

E-Flite's Blade CX Twin-Rotor Helicopter

Every Person's Helicopter

by Frank Granelli



For many years, RC helicopter flying was best left to those pilots choosing to devote most of their RC flying hours to piloting aircraft held in the air, despite common sense, by whirling wings about 2 inches wide. Setting up a helicopter with the proper trim, gyroscope tuning, blade pitch and collective throttle control was a daunting task to would-be helicopter pilots. And flights attempted without setting everything correctly beforehand usually had a quick and expensive ending.

Fortunately, the RC helicopter community was always friendly, outgoing and eager to help the would-be helicopter pilot get started. Our sport has tens of thousands of pilots more than willing to help new flyers in every field of model aviation. But the Helicopter fraternity probably has the highest percentage of such instructors of any RC Special Interest Group (SIG). Considering the expense and problems involved with getting started in whirly flight, this is a good thing for this part of the sport. Without the high instructor percentage, the slow growth of model helicopter flying might not have happened at all.

But the last few years have seen a major change in the helicopter world. The high percentage of instructors is still there, but the helicopters themselves have changed. All helicopters are now much easier to setup and to fly. But small electric helicopters have made flying these machines just as easy as getting started in fixed-wing RC.

Helicopters like the E-Flight Blade CP arrive completely setup and factory-trimmed. They are ready to fly. While these collective pitch helicopters are initially set for non-collective flight, the easier kind, they may be quickly converted to full collective flight. Collective flight can allow auto-rotation and inverted flight and is best for aerobatics. However, even when set for non-collective flight these electric helicopters, just like fixed-wing basic trainers, still require an instructor to insure a successful learning experience.

Helicopter instructor pilots are not always available to everyone. In addition, not every potential helicopter pilot is ready for a full commitment to helicopter flight. Many fixed-wing RC pilots would just like to have a helicopter or two to fly around indoors when the weather outside is frightful.

For these pilot's, the new Blade CX is the perfect introduction to helicopter flight. The Blade CX employs twin rotors to make indoor helicopter flight easy, maybe too easy, for every RC pilot who can fly a basic fixed wing trainer. There is nothing to flying the CX. It might even be possible for a non-pilot to fly this machine with a good pre-flight briefing.



Photo 1 Photo 2

Inside the attractive Blade CX box, which doubles as the carrying box for the helicopter, is everything needed to get the helicopter into the air. The helicopter itself arrives fully assembled and factory tested. It is completely ready for flight and factory-trimmed. Power is supplied by an E-flite 7.4 volt, 800 mAh Lithium Polymer (Li-Po) battery (photo 4).

(Ed. Note: Photos 3 through 8 are from Horizon's website because they take better photos of these little parts than I can. But their photos perfectly match the test machine and parts used in this review).



Photo 3 Photo 4

The battery's charger (photo 3) needs a 12-volt power source to operate. The charger's 500 ma output is approximately .625 C, C being the battery's 800 mAh capacity. This is a very safe current that balances the pilot's need for a quick recharge in order to fly again with the very real need for charging safety and to prolong the life of the battery pack. From what I have been told, the lower the charge rate, the more charge cycles the Li-Po battery will last.

If the battery were fully depleted, about 96 minutes would be required for a full recharge. Fully depleting a Li-Po battery however usually means battery life will be drastically shortened. A Li-Po battery should never be discharged below the 3-volt per cell level or damage may occur. In practice, the pilot is required to land the Blade CX when nearly full power is required just to hover.



Photo 5

Recharging from this point requires just about one hour. Since this helicopter is so much fun to fly, you may want to purchase a second battery (photo 5) so you can fly on one battery while the other is recharging. Horizon Hobby offers a second battery for about \$27. Another convenience would be purchasing the optional 120 VAC power supply for the charger (photo 5). The Blade CX is primarily an indoor helicopter so using AC current to replace a bulky 12-volt battery just makes life easier. Horizon offers the AC power source for about \$20.

