**A Guide To Learning How To Fly Remote Control Helicopters**



Fly your helicopter is not quite as simple as it looks. We have all seen the pilots when were newbies and thought that looks simple. Then you try it on your own remote conrol helicopter and find out to your frustration, that it is not simple after all. Follow these guidelines and we hope you will be up in the air and in control in no time.

Before we start, it is traditional here at heliguy for other pilots to share their [Learning Experiences Of Flying](http://www.heliguy.com/Discuss/Learning/1/). These are great tips for all newbies and we recommend that you read them as well.

**Simulator First**

Following these guidelines when using a simulator will improve your performance in real life.  
My actual flying tips are based on the idea that you have infact used a simulator and have familiarized yourself with the charecteristics of rc flight. There are many unexpected things you will encounter if you don't have a simulator that are not listed here. I can not stress the usefullnes of a simulator enough. You may think they're expensive, at 160 to 230 dollars, but I guarentee you they'll save you that much in parts as well as time learning how to fly.

* The simulator is not a game. Each time you crash could end up costing you hundreds of dollars. Yes, it is going to happen and it's fun some times to see what you can make it do, however, do not get into the habit of watching the helicopter fly into the ground. Fight it to the end and try to recover as hard as you would if a thousand dollars were riding on it. You are trying to form GOOD habits here, not bad ones.
* Don't let the helicopter hit you! This is a habit you definitely want to avoid. (Even though it can not in the sim, it can in real life)
* Don't let that helicopter get too far away. Even though you think it's too hard to see just because it's on a computer screen doesn't mean it's any easier to keep it close in the real world. This is definitely something to work on.
* Ok, so you can land your helicopter in the sim now, but can you make it land where you want it to precisely? Work on this.
* Ok, so you can make it land where ever you want to, can you make it land pointing any direction you want it to? Work on this too.
* Try flying with all the trims slightly off center
* Adjust the trims at random and get used to it, then do it all over again.
* Move all the sticks like crazy all over the place until the helicopter is in a precarious position... then level it out as fast as you can
* Turn the wind up to 10 mph and repeat all the above
* Turn the turbulence up to 10 mph and repeat all the above
* Practice flying from left to right back and forth, then practice flying in and out without hitting or flying over yourself
* The autorotations in CSM are way way way too easy. Don't rely on the practice to help you in a real event. To help you get close to the difficulty of a real autorotation, go into whichever configuration screen has "blade drag ratio" and double it. I think it's at .22 by default, set it to at least .44
* Experiment, if you haven't already, with loops and rolls
* You're ready to try the real thing!

**More advanced sim practice**

* If you have CSM, turn all the colors of the model to pure black. This will simulate the common lighting conditions you fly in for real when the helicopter just turns into a silhouette. This is supposed to disorient you because it will be hard to tell if the helicopter is banking away or towards you etc. This happens in real life so you should practice for it.
* Turn the rudder trim half way off center so that the heli is doing a complete 360 once every 2 seconds or so. Don't touch the rudder now! Only use the collective. Try and slowly fly around without touching the rudder, to do this you need to continually be adjusting the cyclic (bank and pitch) since the helicopter will always be pointing in different directions. Try to land this way. When you get good at it, reverse the direction of the rudder. When you're good at this, land while slowly pirouetting.
* Turn the gyro gain channel on your tx as low as it can go. This will make you control that tail!
* Practice hovering inverted and flying around inverted
* Practice flying around backwards slowly. This is very difficult
* Practice flying around backwards while inverted. Yikes.

