The Flightline

Volume 40, Issue 7 Newsletter of the Propstoppers RC Club AMA 1042 July 2010

President's Message

Well school is out so we can fly morning till dark Reminder: a New Church is moving in and they have a five year lease which is good, so our hours will stay the same for Sunday. Please don't park in the long grass it is dry and could catch fire . I have cut bigger parking spots on both sides of the pits

A big thanks goes out for those who picked up the food and drink for the picnic: Jeff Frazier and Bill Tomasco . At the next meeting We could think of a new menu and if others could help this would great.

For those who haven't been following the yahoo groups Steve Mercaldo from Hobby town, also a member of our club, gave the club a airplane kit to be Raffled at the Picnic. I called Dick B and Dave B. and we agreed to sell tickets at the picnic and take it to the meeting ,and have it in the newsletter for all of the club to see and raffle it off at the next picnic. This all took place in three days. Steve we want to thank you for this plane: a THUNDER TIGER F-4U CORSAIR -- a very nice model. Thanks again I'm sure whoever wins this will be happy. Once again there will be raffle tickets at the next meeting for the drawing of this plane at the next Picnic Sat July 17th. As always bring your planes and helos. We will keep meeting short. Come out and fly and have fun.

Minutes of the Propstoppers Model Airplane Club

June 8, 2010 at the Christian Academy Field on a cool, sunny evening

Call to order by president Dick Seiwell took place at 6:40 PM
Roll call by membership chair Ray Wopatek showed 13 members and 1 guest present
Minutes of the May meeting as printed in the newsletter were accepted by the membership
The Treasurer's report was given by Pete Ottinger without questions

Old Business:

The next club picnic is coming soon so we will get volunteers for food purchase and preparation.
Eric Hoffburg our safety officer reminded of the safety rules we should follow while flying at the field.

New Business:

Mike Williams said he would put together the July newsletter in Dave's absence. He asked for content from the membership.

Show and Tell:

Chuck Kime showed his rubber powered model. It is a 1941 Mulvihill winner that is rather large with a hand carved single bladed prop.

Richard Bartkowski, Secretary.

This Tunder Tiger F-4U Corsair will be raffled off at the July 17th Picnic. Tickets can be purchased at the picnic, or the July 13th meeting.

Agenda for July 13th Meeting

At the Christian Academy Field;
Fly at 5 pm meeting at 6:30

1. Membership Report
2. Finance Report
3. Picnic Plans
4. Show and Tell and Fly

INSIDE THIS ISSUE

Calendar of Events

Club Meetings

Summer Monthly Meetings
Second Tuesday of the month.
Christian Academy Field
Fly at 5:00, meeting at 6:30 pm.

13th July

Tuesday Breakfast Meeting
Tom Jones Restaurant on Edgemont Avenue in Brookhaven.
9 till 10 am. Just show up.
Flying after at Chester Park 10 am.

Regular Club Flying

At Christian Academy; Electric Only
Monday through Friday 10 am till dusk
Saturday 10 am till dusk
Sunday, after Church; 12 pm till dusk

Special Club Flying

Saturday mornings 10 am
Thursday evenings in the Summer
Tuesday mornings 10 am weather permitting after breakfast at Chester Park.

Check our Yahoo Group for announcements;
http://groups.yahoo.com/group/propstoppers/

Beginners

Beginners using due caution and respecting club rules may fly GWS Slow Stick or similar models without instructors.
The club also provides the AMA Introductory Pilot Program for beginners without AMA insurance.

Propstoppers RC Club of Delaware County, Pennsylvania.
Club Officers

President Dick Seiwell
(610) 566-2698 reslawns@verizon.net
Vice President Dave Bevan
(610)-566-9152 olddave@icdc.com
Secretary Richard Bartkowski
(610) 566-3950 rbartkowski@comcast.net
Treasurer Pete Oetinger
(610) 627-9564
Membership Chairman Ray Wopatek
(610) 626-0732 raywop@juno.com
Safety Officer Eric Hofberg
(610) 565-0408
Newsletter Editor and webmasterDave Harding
(610)-872-1457 davejean1@comcast.net
Propstoppers Web Site; www.propstoppers.org

It was a hot day, but everyone had a good time at the June 19th picnic

Club Picnics

Saturday July 17th
Saturday August 14th

Your First 450 Size Helicopter

So you've flown your coax until it feels downright sluggish, and you want something that can fly outside with authority. You've spent tons of time on the simulator, and can hover in all orientations without effort. It sounds like you're ready for a descent sized collective pitch helicopter.