The 36-page instruction book is excellent. It not only provides all the information you need to get safely airborne, it also has sections on fine tuning the trim, flying instructions and maintenance information. There is also an instructional CD but it can be difficult for some computers to run. If your DVD player or DVD/CD computer drive will not open the video disk, follow this procedure:

- 1) Put the VCD into your CD Rom (or DVD Rom) Drive
- 2) Double-click on the **"My Computer"** icon
- 3) Double-click on your **CD Rom Drive** (often D:)
- 4) Double-click on the folder named **MPEGAV**
- 5) Double-click on the file named **AVSEQ01.DAT**
- 6) If you get a "Caution" window, click on the **"Open With"** button
- 7) When the **"Open With"** dialog box comes up, select the **"Windows Media Player"** then click the **"OK"** button

The disk contains information about setup and flying, but is mostly an excellent video of the Blade CX flying. The video specifically mentions that the Blade CX can be flown outdoors in light winds. This is interesting. Many micro-helicopters cannot do this unless there is no wind at all.



Photo 6 Photo 7

The Blade CX is powered by a pair of brushed, 180 series motors (photo 6). These provide plenty of muscle. The Blade CX will lift off using only about 50% throttle and is fairly fast when you get it going (more on this later). Horizon offers a motor heat sink, (photo 7) to provide extra cooling in case the pilot wants to fly a flight, change the batteries and fly again immediately. In electric flight, running cooler usually translates into a longer operational lifetime. At \$4.00 for the heat sink and \$2.00 for the adhesive, the improved cooling system is a great buy. Complete installation instructions are already in the instruction book. I intend to order one for this helicopter because it will be flying a lot.

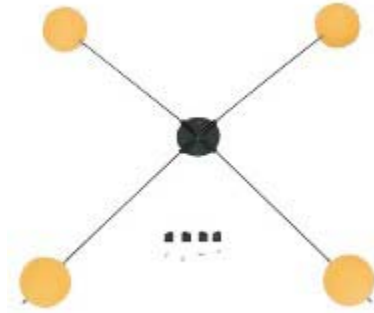


Photo 8

There is one other optional part you should consider. If you have never flown an RC helicopter before, get the optional Trainer Landing Gear set (photo 8). It sells for just \$10.00 and looks very easy to install. The booklet has complete instructions. This landing gear reduces the chance of tipping the helicopter over on its side during a landing that is moving sideways. If that happens with any helicopter, it usually means replacing a blade, or two, and possibly damaging the top rotor head. While both these parts are available as replacements, not breaking them in the first place is the best method.



Photo 8a

Two micro-servos, E-flite's EFLRS75 High Speed, High-Torque servo, are factory installed. Better known as the "S75", these servos weigh just 7.5 grams each and are most commonly used in micro aircraft like the mini-Funtana and various "Foamies." They are more than powerful enough to move a few levers on the Blade CX. Their quick response and accuracy ease the pilot's tasks.

Assembly?



Photo 9

The first step is to charge the battery. The charger in photo 9 is being powered by the 120 VAC adaptor. Note that the battery is being charged through a separate charging lead, not through the power connection (small red connector). The supplied charger is a balanced charger using Charge Protection Circuitry to prevent accidental overcharge. The charger independently senses each of the two individual cells. It can reduce the charge to one cell that is nearly full while the other cell continues to be charged at a higher rate.

This is an important safety feature. If one cell of a Li-Po battery is full while the other is not, a non-balancing charger will continue charging both cells at the same amount. The result could be that the overcharged cell will catch fire. You do not ever want to have a Lithium cell catch fire. Such a fire is nasty in the extreme.

- The fire burns at a temperature of over 1,000 degrees F.
- The fire is really caused by a violent reaction of the Lithium with air's moisture and oxygen. Putting water on the fire just makes things worse.
- A Class C fire extinguisher will put out the fire. But the fire immediately reignites as soon as any uncovered lithium again finds moisture in the air.
- Anything flammable within about two feet of the battery will ignite from the very high temperatures involved.

It is important to note that all *small electric helicopters are powered by Li-Po batteries*. These warnings apply to every one of them, not just to the Blade CX. The Blade CX instruction book has three pages devoted just to charging the battery. Read them and follow the instructions.

You will also note that the battery in photo 9 is being charged while out of the helicopter. Always remove the battery for charging just in case. Not only might the helicopter be lost, but its burning could ignite more flammable items nearby. *(Ed Note: I know, I know photo 9 shows the battery being charged while on a flammable background. This was just for photo purposes and the "charging period" lasted less than two minutes. The battery is usually charged while in an empty metal ammunition case. It just was not possible to get a good photo of the lit LED's while inside the small ammo box.)*

Remember, if you follow the directions, charging a Li-Po battery is safe and easy. E-flite makes charging even safer because it provides a balanced charger. Always use the charger supplied and there will not be any problems. Use this charger only on Li-Po batteries with the same balanced charged lead, the exact same 800 mAh capacity and the same charging characteristics. In short, use it only on other E-flite 800 mAh batteries and vice versa.

