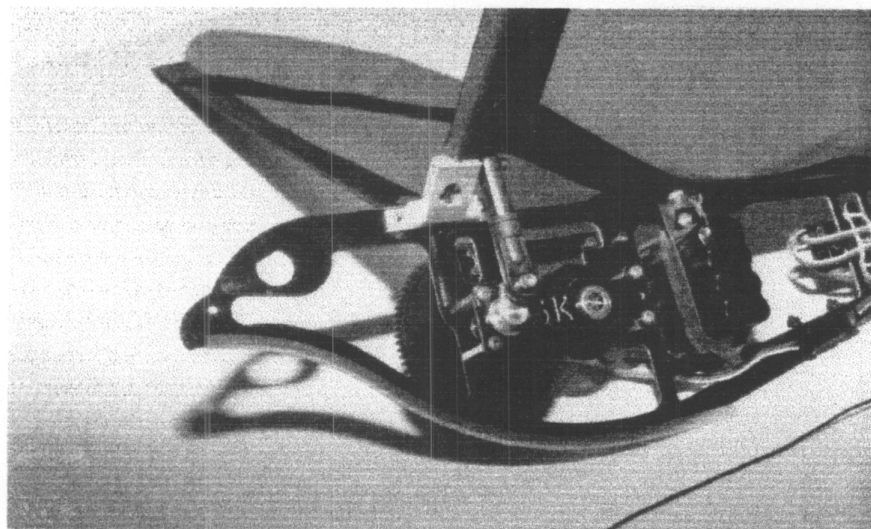


# Flapping Wings

THE ORNITHOPTER  
SOCIETY NEWSLETTER



## Kinkade RC Park Hawk

Reviewed by Nathan Chronister

**S**ean Kinkade is now taking orders for his latest radio controlled ornithopter kit. The second radio controlled ornithopter kit produced by Kinkade, Park Hawk is a well-built machine with many advantages over its larger predecessor. Sean's Skybird kit, introduced in 1999, was a superb machine, but it was almost too much of a good thing. Its enormous size, considerable price, and the use of an internal combustion engine all made it less accessible than the new Park Hawk. Now, for \$199, you can order a beautifully made ornithopter that can be flown in a small field at the flip of a switch!

If you think that sounds expensive, stop comparing the Park Hawk to fixed-wing aircraft. Your money gets you a precision, custom-built gear train and flapping mechanism, a CNC-machined composite airframe,

and a fairly complex wing that's been hand-made to exacting specifications. The wing spars are solid carbon rods, and the ARF kit comes with a powerful Speed 300 motor and, as a limited-time special offer, the 720 mAh, 8-cell NiMH battery valued at \$30 is included free of charge. Thanks to the large degree of preassembly, I had my Park Hawk ready to fly in only five hours, and much of that time was spent staring in awe rather than actually building the thing. The Park Hawk uses a profile fuselage of G-10 composite material that feels flimsy but is extremely durable. I've subjected this machine to some pretty hard landings, and I've never inflicted any damage!

### Ordering your Park Hawk

Each Park Hawk is built to order, so you won't get it overnight. That gives you time to get together the other items you'll need, including a radio, micro receiver, two sub-micro servos, a battery charger, deans connector for

charging, and a speed control. Some of these items might be available from the manufacturer. You'll also need various tools: screw drivers, hex wrenches, drill, soldering iron. The original Park Hawk required a 2-56 tap, but recent design improvements render this unnecessary.

Hitec Feather or GWS micro receiver are suitable. Sean recommends a GFS 10 amp speed control available from Mikro Designs, Inc. or Radical RC. You can also use a Great Planes Electrify C-10 speed control. You can choose two sub-micro servos for the tail. Hitec HS-55 or MPI MX-50HP are recommended, and the latter has more torque. This is the lightest setup, but Sean recommends using a larger, HS-81 servo for the rudder function if you will be flying in any wind. This is because the tail is mounted directly to the servo wheel. The larger servo will shift the balance point back, and that will affect the flight as described below.

Having a good charger is important. I started out with a Great Planes Electrify peak charger, but it didn't work properly with the Park Hawk battery. Then I got a WattAge PF-12 AC/DC Peak Charger, which didn't cost much more, and that allowed me to charge the battery fully and in less time. When shopping for a charger, make sure it can peak charge NiMH packs and that it can handle eight cells. Performance will be lower than normal the first few times you use the battery.

