerodynamic loads on the control surfaces). If you use two SBEC-equipped ESCs in the same model, their output voltages will not be synchronized and the SBEC circuits will basically fight each other to regulate the output. That's bad.

When using two or more SBEC-equipped ESCs, you must disable all but one SBEC circuit. This is done by pulling the red pin out of the ESC-to-receiver plug. On larger, multi-motor aircraft, many modelers prefer to disable the SBEC on all ESCs (or use ESCs without a BEC, also known as "opto"), and use a separate, dedicated SBEC or battery to power the radio gear.

The BEC on this ESC has been disabled by removing the red pin from the receiver plug.

Hopefully, this information will help you avoid some of the common snafus with electric-powered models.

Ultimation Sander for Builders

by Ray Simon

Some DVRC members enjoy building planes from kits, plans, or scratch. For many of us that was the only way to get started and it can be an enjoyable part of the hobby.

I purchased a promising tool from Ultimation Modeling Tools. The company founder is a long-time train modeler who applied the notion that "necessity is the mother of invention". He wanted to be able to create wood stock with accurate angles for truss-built structures.

The product is called the Ultimation Sander. It's a hand operated disk sander that has a miter gauge that is accurate to ½ of a degree.

If you've ever used balsa to build a truss-style fuselage, then you know how hard it is to make tight-fitting angle cuts. For poorly fitting joints we may use more glue to fill in gaps. Sometimes we may add extra webbing. The result is a structure that is heavier, weaker, and typically not very square. And the final product is less satisfying because it doesn't have the craftsmanship that we intended.

Here's a Great Planes Super Sportster 60 which I'm building from a short kit. I wanted to build lighter than the original design which called for solid plank fuselage and tail feathers. I replaced them with trusses and reduced the weight of each of those pieces by 50%. You can see that the joints are clean and accurate. All the truss pieces and joint angles were made using the Ultimation Sander which helped create a lighter, stronger, and more finished-looking airframe.

The sander is fun to use and it definitely stepped up my game for building truss structures. It's not cheap at $225. If you want to learn more you can go to their website ultimation.ca

Crash of the Year

by Mel Nash

Mel shared these before/after photos of his Stinson Reliant. I think we can all say we know what this moment feels like!

…and there is still a lot of year left so maybe someone wants to give Mel some competition☺

DVRC Contacts

President: ***Nigel Watson;*** *(925)* 229-2336; Resolves questions on bylaws, policy, etc. Contact the president to get items put on the meeting agenda.

Vice President: ***Mel Nash;*** (925) 597-8142; If President is not available, same as above. Solicits items for and plans meeting program.

Secretary: ***Doug Schramm;*** (650) 922-1479; AMA dealings, keeps DVRC forms, records, correspondence. Takes minutes at Board Meetings and monthly Membership Meetings.

Treasurer: ***Ike Enriquez;*** (925) 759-5210; Collects dues, special assessments, other revenues. Pays expenses. Keeps financial records.

Board Members: All Officers listed above plus: Bill Selling, Phil Spina, Werner Hoch, Gordon Laporte, Marshall St. John

Membership Coordinator: ***Gordon LaPorte;*** (925) 997-0709; Maintains membership Manual. Sends out new member packages when requested and processes new members.

Field Manager: ***Ron Williams;*** *(925) 375-1494*

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Contact DVRC – PO Box 9411, Pittsburg, CA, 94565

USA F3F World Championship Team Selection Event sponsored by DVRC

by Miguel Navarro

Every 2 years an international rc racing glider competition called FAI F3F World Championship
is held representing as many as 20 different countries. Usually the year before the competition a USA Team selection event is held giving the Team a year or so to prepare for the event. Unfortunately in 2020 the competition was canceled due to the pandemic and the decision was made to have a new selection event for 2022. However this left little time to prepare and host the selection event and even less time to prepare for the championship in Denmark in October 2022.

As a little background F3F is a glider race using slope and sometimes additional thermal lift to race between two bases a 100 meters apart. There's typically an individual at each base clicking an audible beep so that the pilot knows they crossed the base and that they could turn around and go to the other base. An individual round is 10 laps completed and a time is given. The lower the time the better. To start a race a pilot is given 30 seconds to climb out and enter the course.

The gliders are usually carbon fiber and about 3m and can be ballasted up to about 10 pounds in strong conditions to provide maximum inertia and speed.

Because of my former membership in DVRC and friendship with Raymond Davis, I asked Mel about sponsoring the 2022 USA team selection event because AMA rules require that a local club sponsor the event. The main incentive to have the event in NorCal was to give NorCal pilots a fighting chance against SoCal pilots because almost all selection events have occurred in SoCal where they have a distinct advantage of knowing the slopes well. NorCal wanted to act very aggressively for hosting an event in NorCal and the slopes in NorCal are actually more representative of the slopes in Denmark.

DVRC club agreed to sponsor the event and I agreed to help DVRC with the website if it needed some work :)

The team selection event was held April 1-3 at Fort Ross, California, which is a historic site and recently a point of interest in the news as a Russian politician was demanding that we return Fort Ross and Alaska as reparations for all the sanctions we have placed against them.

My goal was to arrive two days early and get some practice in as there was some pilots at Socal trying to get some practice in. The wind was extremely strong and there was no shelter from the wind so it can be a little exhausting staying out there for multiple days. By the time Friday arrived I felt pretty good about my flying in strong conditions.

I started first, a little at a disadvantage because the winds build over time. During the first few rounds of the competition it became pretty obvious who the good pilots were in strong conditions and my strategy was to always wait for the beep and fly in the areas where I thought the most energy was. One critical mistake pilots can make is to make a cut. A cut is where a pilot in anticipation of a turn, turns before receiving the signal that they crossed the base and has to turn around and make a turn once again. Over the course of two days of racing I didn't make a single cut, although once I came close.

As the winds got stronger I changed my plane from a Freestyler 6 to a Freestyler 5 which is known to be a bit faster in strong conditions and ballasted my plane all the way to 160oz (10lbs). The plane felt almost light in these conditions.

After one day of racing 10 rounds I was barely the leader at the top, sneaking just ahead of one famous rc pilot Chip Hyde. I was a little surprised I was in the lead but I had done pretty well. The practice and preparation had paid off.

The next day it became evident we would finish the race, but the conditions would be much lighter. The big problem with the lighter conditions was that they were cycling too, so sometimes stronger and sometimes lighter and even within the same flight. So because of this
the scores would be tighter and success more variable and not exclusively dependent on pilot skill. I flew basically the same strategy as day two but with a much tighter and lower line because of the wind. Unfortunately I was first again, and we had numerous technical issues with the timing system, but I finally finished my first round after 3 bad attempts due to technical issues. I flew a little tentative because I didn't have a good sense of where in the distance the bases were.

After a few rounds it became clear that Chip and another pilot were fading in light conditions where I was holding strong. I kept flying well but a bit conservative and I still did well enough at times to beat the other pilots and create a reasonable safe distance between me and the other pilots that my place on the team was virtually assured.

After all the results were tallied up:

https://f3xvault.com/?action=event&function=event_view&event_id=2307

I was in first place and I had made the 2022 USA F3F World Cup team. Thanks DVRC for being the sponsor of the event!

Here is a little video that was made about the event, specifically Saturday:

https://youtu.be/RM1kD0g0nnE