Hyperion Helios 63

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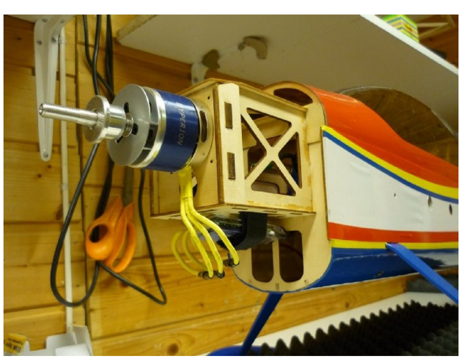
Key-figures Helios 63	
Manufacturer	: Hyperion
Model type	: Precision aerobatic
Wingspan	: 140cm
Length	: 145cm
Weight spec.	: 1.8 – 2.0
Weight tested	: 1.7kg without battery

Introduction

Every year after end of the competition season and when winter is approaching I put my competition models into storage until spring. Winter conditions in Norway are not suitable for the big and expensive models, one need smaller and cheaper models. Over the years I have had a lot of intermediate size models for winter flying, and my experience is that it can be difficult to find the best compromise between size and flying qualities. There is no question about it; the bigger models are better, they are far more stable and the control-response is significantly better. Currently I have more or less stopped flying with IC-engines and gone totally electric for my models, and for a while I have been looking for a suitable intermediate size electric model for winter use. There are a couple of promising alternatives, but some of them require batteries different from what I use on my other models. For this reason I decided to go for the Helios 63 from Hyperion, as this one is made for 5s LiPo's. This fits excellent with one half of the combined packs used for full-size F3A-models. In addition Hyperion has come up with both a motor- and a servo-set for this model, a good idea that enables an easy 'no-brain' completion of the model. In addition this model has an airfoil shaped horizontal stabiliser, a must to achieve a smooth and precise feeling on elevator control.

The kit



When opening the box one immediately sees that all parts are well packed in separate compartments. A more thorough inspection reveals good quality, light and straight parts nicely covered in sharp colours. The accompanying complete hardware package is of better quality than what I have seen in other low-price ARF's. Both the cowling and the wheel-pants are made of fibreglass and are painted in colours matching the covering, and even the aluminium undercarriage is painted in the same colour as the wheel-pants. The motor-set contains a Hyperion Z4020-14 motor for rear mounting, a Hyperion Titan 80A ESC a propeller and a spinner. The servo-set contains 4 Hyperion DS16FCD servos that fit's perfect in the prepared mounts, and all necessary extension cables to hook up both the aileron-servos, and elevator- and rudder-servos in the tail of the airplane.

Assembly

There is not much to say about the assembly process, it's rather straight forward and on par with most other ARF's of today. As previously mentioned I liked the hardware that was supplied, they included ball-links and stiff metal pushrods. The parts fit well together with only minor adjustments needed to get them together properly. All control surfaces are pre-slotted for CA-type of hinges, not my first choice in hinges although I have to admit that they work well and have never failed me. The motor fits directly to the plywood motor-box that are prepared with right-thrust. Beneath this box there was room for the ESC, this way both are well exposed to cooling air entering through the openings in the cowling. On the bottom of the fuselage one has to cut open a hole to let the heated air out. My plan was to use the half of F3A batteries in this model, even though smaller ones are recommended. There are plenty of room for the bigger ones and it turned out to be the right choice with respect to where the centre of gravity ended. With the suggested size batteries the model would have become slightly tail-heavy. Sure, with the bigger batteries the all up weight surpassed the manufacturer indications, by following the recommendations it would have been spot on. I must say then that even with my heavy solution the all-up weight and thus the wing loading is far from being anywhere close give a negative impact on flight performance.

Preparation

Before flying a new model it is important to spend some time with the initial set-up, this includes CG position and basic control throws. To get this kind of models to roll properly it is vital to start with equal throws both up and down on both ailerons. This task has become much easier after I acquired an *AnglePro* digital incidence meter. By utilizing the measurement unit only and placing it onto a control surface it's easy to measure the throws with sufficient accuracy. A piece of Du-Bro foam (no 514) between the meter and the surface avoids it sliding off, even at extreme throws. If the throws are not equal it is due to errors in the geometry between servo and surface. For the best result this must be corrected by changing the length of the pushrod and re-centring of the surface with the sub-trim on the transmitter. In the documentation that came with the model I found recommendations to the surface throws, to my eye they looked way too big for precision flying, so I set up something