The Park Hawk is available in a lot of different colors. Check with the manufacturer to see which ones are

currently in stock, and this will shorten your wait. I chose black because I wanted my Park Hawk to look like the raven in the OS logo. The problem with black is that no one will notice you are flying an ornithopter. From a distance, people will think it's a crow and not give it a second glance. Therefore, white might be a better color if you want it to look natural, or opt for one of the brighter colors if you really want to attract attention. Increased visibility also makes it easier to fly.

The Park Hawk sells for \$199.00 plus \$10 shipping to US residents. If you're not in the US, you'll have to find out the shipping for your area. Order from Kinkade RC, 1889 Cherry Lane, Mt. Dora, FL 32757. The phone number is 352-383-6721, or if you have questions you can E-mail [thopter@earthlink.net](mailto:thopter@earthlink.net).

### Assembly

The instructions were clear and easy to follow, and Sean plans to include some assembly photos in future releases, though I didn't even need them. Sean continues to improve the design, so your Park Hawk might be simpler and lighter than the one I got.

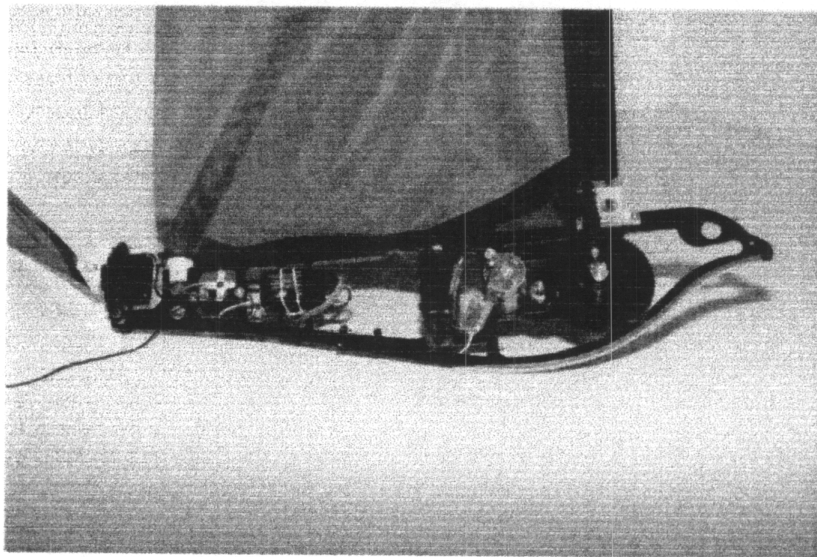
The Park Hawk comes with a really neat circuit board with noise suppression capacitors. This was really easy to install onto the motor. Just make sure the "tail" is soldered onto the motor case securely and that the motor tabs are soldered to the board. Heat-shrink tubing is provided for some of the solder connections. Keep it a good distance from the solder joint or it will shrink prematurely. Hold the iron near the tubing, but not in contact, to shrink it when the time comes.

The unique tail assembly gives the Park Hawk a very bird-like appearance. The tail moves up and down for elevator control, and it tilts side-

ways for directional control. The tail mounts directly onto the wheel of the "rudder" servo. This whole unit - rudder servo and tail -- is mounted on a hinge, so it can tilt up and down when acted on by the elevator servo. Don't worry if there is a little play in the tail mechanism. It works great!

### Flying

The Park Hawk is easy to fly, but it doesn't handle exactly like a fixed wing aircraft. For one thing, the flapping motion of the wings can make it hard to judge the orientation initially. You'll adjust to it, though. The elevator function mainly regulates flying speed. Pulling back on the stick causes the ornithopter to fly slowly. It does not make the ornithopter climb. Too much "up"



elevator will actually make the ornithopter descend, perhaps because of partial stalling of the wing in this slow flight mode. Pushing the stick forward increases the speed of the aircraft.

I opted for the larger rudder servo, which moves the balance point back a little. Therefore, my Park Hawk needed a little down elevator to climb properly! I adjusted the servo wheel so it would climb with the stick in its neutral position.

The Park Hawk has a special mechanism to lock the wings for gliding. Obviously, it isn't going to glide as well as a fixed-wing aircraft, but you can get it to glide to a soft landing. As you throttle down, not too abruptly, the wings will lock in the mid-downstroke position for gliding. If the wings stop in a V position instead, throttle back up again. Don't try to glide unless you are high up, because you can lose a lot of altitude in the transition. You'll probably get a better glide if you use the smaller tail servo.