**The Real McCoy**

* I suggest that you should wait to fly the real thing until you can confidently fly around in the simulator and land without crashing. You'll be much better off in the event of an emergency and learn quicker too.
* Put big training gear on your heli
* Have someone verify the linkages, reversing, and test fly if possible
* Practice doing small hops up to 6 inches, paying attention to how the helicopter is trimmed. Don't adjust your trim in the air unless you are very confident. Drifting to the left (in US helicopters) is normal and results from the tail rotor thrust which you can compensate for by putting a very-very slight right-bank in just after takeoff, but this is different than pitching. If your helicopter banks, yaws or pitches by itself you need to compensate with trim.
* Practice hovering from 6 inches to 1 foot. Be prepaired for ghusts: wind will increase the effectiveness of your rotorblades and make your helicopter climb fast. Don't overreact and slam it into the ground. Slowly lower the collective and gradually bring it back down. Be prepaired for the wind to stop and the helicopter to descend more quickly. Again, don't over-react and send it launching into the sky. Just take it easy and if it gets "on top of you" don't touch anything but a little forward cyclic for 1 or 2 seconds. Eventually it will fly out in front of you, level off and use back cyclic as needed to stop, then level off again.
* Adjust gyro as needed to stop wagging or tail swaying when you adjust power.
* Practice hovering out of ground effect. At least 3 feet up, and hold it steady, the wind will really affect the height at this level.
* Get used to how responsive the collective is. Give it a few SMALL taps. You want to get used to NOT over-correcting with the left stick. This is hard, most people want to move the stick all the way down when they get in trouble, this is bad, this s lams the heli into the ground. Get used to merely lowering the collective 1/4 way down or so.
* Practice walking the heli around. Follow at a safe distance behind it and make it go places slowly. Be careful not to step in any holes.
* Practice turning the heli a little bit to the right and left. Get used to the perspective in real life. The sim experience only helps.
* Practice flying the heli out and back (tail in both ways)
* Practice a little side to side slow-flying
* Practice doing left / right turns in front of you while flying back and forth. Almost like a figure-8, but always keeping the tail in a little. Basically, just fly the helicopter sideways to the left and right, in front of you, then start adding rudder so instead of flying sideways back and forth, the nose leads the turn a little. The helicopter will never turn with JUST the rudder or JUST the cyclic. You need to use both the same time.
* Practice turning the heli towards you a little more
* Practice doing small, very slow, circles. This is difficult
* Flying left to right is easier than flying in and out. Start doing this
* Don't fly with the sun near the horizon. It gets hard to see the attitude
* Practice hovering a little bit higher, say 10 - 20 feet. Don't force it back down, lower the collective a little bit at a time. If it starts to sink rapidly, raise the collective slow at first and slowly raise it faster until it stops falling. Star t lowering it again and do a slow, controlled descent. If you descend to quickly you will enter your own down wash and the helicopter will pull itself into the ground and need considerable collective to compensate. This is a bad condition.
* Practice doing a little bigger circuits but keep the speed down.
* Your ready to take the training gear off. They're slowing you down and you're probably developing bad habits by using them for visual cues
* After you take the training gear off, start all over again, because it's much more responsive now and much more difficult to see, however, it will fly much much better.
* Practice subtle 180 stalls and figure-8's
* Practice going faster and slowing down
* Practice transitioning from fast forward flight to landing. I had a lot of trouble getting the helicopter anywhere near me by the time it was hovering
* Practice in a little more wind... wind really makes a 30 size jump around, be on top of it!
* Practice controlled flight. Try to make the helicopter go exactly where you want it to. Take more authority of the sticks
* Practice "baby-autos" where you hit the throttle hold at 3 or 4 feet to send the engine to idle. The helicopter will drop suddenly, but don't over react and pop it up into the sky or you'll use up all your momentum and it will really drop like a rock. It would be better just to let it land itself if you're unsure about how much collective. Start with a little and work your way up and try to use up all the blade speed touching down at the last second.
* Practice doing nose-in landing approaches and hovering at many different aspects
* Practice "fake-autos" where you don't use the throttle hold at all, just bring it in as fast and hot as possible with the collective as low as you can, to simulate a emergency decent. Stop the helicopter at 8 feet up in a hover and do it some more.
* Practice the "baby-autos" from 6 feet, NO MORE than that. You should have enough rpm in a hover to softly touch down from a 6ft power loss.
* Practice aborting autos, where you hit the throttle hold up high and "glide" on in, but abort at about 10 feet by unflicking the throttle hold.
* You're ready to try a whole auto. Autorotating in 10 to 20 mph wind is the easiest because forward speed makes the blades lift better. Start your auto with power and get 15mph of forward speed, hit the hold switch and keep the nose down 15 degrees and the collective so the blades have -2 or -3 degrees in them. If you have too much negative you'll actually loose rotor speed. Bring it in with as little cyclic and collective change as possible. As you get to 15 feet, gradually pull back on the elevator to slow down your forward speed. As you start to drop from your decrease in forward speed gradually feed in collective like you did from your 6ft baby-auto and you know the rest. Note: It's better to land with too much forward speed than to land on the tail, the helicpter will harmlessly slide like an airplane on skies with extra forward speed.