Photo 9 shows the charger with both the green and red LED's lit. This is the normal charge appearance. A flashing red LED means the charger is powered but no battery is connected. A steady red LED indicates a fully charged battery. Flashing red and Green LED's mean something is wrong. Disconnect immediately and investigate.



Photo 10

After it is fully charged, affix a small section of the hook and loop tape provided in the "kit". The opposite side of the tape is factory installed in the helicopter. Study photo 10, enlarge if necessary, and note that there is a piece of black plastic on which the factory tape is installed. Make sure that the battery power and charge leads are positioned on the side towards the opening left where this plastic piece does not extend to the other side. The photo shows this better than words.

The instruction book says this as well but puts the opening on the left side of the model as seen from the rear. Their illustration shows the battery label pointing away from the helicopter body. Not on my sample. The caution label has to show in order to get it right. The wires must go through this small opening or it is not possible to lock the battery in place. Go slow and be careful and there will not be any problems.

Getting Ready and Flying



Photo 11

The ELFH 1025 receiver is housed in the "pilot's" compartment. This receiver is a combination 4-channel FM receiver with a motor mixer and speed control (ESC) installed combined with a piezo gyroscope to help keep the helicopter pointed in the right direction. This is a remarkable piece of equipment; only a little more than one inch long and weighing less than 2 ounces. This receiver and the twin rotors are the secrets to the Blade CX's amazing flying ease and performance.

The gyro and motor mixture settings are adjustable if required. The instructions cover all the details. But this machine flew right from the start and never needed any adjustments. The instruction book also mentions checking the blade tracking meaning that both blade pairs rotate in the same plane. The blade tracking was perfect so there was no problem. Adjustment procedures are detailed if they are ever needed.



Photo 12 Photo 13

Photo 12 shows the Blade CX and its transmitter just before the first flight. You do need to install 8 “AA” alkaline batteries into the transmitter. We checked the balance by lifting the helicopter by the center of the top rotor head. If the battery had been placed too far aft, the tail would have dropped. But the helicopter stayed level so we are ready to go.

Even just sitting on the floor, the Blade CX had that “fast and mean” look that most pilots love. They say that an aircraft will fly right if it looks right. If true, the Blade CX should fly great because it does look just right.

Before flying, the aircraft’s gyro must be set for straight and level flight. This is automatically done when the battery is connected. Always turn on the transmitter first and then extend the antenna. Make sure that the throttle stick and the throttle trim lever are both all the way down towards the bottom of the transmitter. This is the extreme low throttle setting.

Then connect the battery lead. The helicopter must remain motionless during this 4-5 second startup period. I put one finger on the skid to make sure there is no movement. An LED initially flashes red as a warning that the gyroscope is about to align itself. This gives you a few, very few, seconds to put your finger on the skid. A flashing green LED is seen as the gyro aligns. The Blade CX is ready to fly as soon as the flashing green LED becomes steady.



Photo 14 Photo 15

Put the helicopter on the floor (ground?) and stand back a few feet. When I slowly advanced the throttle first the bottom blades began spinning followed by the upper ones

once another “click” of throttle was added. The blades rotate in opposite directions which eliminates rotor torque that can spin a standard helicopter, without using a tail rotor.

Adding more throttle, just a little, brought the 8 oz. Blade CX into a low-level hover (photo 14). It immediately started to rotate, moving its nose to the left (photo 15). Two “clicks” of right rudder trim stopped that. The Blade CX stayed in the hover without further trimming. After flying two other micro-helicopters a total of 18 flights, I was now an expert chopper pilot. Yeah, right. Excuse me for a second while even I stop laughing.



Photo 16



Photo 17

But the Blade CX just hung there as if I knew what I was doing. Small, very small, control inputs were immediately followed by the proportionate response. Feeling confident, I sent the helicopter forward across the school cafeteria. It moved out slowly as that was what the control input said to do. Twin rotor helicopters are not meant for fast forward flight (more on this later too) so 1-2 mph forward was all it was told to go.

The Blade CX went forward with no complaints, remaining on course all the way. The photographer moved to the other side and snapped photo 17. Despite the look on my face, I was really having a good time. The grimace and expert body language were caused by the photographer moving before I was ready. The Blade CX may have made everyone else think I knew what I was doing, but I still wasn't sure. For those who must ask, leaning to the left *does* make the helicopter move left more quickly. So there!



