

CVF Workshops 2023

Intro to Electric RC Helicopters

Purpose:

This workshop is being offered in order to inform and/or expose club members to another facet of RC aviation; helicopters. Through variety and constant learning it is hoped to keep the membership interested and active in this wide-ranging RC hobby.

1. Why RC helicopters?

The attraction of the mechanical complexity of this flying machine.

The ability to fly with no runway required.

Helis can fly in limited spaces and hover, such as backyard, driveway, gymnasium.

The challenge of taming a very difficult to control machine is satisfying.

The challenge of learning the electrical and software setup of a Flybarless unit is satisfying.

2. To learn to fly RC helis a certain level of commitment must be made:

Time-it will take repetitive patience, perseverance, and practice and time to master hovering.

A simulator is highly recommended to practice hovering initially, then to practice more advanced maneuvers.

A suitable helicopter is required which will take some financial commitment. What type depends on the goals of the heli student.

Setup and repair of the heli mechanics must be learned. Crashes will happen eventually, and the ability to repair and setup the mechanics is required unless you have a repair person to outsource to.

3. Define your goals:

Do you want to just hover in your yard, at indoor flying, or at the fields' heli area?

Do you want to progress into more advanced maneuvers eventually?

Do you want to become 3D proficient?

4. Your goals will help drive what heli type to choose.

This brief will deal with electric collective pitch helis only. Fixed pitch helis and coaxials, which are easier to fly, can be learned without much instruction.

“Micro Helis” in my opinion are not very suitable for training due to their small size and quick response. But they can be very fun after basics have been mastered.

Larger helis react a bit slower and behave more like their full-size counterparts. In my experience they are much easier to learn on.

Beginner Level:

If your desire is to just hover and “putter around” with a heli then a simpler design will be suitable. A Direct Drive main rotor and a motor driven tail can do the job, and will keep repairs simpler. Several helis on the market are available that fit this bill:

- OMP M2 Explore-\$249
- Goo-Sky S2 BNF-\$349
- Blade 230S BNF- \$280

Intermediate Level:

If your goals involve more advanced maneuvers such as stall turns, flips, etc. A variable pitch tail is recommended. Motorized tails typically have weaker response to the right. VP tails work equally well in either direction. The choices available in the market are broad. And a decision must be made on whether to buy a PNP heli or a kit.

PNP helis will include all the electronics required, making the learning process more streamlined. If a kit heli is chosen, then the learning curve of heli assembly and set up will be entailed, on top of learning how to fly after assembly. Not difficult, just more time investment.

Note: kit helis will require a separate servo, ESC, and a Flybarless unit, unless a complete combo is purchased. The FBL is a 3-axis gyro unit that provides artificial stabilization to the heli. These FBL are highly tune-able and may require a laptop to setup and tune. The choice of which FBL unit is most suitable can be a very in-depth topic in itself. Perhaps a couple of topics for a future heli workshops!

- Blade 330S, BNF-\$430
- Align T-Rex 470 LP, PNP or Kit, \$299-\$432
- OMP M4, PNP or Kit, \$499-???
- Goo-Sky RS4, PNP or Kit, \$619- \$699

Others....

Advanced Level:

If your future goal is to become 3D proficient, you can start with a heli having a variable pitch tail and then develop the skills with much sim practice and watching the myriad of YouTube instructional videos by top pilots. The variable pitch tail machine will be capable for learning this. As your skills advance, more refined helis optimized for 3D are available.

- Align T-Rex 470 kit
- SAB RAW 420 kit
- OMP M4 PNP or Kit

**Don't forget you will need batteries for all of these helis, and appropriate charging cables or balance board. A pitch gauge will be needed as well.

***Going from beginner to advanced is often done via different machines. i.e. and advanced capability machine is purchased after mastering the basics with a beginner-level machine.

It is possible to tame down an advanced machine to learn on, but repair part costs will likely be higher.

5. Learning to fly

A methodical approach to learning to fly a heli can be rewarding and can be achieved with no crashes!

Understand heli aerodynamic theory. A good starting point is John Salt's website. He sells a good beginners e-book for \$20:

<https://www.rchelicoptersfun.com/radio-controlled-helicopters.html>

Simulators:

Using a Sim is extremely useful. I can recommend Heli-X for \$50 served via STEAM.

AccuRC \$49.99 has a wide range of heli models, with full adjustability. I think Heli-X has better “physics” than, AccuR though.

Real Flight has very few heli models to choose from and it costs \$99 on steam, but you may already have it.

A USB dongle can be purchased to hook up your flight Tx to Real Flight on Amazon or eBay.

Training Gear:

Using training gear on the heli will initially save many parts from damage. Training gear is easy to construct from CF rods and ping pong balls.

SAFE or “Stability Mode”:

Alternately, using SAFE or “Stability Mode” can help with strong artificial stability. But, this will inhibit learning the fine corrections required to hover and fly a heli without it.

It is best not to count on SAFE or other self-leveling aids to learn to fly a CP heli, in my opinion. Doing so will inhibit learning the fine motor skills to hover solidly, and transition to forward flight. A heli is inherently unstable and constant control input is required for a stable hover.

If you rely on the SAFE or “Stability Mode”, you may never acquire the skills required for more advanced maneuvers. If all you ever want to do is hover and slow forward flight, it may be OK.

A step-by-step, ground-up approach on maneuvers is recommended. Following this ground-up philosophy you can learn to fly a heli without crashing. A buddy box is not needed, but coaching will help tremendously.

Curriculum:

1. [DAY 1 – Pre Flight Setup](#)
2. [DAY 2 – Dynamic Pre Flight Adjustments](#)
3. [DAY 3 – Ground Hover Exercises](#)
4. [DAY 4 – Low Hover Exercises](#)
5. [DAY 5 – Hover Figure 8](#)
6. [DAY 6 – Nose Pointing In Direction Of Flight Figure 8](#)

7. DAY 7 – Slow Forward Circuit Around Pilot
8. DAY 8 – Forward Flight & Translational Lift
9. DAY 9 – Flying A Large Figure 8 Circuit
10. DAY 10 – Nose In Hover

After the first 10 lessons you should be able to comfortably fly upright maneuvers. Note that each lesson may take longer than one day. Maybe several days each...

After that, a period of self-learning with 3D maneuvers can occur. Buddy boxing *at this point* can be helpful too.

This has been the briefest of introductions on what it may take to learn how to fly RC Helis. If this topic interests you I suggest further reading on the web:

<https://www.rchelicoptefun.com/>

<https://www.helifreak.com/>

If you are serious about learning to fly RC helis and want to begin your journey, contact me and we can get a plan together for you. billgilbert1@gmail.com