A WHAT, HOW and WHY Demo with a Watt Meter. Calculating Flight Time, Operating an ESC with a Servo Tester and the Difference Propping Up a Size or Pitch Could do to your Battery or ESC and the importance of using a timer for flight.

So this is much like the issue of what came first, the electron or the need for it. We buy electric planes and use the prescribed (or bigger) battery and hope that everything works out fine. They do because it's an engineered power system and the one thing that mfg's now want is for you to have success. Why? More sales, period! If you enjoy it you'll buy more and have trust.

Then we break a prop that we find out is a 'special' prop that is designed for this model so we go to the hobby shop and get dismayed when they don't stock that prop from the ever so popular on line seller and the original is weeks to months away (even Tower Hobbies has this issue with special props on some of the Flyzone models). So in our best guestimation we say that the 'looks close to' 9" x whatever whirlie thing is very close to this 9x7 prop. So off we go and happily implant the new speed-o-prop on the foamy flying thing and all of a sudden it flies different, battery run time sucks and the battery is all poofed up??? Enter the watt meter….

Years ago I bought an AstroFlight Watt meter that will read up to 70 amp. For what I fly, that's plenty but the newer ones read at least 100 amp (That's serious electrons for me and my 2200 mAh LiPos, they'd run about 1min 30 if they're 45 to 50 C).

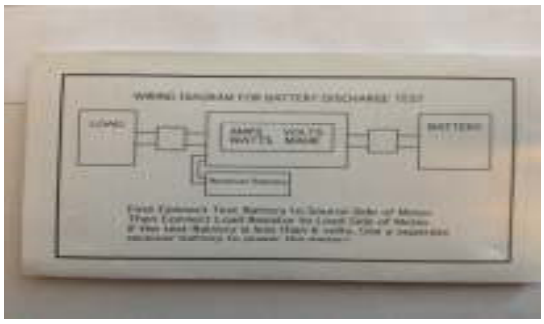
I paid over $50 for the AstroFlight but now HK has them for around $20. If you're into electrics at all it could be the best $20 insurance you ever bought.

So the point of it all is that the stuff on the original plane was engineered to not blow up the ESC, motor or batteries. But in the world of mfg, everything is super closely sized and matched so they keep their cost down, the prices to what the market considers affordable and grow their profit margin to the max. So changing that prop to what was available, seemed the same or maybe try to squeeze out a little more power can do you in for more than what it was worth. I remember a few years ago a member had a sea plane (with wheels also) with a center top pod mounted motor. It flew…. Lazily and lumbering along, but in reality it was probably close to scale. They aren't supposed to be aerobatic but an occasional roll or loop without teeth gritting altitude drop would be fun so he propped up 1 pitch. Probably from a 9x6 to 9x7. Flew great! Increased performance, roll nicely and power up for a loop. Battery life dropped more than expected, started dying quickly, he landed and the battery looked like it was pregnant, nice and round. That simple upgrade by one pitch put the battery (stock battery) over the C rating and puffed the battery up. The mfg engineering was that close. It probably only raised that amp draw by an amp or 2, but it was enough to exceed the C rating of the battery. If he had a watt meter and checked it, he could have avoided that.

Scenarios…..

Get the info on the plane such as ESC rating, Proper prop size (spares if you can), recommended battery type (mAh & C rating). The battery upgrade is the easiest as long as

there's room, a higher C rating most likely won't hurt anything. Higher C rating battery is heavier and slight larger for the same mAh so just be aware of that. Also, measure your battery compartment. Often the mfg only allows enough room for the specific battery so search that data well.

Hooking up the watt meter.  There is also a 4.8 to 6 volt std battery wire and plug available if your ESC doesn't include a BEC. **WHAT????** The ESC is the Electronic Speed Control and the BEC is the Battery Elimination Circuit. The BEC allows the smaller 10 to 50 amp (or so) ESCs do it all. Control voltage to the motor and feed the receiver that required voltage. When into higher amperage ESC, it can be necessary to provide a flight control battery (like in glow or gas models) to power the receiver.

If you are in the planning or building stage and don't want to hook up the receiver and program the radio you can use a Servo Tester like this to run up the ESC.  These can be as inexpensive as $8 and up to $25 to $30. It's all in what you want to do. This one has manual, neutral and auto on it. For running up the motor, attach the ESC servo type plug into a servo slot and BE SURE THE DIAL IS AT ZERO AND SELECT THE MANUAL MODE.

Use the dial to simulate the throttle stick on your transmitter. If your ESC has to see OFF first, dial zero and wait for chirp, then MAX throttle move dial clockwise until the next acknowledging chirp, dial back to zero to acknowledge OFF throttle position. Different ESC require a different arming sequence so as always, be careful and keep body parts clear of the spinning knives! Then rotate the dial up to max, read amperage and shut down. It is never recommended to run an electric brushless motor for extended times in a static position. Heat and bearing wear can ruin your motor but keep the hobby shop business alive ☺.

The servo tester can even test servos!!! What a great name for this device. Attach a 4.8 to 6 volt battery to the input side and attach your servo to any of the designated servo connection ports. Choose manual and you can turn the servo axis as far each way to check travel using the dial. Choose neutral mode and it will center the servo. Good for setting up your control surfaces without using the transmitter. Use auto and it will swing the servo both directions, use the dial to increase the speed of each cycle.

Calculating flight time per battery specs (mAh). Try this formula.. A 2200 mAh rating is 2.2 amp.

Multiply the 2.2 by 60, = 132. Divide 132 by your full amp load (17.2 for my P51) and it comes up 7.674419 minutes. Round to 7.7 at full throttle. Hopefully there's some throttle management. I use a 70% factor which is 7.7 x 1.30 = 10.01 minutes. For me this is almost exactly what I get battery life on the plane on a mild day. The windier it is, the harder the motor works (for the same performance) the more amps used, the shorter the flight. Easy Peezy..

ALSO…… running a battery too long, at or below minimum threshold voltage can permanently ruin a good battery… make it Mr. Puff!

For me setting the timer is critical. I always set the transmitter timer a minute or more shorter than the calculated time in case I have to do a ‘go around or someone else is landing, etc’.

I’ve seen some nice models go down because the pilot said they just fly until it feels mushy, then mush it right into the ground on the last loop, roll or can’t make it back to the runway. My 9303 has a throttle timer that controls the timer on/off at a minimum throttle that I set. I got this idea form a supplier Rick read about and installed on his 9303. My Spektrum DX7S has this built in. I usually set it to turn the timer to turn on around 20% throttle. I really feel that using the timer has saved me a lot of grief of going out into the field and picking up models and/or pieces.

This isn’t really much different than using the timer for glow engine fuel capacity. Final effect is the same, when there ain’t no glow, there ain’t no go.