At this stage many folks opt for a 450 sized helicopter. Almost everyone who flies a model helicopter will own at least one 450 at some point. It is the most popular size of electric heli for a number of reasons:

- It is large enough to offer some stability
- Parts are (relatively) inexpensive
- They use the low-cost, easy to find "universal battery": 3S 2200.
- 450s are easier to work on than their smaller cousins
- There is a wide range of options in terms of brands and models
- They can be flown in more locations than the larger models which require more room to maneuver
- They can be tuned to fly anywhere between wild and mild. Some of the craziest 3D routines I've seen have been with 450s. Turn down the head-speed, add some flybar weights, and add some expo and you have a suitable trainer that will grow with you as your skills progress.

Name Brand vs Clone

One of the first decisions you will need to make is whether to build a name-brand helicopter or one of the many clone brands that are out there. There are pros and cons to both. Here are some things to think about:

Brand Name

A brand name helicopter will generally provide you with better post-purchase support. Warranty support, documentation, and parts availability are important things to consider when choosing a brand. You are also more likely to find third party support on the internet, your local hobby store, and your club for brand name helis.

In general, a brand name heli will have higher quality components such as bearings, blades, etc. In addition, a brand name will generally offer a suite of components that are designed to work together. You will know that the recommended motor will work with your airframe, etc.

The advantages of a brand name helicopter come at a premium. For example: a 450 sport kit which includes the airframe, blades, motor, and speed controller will run you around $275. A comparable setup using clone components will set you back about $150 (you would still need to purchase servos and gyros to have a flyable model).

Attack of the Clones

The high availability of the clone kits on the market is a hotly debated topic on some of the helicopter forums. The prices are very attractive, but you need to use caution when buying from a vendor you are not familiar with. You should also not expect much in the way of documentation or instructions.

Many of the clone vendors rely on the end-user downloading the documentation for the cloned airframe. If you have some patience, and someone that is willing to provide some guidance, a clone is a viable option. If you are a newcomer to building helicopters, and are trying to go it alone (something I don't recommend) a name brand kit is probably your best bet. Most clone kits are parts-compatible with their cloned counterparts, so parts availability is not a problem. It is not uncommon to see a heli that started as a clone slowly morph into the name brand article as parts are replaced with the name brand after crashes. I have a 450 that started life as a HobbyKing HK450 (Trex 450 clone) but after a few crashes is now 95% Exi 450 (another 450 clone). The only part that remains from the original kit is the landing gear!

Kit vs. Components

Another decision that you need to make is whether to buy a barebones kit and piece your helicopter together from hand-chosen components, or buy an all-inclusive "combo" that will provide everything you need to get it in the air except for a battery and radio. This decision is closely related to the name brand vs. clone decision because generally, the clone manufacturers do not offer the combo packages, and you are left to find your own supporting components. The advantage of a combo kit is that it is one stop shopping. The components have been chosen because they have been shown to work together. You know that the speed controller is big enough for the motor, etc. The downside of a combo package is that it eliminates flexibility – you are stuck paying for the components that someone else has chosen for you. If you are new to building heli kits, this can be a good thing because it eliminates the guesswork that sometimes comes with choosing components.

Vendors

Name-Brand

In the model helicopter world, the 800 pound gorilla in the market is Align. While there are other brands out there that may offer better performance, Align has done a great job of marketing, and insuring that their kits and parts are readily available to their customers. Align kits can be purchased through the following methods:

Local hobby store:

- Hobby Town USA
- G-Force Hobbies
- Hobby Hut

Online (these are just a few):

- Readyheli.com
- Helidirect.com
- Flying-hobby.com
- HobbyHut.com

Other brand-name manufacturers in the 450 kit market include Beam, Mikado, Miniature Aircraft, Gaui, and Curtis Youngblood. While these are generally high quality machines (often better than Align in technical or quality areas), they do not match Align in terms of market share or parts availability. This is one of the primary reasons that the Align models are the ones that the clone manufacturers target.

