FIRST IMPRESSIONS – MINIATURE AIRCRAFT ION

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COMMON SENSE RC 10S/4000mAH
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As a long-time advocate of electric RC, I am excited to see such rapid growth in virtually every area of electric RC. It has grown so much from such humble beginnings that I have witnessed in the '70s, where models were heavy, didn't fly long and were so specialized that their appeal was limited to the "tinkerers" of the hobby. I was equally excited to participate the continuing evolution of electric RC when I was asked by Common Sense RC to test a set of batteries on my Miniature Aircraft Ion, a helicopter in the 90 class size, which is designed around a 10s lithium power pack.

The Ion is one of best helicopters I have ever owned for its "right now" torque, smoothness and cleanliness. It was introduced to the market in 2004 to be the only production 90 size electric helicopter, designed to be the pinnacle of electric RC helicopter performance, and help break the stronghold that the Europeans have enjoyed for many years with the Logos and Jokers. It seemed right, as the market was literally exploding with micro electric helicopters to introduce the Ion at that time.

Like the Shogun and T-Rex, the Ion is designed around the Lithium-Polymer battery. Previous designs like the Hornet, Piccolo, ECOs, Logos and Jokers were first designed around the Nickel Cadmium batteries, and later adapted to Lithium-Ion, and then Lithium-Polymer. The primary advantage was a considerable weight savings, which yielded an immediate robust increase in performance and endurance.

The Ion flew extremely well with the stock configuration of 10s4p batteries in a two-pack configuration, but the downside was its weight, which was 11 lbs 4 oz. Switching to a UBEC and removing the receiver battery saved a couple of ounces, but its change was nearly imperceptible. Having 8 amp-hours of capacity meant a lower amp load per cell, but the added weight slows the helicopter down, requiring more power.

A couple of years ago during the AMA Exhibition in Ontario, I had a short conversation with Walt Ferar, who is the undisputed champion of the MS Composit Hornet, and he was introducing what seemed a radical change in the common battery setup, He had changed the established setup of a 3S/1200 mAh (which were max 4C at the time) to a 3S2P of 350mAh cells, rated at 10C, giving 700 mAh capacity, essentially trading off some endurance for performance. But by the time I was ready to jettison off my trusty ETech 1200s, Thunder Power batteries were introducing 10C packs in the 1320 mAH range.

Soon afterward, claims of 10 and 15C were surfacing, without a lot of testing and data to back it up. From an investment standpoint, the battery has value when you can get a reasonable (200-300 cycles) amount of use out of them.

Fitting the batteries

The battery dimensions are narrower than the stock 5s4p packs for the Ion, but are longer. There is an immediate advantage in that there is greater control over center of gravity, which was teetering on the aft limit previously. Each battery is covered with a temperature-sensitive tape that turns black when 170°F is reached, the max limit. I was quite surprised to hear that, since I have religiously kept my battery temps to a max of 120° F.

Even though these initial tests were with a 10S2P performance setup, the batteries have been tested in actual load tests of 60 amps continuous and 80 amp surges for 5 seconds every 30 seconds. I felt confident that it could handle just about anything I threw at it. Each battery pack is 6 ounces lighter than the previous battery pack, so I knew it would be performing better than it ever had.

First hover and flight

Startup was normal with procedures carried over from the previous setup. Governor off mode on the Hacker 77 Heli ESC, collective in the middle and switch to idle up 1, which puts the throttle command at 80%. During acceleration, the helicopter was constantly light on its feet, requiring slightly less pitch to keep it on the ground. After accelerating to 1825 rpm, the helicopter came off the ground at just slightly above half-stick. It was so light! After a brief visual check for security, the throttle came up to ¾ stick and it shot up effortlessly! I limited the collective pitch inputs as to not bog the head speed down. After a short series of rolls and flips, the helicopter needed only half the collective input as before, with no indication the model was breaking a sweat. It's lighter weight made it more responsive so extra care was needed against powering it too rapidly into a corner. After a while I found it necessary that the collective travel should be reduced in the radio slightly, which decreased its sensitivity in a hover and provided the same maneuverability as the previous setup. It was very gratifying to know that I was performing these maneuvers on less power! Autorotations were a joy as well, with the lighter weight; the helicopter had way more hang time than it did before!

After nine minutes of flight, it was time to shutdown. An initial reading of the battery temperature showed no more than 100° F anywhere on the pack. After recharging and balancing, the battery took in 3.6 amp-hours which left a 10% reserve, the minimum acceptable. The flight averaged 6.5C or about 27 amps, with great temperature control, which should yield a high number of charge/discharge cycles.

Overall, I am pleased with the results. I am looking forward to more testing as well as testing a 3p version of the pack. The fact that I could fly as long with a 2p pack as the previous 3p pack is an eye-opener in itself!