You can also land with the wings flapping. To descend, you simply reduce the throttle. If the ornithopter starts to porpoise due to inadequate

flapping rate, throttle back up a little and it will smooth out. If you're used to flying fixed-wing aircraft, you might be in the habit of cutting the power altogether at some point during the landing approach. With an ornithopter, you have to keep the wings flapping until the moment it touches down.

The Park Hawk achieves its strong flight performance through a combination of good design, a powerful motor, and light - weight

construction. The light wing loading allows you to make dramatic close fly-bys at low speed or climb hundreds of feet into the air, but this same feature means you shouldn't fly in breezy conditions. As with any slow-flying aircraft, you need to be careful about unseen high-altitude winds. As you ascend, keep noting the groundspeed of your aircraft. If it flies more slowly on a certain heading, there is significant wind and you should avoid flying downwind. If you do find yourself getting downwind of the flying field, simply reduce the throttle and drop until you're out of the wind. With an airplane, you would handle this situation differently: full throttle, stick forward. If you try that with the Park Hawk, it may continue climbing!

There's nothing like the sight of an ornithopter hovering on a breeze three hundred feet overhead or flying past you only feet away, and you'll definitely get a lot of attention with the Park Hawk. People stand at the edge of the field and watch, or they drive by for a look and say things like "That's pretty neat!" or "That looks just like a real bird!". People who wouldn't look twice at a model airplane are drawn to the ornithopter because they don't know what it is and can't believe their eyes. And the best part is, even girls think it's neat.

#### Park Hawk specs

Aircraft type: RC park flyer  
 Motor: Speed 300 electric motor  
 Battery: 8 cell, 720 mAh NiMH  
 Wingspan: 48 inches  
 Length: 28 inches  
 Weight: 14 ounces  
 Channels: 3  
 Flight time per charge: 6 to 9 min.  
 Wind speed: 0 to 4 mph  
 Flying area required: soccer field or larger

## Translators Needed!

**A**s the world turns into a global village, we the ornithopterists are also expanding our horizons. However, the language barrier still presents a sizable obstacle. A Russian team led by Vladimir Toporov has produced a great volume of research. They have also built and test flown many manned ornithopters. However, all of their work is recorded in Russian. Are there any OS members that can translate these works for us? Furthermore, the French ornithopter organization URVAM has supplied me with their periodic newsletters, but I cannot read French. Do we have any OS members that are also Franco-phones?

## From the editor

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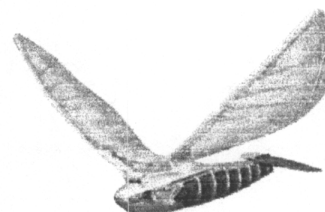
[ornitech@yahoo.com](mailto:ornitech@yahoo.com)

Let's hear more about your projects, experiments, successes, and failures. Perhaps you built an unsuccessful ornithopter many years ago and never mentioned it? We want to see failures, so we know what doesn't work!

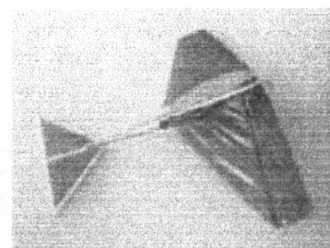
I have been entertaining the idea of an OS conference. Perhaps it can be done in tandem with URVAM? How many of the members would participate? Where should it be? What should it feature? When? There are so many questions to be answered, send me your thoughts.

## NEWSFLASH

Courtesy of [www.ornithopter.org](http://www.ornithopter.org)



**S**pinmaster released a compressed-air powered ornithopter. Available from [towerhobbies.com](http://towerhobbies.com) for \$29.99.



**N**athan Chronister has developed a micro electric ornithopter that uses wing tension to control roll and pitch



**U**C Berkley is developing a micromechanical flying insect. It weighs 1/10th of a gram and uses piezoelectric actuators for power.

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***Ornithopter Society***  
***Membership Info***

**Join the Ornithopter Society or renew your membership:** Dues are \$12 per year in the USA. Dues outside the USA are \$17 US per year. Checks are payable to *Sean Frawley*.

**Get published:** Sean Frawley, editor of *Flapping Wings*, invites you to send your articles and photos to be published in this newsletter. Send your material to the address above or E mail it to [frawley@warwick.net](mailto:frawley@warwick.net)

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