Clones

In the clone world, there are three primary manufacturers of Align 450 clones:

Copter X (www.ky-model.com)

Copter X is probably the largest of the clone manufacturers. I have not owned one myself, but have read good reports in the online forums. They make everything from the traditional Align 450 SE V2/450 Sport type to the newer 450 pro style airframe. They have also started designing their own models with their Black Angel series.

Exi (www.xheli.com)

Exi offers a wide range of models, including low-end plastic-head SE clones, to the newer 450 pro style. I have owned several of their models over the last year or so, and have been happy with them.

HobbyKing (www.hobbyking.com)

Hobbyking has historically only offered the SE/sport style frame, but has recently added the pro style airframe to their lineup as well. Their prices are good, but shipping can be expensive, and the quality of their kits are generally lacking compared to Exi.

Components

Airframe

In the Align 450 arena, there are two basic airframe types:

450 Sport

The 450 sport is the current version of the Trex 450 SE airframe which has been out for years. It is composed of a multi-part frame that is stacked in two sections. The tail is belt driven. The 450 SE has been the most widely cloned model on the market until the recent introduction of the Pro. With Align still selling the 450 Sport, and the fact that there are tons of 450 SE/Sports out there, there will be parts and kits for these on the market for a long time. The clone airframes will come with aluminum or carbon-fiber frames. The aluminum frames are less expensive, and fly well, but bend easily in a crash. Straightening an aluminum frame is an exercise in futility. I generally recommend the carbon fiber option – it will stay straight after a minor crash that would bend an aluminum frame.