**Moving on**

* Before moving to loops and rolls you should switch some parts out for higher performance parts
* Servo upgrades are important for the tail rotor and collective. I recommend Futaba 9202 or equivalent for these high stress servos.
* K&S Paddles which are about half the mass and a little more area will double or triple the cyclic response on the standard nexus.
* Unfortunately, the K&S paddles make the helicopter want to pitch up in forward flight so you'll need to increase your idle up rpm to around 1900 RPM. These paddles will also make the helicopter very hard to trim perfectly, and the trim will drift douring flight, so that if you trim it at the beginning of your flight when you're done you may be pulling to the right or back or what ever. This is the nature of the lighter paddles.
* For looping and rolling you'll need to adjust your pitch range to include at least -2 degrees at the low end of the collective.
* For sustained inverted with some climb-out power you'll need to adjust the pitch range to at least -6 to +8 degrees. This amount of pitch range is one of the limitations of the stock nexus. You can not get a -10 to +10 degree collective set up with the stock nexus head.
* If you haven't already, you're going to need to set up and idle-up on your tx so when you pull the collective all the way down your engine doesn't go to idle, but maintains a constant RPM throughout the pitch range.
* The Futaba 6XH helicopter remote has a very limited idle-up throttle setting. You can only set the minimum throttle to as high as 50% which means you'll never have more than 50% engine power for inverted flight. This is ok for loops and rolls only, but if you want to do more aerobatics like sustained inverted flight you'll need a different radio.
* Before you start looping, get used to very steep 180 stall turns where you practice the first 1/4 of a loop. Your goal is to get as high as possible so you understand how smooth to be on the elevator in the first part of the loop.
* Remember to enter the loops with a high forward speed, plenty of altitude and start the loop gracefully so that you don't kill your airspeed, as you reach the top of the loop your collective should be at about -2 degrees then pull more and more cyclic to return to a right-side-up dive and pull out while adding positive collective. Never add negative collective until you're at least on the top of your loop or you'll stop all your forward motion and start flying upside down backwards. If this happens, just yank back on the elevator to follow through with your loop. It won't be pretty, but you'll come out of it all the same.
* When practicing aileron rolls, try to time it so you have 0 pitch at the 90 degree bank and -6 at full invert, and 0 again at 90 then back to what ever at level. If you're used to airplanes and pull up prior to doing a roll you'll loose all your forward speed and end up with a helicopter flying right-side up but backwards in the end. I actually dive 5 or 10 degrees before I roll to maintain forward speed.

**Tricks**

* Add a pierouette to the top of your loop.
* In FFF, climb 45 degrees, bank 90 degrees with 0 collective and do fast pierouettes, then level off and come out of it nose-down 45 degrees as it would naturally.
* A tic-toc is when you make the helicopter look like the boom is fastened to a metronome. You alternate positive collective and backward elevator with negative collective and forward elevator back and forth so you don't loose any altitude. The boom from the profile view looks like this motion: \ to | to / and back and forth.
* A death spiral is when you go from a high hover to a 90 degree bank with 0 collective and 0 speed, then give full forward or back elevator only for as long as you can. Correct any time by banking the opposite as you did to begin the bank. If you wait too long the tial may not keep up and it will dive nose down. Be prepaired!
* The "moon walk" is when you go through the motions of a loop, but you make it look streched out so it's not really a loop any more. Enter it as a regular loop, when your vertical from the 1/4 of the loop add lots of negative so it maintains it's forward momentum, keep the elevator steady the whole time. You'll end up flying backwards inverted for a second or two, but keep holding the elevator. As it points straight down start adding in lots of positive collective and level out.
* The Split-S is a half loop and half roll. You can choose if you roll first or loop first. If you roll to inverted first you pull out rightside up with a half loop. To gain altitude, do a half loop to inverted, then roll to right side up.
* Inverted auto's are done by hitting throttle hold while inverted up high. You add positive collective to maintain rotor RPM and as late as possible you roll to rightside up, regain your RPM and land in the last second. Hard to do with a .30, but it's been done with my raptor. (Not by me!)
* Fly inverted, and do all of the aerobatics you can do, inverted.
* Fly backwards, and do all the aerobatics you can do, backwards.
* Try doing big circles in front of you while rolling.
* Try doing big circles in front of you while pierouetting.
* Try doing extreemly tight circles (10ft diameter at 75 degree bank) with near full collective.
* Combine pierouettes and flips to do strange looking "pierouetting tumbles"

**Competition Flight**

* Pilot Proficiency Program (PPP): If you're ready to start practicing for aerobatic competitions by IRCHA, [here are the routines](http://www.ircha.org/) you want to perfect.
* FAI F3C Schedule: If you're a pro at hovering and precision control this is for you. It's boring to watch, but impressive flying. [F3C Scedule](http://www.tc99.com/rc/pppircha/F3C.htm).

Now you have read our tips on learning to fly remote control helicopters, please [share your learning tips](http://www.heliguy.com/Discuss/Learning/1/) and experiences. Thanks in advance.