more similar to what I am used to on this kind of models. Test flying proved me right, even the reduced throws that I started with was way to big to enable the type of smooth and precise flying this model is meant fore. It seems that Hyperion has just copied the recommendations from the documentation for their 3D-models. The best precision is achieved when during normal aerobatic flying the full range of the sticks on the transmitter is utilized. If bigger throws are needed for manoeuvres like snap rolls and spins it is better to configure this as separate flight-modes on the transmitter and select it when needed only. My old and trusty Graupner MC24 and several other new transmitters also have the possibility to switch flight modes automatically (no user operated switches) when defined stick positions are reached. For this you will need 6 stick-operated switches and a possibility to configure a set of so called logical switches that combines the stick operated ones into one that does the actual mode switching.

Test-flights

The maiden flight took place on a beautiful winter day just before my home field got covered in loads of snow. When testing the motor at home with the APC 13x6.5E propeller that was part of the motor-kit, I felt the power and current consumption to be on the low side. The first flight showed me that I was right again; there was just not enough power for serious aerobatic flying. In spite of this I got a positive feeling for the flight characteristics of the model. With a detailed study of the PR-material for this plane/motor combination I detected that the recommended propeller is actually an APC 13x8. On the next day of flying I used this size prop, and the power was definitely more to my liking. Still it was a little bit less than what is needed for practicing the F3A schedules. Since am running bigger batteries than recommended I am able to extract even

more power and still maintain sufficient flight times per charge, so I decided to experiment some more with propeller size. I tried both 14x7 and 13x10 APC-E, and for my typical flying I prefer the 13x10. This one enables me to fly at reduced power and proper speed in horizontal flight, and then to apply full power to maintain good speed in the verticals. This is exactly the same way of throttle management used on the big F3A-models. After the testing in flight I performed a static test with the tested propellers, all done on the same day with a freshly charged battery, the results are presented below.

Propeller (APC-E)	Current [A]	RPM [o/m]
13 x 6.5	38	8900
13 x 8	43	8650
14 x 7	51	8300
13 x10	60	7900

On one flight with the 13x10 prop I hooked up a logger (Hyperion Emeter-2 RDU) while flying through the P-09 F3A schedule. The maximal recorded current consumption during the flight was just over 50 [A] and the consumption for the flight was just below 3.5 [Ah]. This is Ok when using big batteries as I do, with recommended batteries it is better to use the 13x8 prop to maintain a reasonable flight time per charge without the risk of running the batteries too far down. The idea here as always is to test different combinations to find the optimum solution for the type of flying being done.

Fine-tuning

After a few flights with fine-tuning of control throws and adding a couple of free mixers the Helios63 proves to be a well flying model. For normal aerobatic flying, I have ended up with the following configuration:

Control	Throw [°]	Expo [%]
Rudder	17	10
Elevator	9	25
Aileron	9	20

As I extract more power through a bigger propeller I find the build in right-thrust angle to be a little bit too small. So far this has been solved with a mixer from throttle to rudder that kicks in from half throttle to the top. A mix for this is not as good a solution as offsetting the motor more, but as the maximum mixing contribution is only 3% I think I will leave if like that for this model. The location of the centre of gravity has an influence on several model characteristics, often these are in opposition to each other.

In these cases one must prioritise between them according to personal preferences, and maybe accept some compromises. I prefer to have my main focus on how the model tracks ascending and descending 45° lines, on many models I then have to add some mixers to make the model go straight in knife-edge flight, or maybe some compensation in vertical descending lines at idle is needed. The Helios63 is actually quite good in this respect, with the big batteries I ended with a CG that makes the model go straight in knife-edge flight, and hold the 45° lines well, but it requires a couple of % down-mix at idle to go straight down. It also needs a slight mix from rudder to aileron (same direction) to not roll into inverted flight from knife-edge, an indication of a wing with not enough dihedral. All of the described mixers are really small and something that one can easily live with.

Conclusion

As with any model this one requires some fine-tuning and tinkering to perform it's best. For everyone that is willing to spend some time on this, the Helios63 will prove to be a well flying model. And even if I use it for off-season practice and fun, it will for sure not be the limiting factor for anyone that wants to improve basic skills in aerobatic, or even enter competitions in one of the intermediate classes.