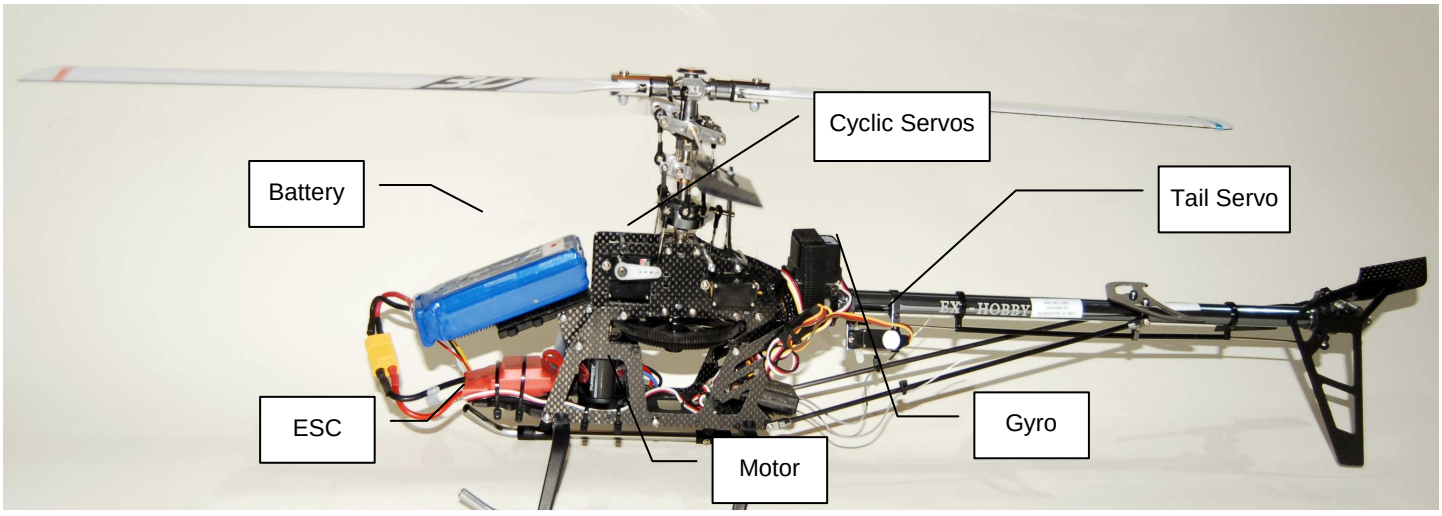
450 Pro

Introduced in 2009, the 450 Pro is a complete redesign, and has received rave reviews. It has a new, lightweight head and the frame is a single piece which increased rigidity, but can make it difficult to route wires and work on, especially for someone new to working on helis. The tail is shaft driven. Clones of the 450 Pro have recently been hitting the market. Some of the clones offer their pro version with a belt driven tail as well as a shaft driven version.

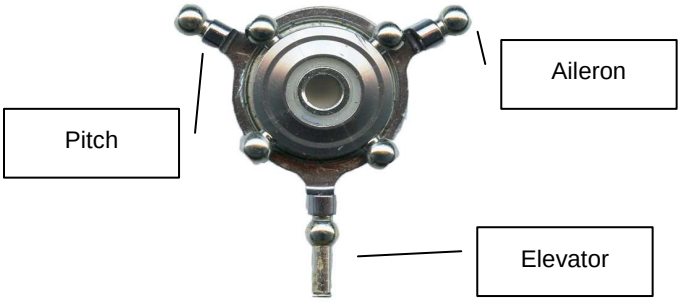
Cyclic Servos

In a modern ECCPM (Electronic Cyclic Collective Pitch Mixing) helicopter, there are three servos that work in unison to effect collective and cyclic actions. These servos are tradionally called the aileron (right), pitch(left), and elevator (front or back). These servos are connected to the swashplate and provide the collective and cyclic control for the helicopter. As the pilot moves the collective stick up, all three servos work together to raise the swashplate. If the pilot moves the cyclic stick down, the elevator servo moves down while the aileron and pitch servos move up, causing the helicopter's tail to drop.

Regardless of whether you decide to go with a name-brand airframe or a clone, servos are one area where you do not want to skimp. The cyclic servos must all work together and be fast enough to keep up with your inputs. They must also provide enough torque to manipulate blade surfaces spinning at 3,000 RPM. You will need three cyclic servos.



Some of the major components you need to choose when building an electric helicopter



The Swashplate from a 450 heli. The balls that connect to the cyclic servos have been labeled. The inner balls connect to the mixing arms that control the flybar and main blades

One thing to think about when choosing a servo is that the servo takes a beating in a crash. Unless you want to replace servos a lot, make sure that parts such as servo horns and replacement gear sets are available for them. Metal gear servos are a great choice for cyclic servos because they will stand up the abuse of crashes. Some good servos on the market include:

- Hitec HS-65HB: This is a good, solid servo with gears made from Hitec's Karbonite reinforced plastic. They run around $22 each.
- Hitec HS-65 MG: This is the metal geared version of the HS-GB HB. It is more expensive, but will last longer. They cost around $32 each.
- Hitec HS-55: This is a low cost plastic geared servo that would be the smallest, cheapest servo that I would put in a heli. They cost around $12 each.
- Align DS410: This is the Align-branded servo for their 250 and 450 machines. It is a solid, plastic-geared digital servo that is well suited to helicopter duty. Cost is about $28 each.
- Align DS410M: This is the stock servo that comes with the Align 450 kits. This is the metal-geared version of the DS410. It will stand up to more abuse and should survive most crashes. Cost is about $37 each.

Blades

Most 450 sized helicopters swing 325 mm blades. These blades are usually constructed of wood, fiberglass, or carbon-fiber depending on the desired flight characteristics and budget.

Wood blades are the best blade for the beginner. They are inexpensive (around $12 a set for Align brand blades). The key advantage of wooden blades is that in a crash, the blades self-destruct, hopefully saving the more expensive bits in the head and servos. Wooden blades will serve you well into forward flight. Once your skills have advanced to include inverted flight, you will want to look into fiberglass and carbon-fiber.

Fiberglass blades are a good compromise. They are stronger than wood, and will handle the forces of some aerobatics without flexing too much, but are a bit heavy. Cost-wise, they fit between woodies and carbon-fiber at around $14 a pair.