Photo 18



Photo 19

Whether flying backwards or forwards, the Blade CX seemed unusually at home and did not exhibit any handling problems. I gained some altitude and started moving it around the room. After nearly 2 minutes, I did notice one change. As the motors heated up and the battery lost its high initial “surface” charge, the rudder trim changed. Instead of requiring right rudder trim, it now needed about half of the available left rudder trim to fly in a straight line.

I am told by true helicopter pilots that trim changes in micro-helicopters as the motors heat up is common. My limited experience with other such machines tends to make me

agree. But the Blade CX's trim change only occurred once, rather than constantly varying over the entire flight. After a few flights, I found it easiest to leave the left rudder trim in place at the takeoff and just hold a very slight amount of right rudder using the transmitter stick for the first 60-90 seconds.



Photo 20

The Blade CX is so easy to fly that holding an extremely small, very tiny, really, really little amount of right rudder for 90 seconds or so just was not a problem. Even out of trim, landing the Blade CX on a table posed no problem.



Photo 21



Photo 22

On the second flight, after a quick battery change, I started moving all around the room. The cafeteria is about 40 ft. x 100 ft. with a 9-10 foot high ceiling. Control was easy and I was really enjoying the flight. On one flight, I hit the throttle just a bit too hard and bounced off the ceiling tiles, some say off the light fixture but it should be on one of the videos so check to be sure. The Blade CX had only the stock plastic rotor head, an anodized aluminum rotor head is available as an option, but still did not sustain any damage from the collision.

It was on this second flight that I began to notice something unusual. The Blade CX was flying forward and backward with no problems or changes in the flight path. Even at around 5 mph, the helicopter just kept flying along as stable as if it were just hovering. Just as I was noticing this, it was time to land as the club meeting was starting.

After the meeting had ended, I took the Blade CX into the now-empty gym. Three school basketball games had kept the gym bouncing before and during the club meeting. I placed the recharged Blade CX on the floor and went into a hover. At about 15 feet high, I pushed the "elevator" stick half forward. The Blade CX stepped out at about 10 mph in a strait line. Initially, I only needed to add some extra throttle to maintain altitude. As the forward airspeed built up, even that was not necessary.

This is not supposed to happen. Twin rotor helicopters are not famous for their forward flying abilities. But even at 10 mph, the Blade CX handled easily and remained stable. As can be seen on the videos, this is an amazing helicopter.

A true helicopter pilot was there. Dean Digiorgio is a member of the JR Scale Team but has many hours pushing rotorcraft around the sky. He really put the Blade CX through its paces and some of it is on the video. Dean's appearance was totally unplanned. He had just moved back North after living in Florida for years and was looking for a club to join. I didn't know him but learned that he can surely fly helicopters. Portions of his flight are on the videos.

The Blade CX differs from other twin-rotor helicopters in two respects. The rotor blades are spaced more closely together vertically than most other twin-rotor micro helicopters. In addition, small "turbulator" strips are molded into the top of each of the four blades. These small ridges run the length of each blade in a zigzag pattern.



Photo 23

With the blades spaced more closely together, it is possible that the destabilizing effect caused by two different rotor pitch angles during forward flight has a reduced effect since there is less distance amplifying the top rotor's force. This is just a guess but should be accurate. The turbulator strips are nearly impossible to photograph but photo 23 gives a good hint. Another guess would be that these strips help to reduce the extra lift usually generated as a rotary wing moves forward in flight. Eliminating some extra lift might make the Blade CX easier to fly forward than would otherwise be the case.

For whatever reason, the Blade CX enjoys forward flight. If its indoor performance is any guide, the Blade CX should be able to handle outdoor winds up to about 4-6 mph. This is excellent performance for an indoor, training helicopter.

Summary



Photo 24

For \$180.00, any fixed wing RC pilot can explore the world of rotary flight with little pain and greatly reduced risk. This aircraft is easy and fun to fly, tough to hurt and looks sharp. There is even a separate police body available (photo 24, *again stolen from the Horizon website-Ed.*) should you ever get bored with the original sharp yellow and black design.

For more information about this excellent beginner's helicopter, please go to:
<http://www.horizonhobby.com/Products/Default.aspx?ProdID=EFLH1200>