Carbon Fiber blades are the most common due to their stiffness and low weight. They are also generally the most expensive. A pair of Align branded blades will set you back about $30. They are not recommended for beginners due to their high cost and the fact that their increased stiffness transfers crash damage into the head . Off-brand blades can be found for as little as $15 a pair from vendors such as HeliDirect.

Motor

Which motor to choose is largely dependent on your needs. A beginner who will be spending most of their time learning to hover, practicing orientations, and beginning forward flight will do well with an off-brand motor that doesn't supply a tremendous amount of power. This will also provide maximum flight times for each battery pack. When ordering a motor, make sure that it includes mounting screws and pinion(s).

Good motors include:

Beginner:

- Alpha 400 (Xheli.com $17.95)
- Turnigy Typhoon 450H 2218H -3450KV ($14 at Hobbyking.com) Note: You might want to get two of these since they don't sell spare parts for them. I've had the shaft break on one these. The other one I bought has been holding up well. I recommend a 12 tooth pinion (Align part number HZ053)

Intermediate/Advanced

- Align 450M ($50)
- Scorpion HK-2221-8V2 ($55)

ESC

The speed controller is the electronic heart of your heli, providing the power to the motor, servos, and radio. If going with an ESC with a built-in BEC to provide power to the servos and radio, make sure it can provide enough current to the servos, especially when running digital servos for your cyclic servos. Three digital servos on cyclic, a radio receiver, gyro, and tail servo can easily overwhelm a BEC which is not up to the task.

Some main-stream ESCs include:

- Castle Creations Phoenix Ice 50 ($85). This is the high-end of speed controllers for helicopters (unless you want to spend $180 for a Kontronik). It includes the ability to be programmed via a USB connection to your PC, data logging, and exceptional support. I've been using an ICE 75 on my 500 with great success, and Jeff Frazier has been using a Ice 100 on his Trex-600. Jeff has had some trouble with his, but Castle's support has been outstanding as he continues to work the bugs out of his configuration.
- Align 35A ESC ($55). This is the stock ESC that is included with the Align kits. It is a solid controller, without a lot of bells and whistles.

- Turnigy Plush 40 amp ESC ($23 at Hobbyking.com). A solid, no-frills ESC. I've been using this unit on my 450s for a while without an issue.
- Turnigy Super-Brain 40A Brushless ESC ($29.99 at Hobbyking.com). This is Turnigy/HobbyKing's next generation ESC which includes data logging, etc. However, the BEC is only a linear-type with a max current of 2 amps. I wouldn't recommend it if you are using digital cyclic servos. They are also usually out of stock on the HobbyKing web site.

Battery

If the ESC is the electronic heart of your heli, the battery is the stomach. One of the nice things about the 450 size heli is that it uses the ubiquitous 3S 2200 battery that almost every flier has in their inventory. One thing to keep in mind is that helis are harder on batteries than an airplane. You may want to consider getting some fresh 30-40C packs for your heli if the packs you already own have seen better days. Popular choices include:

- HobbyKing Zippy Flightmax 2200 3S1P 40C ($22 at HobbyKing.com) A lot of us have been using the Zippy and Turnigy batteries for a while now, and have been very happy with them. You can't beat the price, but you have to catch them when they are in stock. Use the HobbyKing battery compare tool and find a comparable battery. Anything 30C or better will be more than sufficient for a 450 heli.
- Hyperion HP45C22003S Hyperion G3 EX 2200mAh 3S 11.1V 45C/90C ($55.99 at readyheli.com) While I've not used them myself, Hyperion is a popular brand among heli fliers.
- OUTRAGE XP35 3S1P 11.1V 2200mAH 35C - XTREME POWER SERIES ($69.95 at helidirect.com) While there are those that swear by this brand (it is popular among the hard-core 3D pilots), I have a tough time justifying the cost. It is massive overkill for someone learning to fly a 450.

Tail

Belt vs Shaft Drive

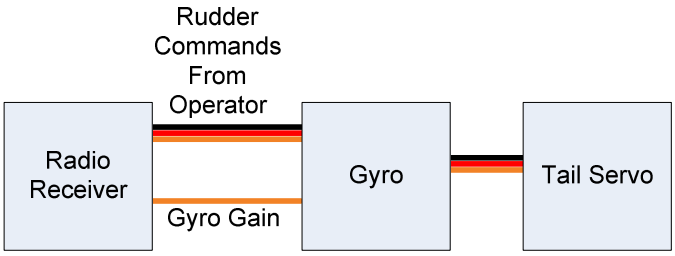
If you are getting a 450 sport or SE clone, your choice is already made for you: belt drive. If you are going for an Align 450 Pro, you will get a shaft driven tail. If you are going with a 450 Pro clone, you have the choice of belt or shaft drive.

The belt driven tail is a distinct advantage for a new pilot because it is more tolerant of the occasional tail strike. If a shaft driven tail strikes the ground it almost always results in a stripped gear and bench time, where a belt driven tail will simply slip. A belt driven tail does require occasional maintenance: the occasional spray of silicon lubricant and check of belt tension is all that is needed.

The shaft driven tail is an advantage for intermediate to advanced pilots who can land consistently without a tail strike. It is no-maintenance and low resistance offering good performance during auto-rotations.

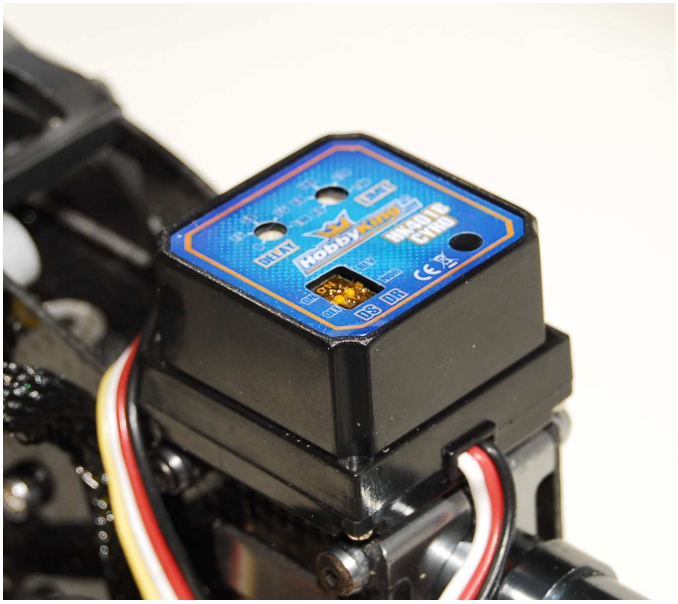
Gyro

Physically, the gyro sits on the back of the helicopter. Electronically, it is between the radio receiver and the tail servo. The gyro automatically controls the tail servo to rotate the heli in the direction indicated by the pilot. For example: if the pilot has the rudder control in the center, the gyro will send the appropriate commands to the tail servo to prevent the helicopter from rotating on the yaw axis due to torque from the motor or wind.



Relationship between the radio receiver, gyro, and tail servo

One opportunity for savings on a beginner machine is the gyro. For learning to hover, and basic forward-flight, a low end heading hold gyro will serve nicely. When you are ready for 3D and aerobatic maneuvers, a higher-end gyro will be necessary, but not before then.



Selecting a budget servo like this HK401B from HobbyKing is one way to save money when building your first heli

Some example of low-end heading hold gyros include:

- HK401B ($13.99 at Hobbyking.com). This is a clone of the Futaba GY401, which Brain Williams and I have been using for a few months now. It works well.
- Telebee ($44 at helidirect.com). This is the unit that Align used to re-brand before they came out with the GP750. It is a solid piezo-based gyro, but does exhibit some drift during flight.

A couple of higher-end gyros include:

- Align GP780 ($177 at HeliDirect.com) This is the current Align gyro, which is based on SMM technology, and does not drift. The GP780 and its predecessor the GP750 are solid gyros capable of basic through 3D flight.
- Futaba GY-520 ($150 at helidirect.com). This is the heir-apparent to the GY-401 which was Futaba's tremendously successful gyro, and was the standard for some time. It is very small, weighs a mere 10 grams, and is programmable via the rudder stick on the transmitter, or via an optional USB interface.

Tail Servo

The tail servo is a specialty servo that is considerably faster than a standard servo. It is also common to see special gyro/servo combinations that communicate at a higher frame rate than standard RC servos (such as 720 ms instead of the standard 1540 ms). This allows the gyro to command the servo to make many small corrections in yaw, rather than fewer large corrections. A fast tail servo that can keep up with the server will insure that the tail doesn't wag. Some good choices for tail servos include:

- Futaba S9257 ($60 from HeliDirect.com) This is a solid tail servo for the 450 and 500 sized helis. Works great with a GY401 or GY520 gyro.
- Align DS420 ($30 from HeliDirect.com) This is the stock tail servo that Align includes with their kits. It works well in flight, but has been known to burn-out on the bench.
- Turnigy DS480 ($25.90 at HobbyKing.com). This is a re-branded MKS DS480. I've been using MKS 480s on my 450s for a while and have been happy with them. Note – they are incompatible with the Align GP7xx gyros.

Radio

If you haven't already invested in a good computer radio, now is the time to do so. You will need a minimum of 6 channels (3 cyclic, throttle, rudder, and gyro gain). Most manufactures offer a heli and airplaine version of their transmitters. The main difference between them is that throttle stick on the heli version is smooth, and the switch placements are different. Good choices include:

- Futaba 7C
- Spektrum Dx6i (recommended if your are primarily an airplane flyer. If you plan on going far with helis, the Dx7 is a better choice)
- Spektrum Dx7

Summing it Up

Below is a spreadsheet comparing the costs of assembling a 450 helicopter based on the options I've outlined. The prices listed are based on US-based internet vendors (except HobbyKing) and should be used for comparison only. Shipping is not listed. There are endless combinations to choose from, and prices will change. Also, don't forget your local hobby store as a resource for helping you pull together the components you will need.

What next?

So you've made your choices on hardware, and have this big pile of stuff that doesn't look like it's ever going to fly. Don't panic, there are a lot of resources out there to help you get going:

- Online: Sites like helifreak.com can be a huge source of information, especially *Finless Bob's Tech Room* where there are free build videos and how-tos to help you program your radio.
- RTFM (Read The "Fine" Manual): If you bought a kit with a manual, read it cover-to-cover, and then read it again before starting assembly. If you bought a clone, download the manual for the corresponding Align kit from helifreak.com, and read it.
- Local: Don't forget that there are fellow club members that have been where you are now, and would be happy to get you going. Always feel free to ask for help!

Mike Williams

		Budget							
Component	Quantity Needed	Low-Budget	Price	Medium-Budget	Price	Higher Budget	Price	Align 450 Sport Combo	Price
Airframe	1	HK-450 GT	46.99	Exi T-450 SE Carbon Edition	77	Copter X 450SE V2	144.99	Align 450 Sport Super-Combo (readyheli.com)	439.99
Cyclic Servo	3	Hitec HS-55	12	Hitec HS-65 HB	22	Hitec HS-65 MG	32	Align DS410 (included in kit)	0
Blades	1	Align 325 mm PRO (wooden)	12.99	Align 325 mm Fiber	13.99	Align 325D Carbon Fiber	32.99	Align 325 Carbon Blades (included in kit)	0
Motor	1	Turnigy Typhoon 450H 2218H	13.38	Alpha 400 (3500KV)	17.95	Scorpion HK-2221-8 V2	54.99	Align 450M (included in kit)	0
ESC	1	Turnigy Plush 40 Amp	23	Align 35A ESC	55	Castle Phoenix ICE 50	85	Align 35A ESC (included in kit)	0
Gyro	1	HK401B	13.99	Telebee	44	Futaba GY520	150	Align GP750 (included in kit)	0
Tail Servo	1	Turnigy DS420	25.9	Align DS420	30	Futaba S9257	60	Align DS420 (included in kit)	0
Battery	2	Zippy Flightmax 220max 3s1p 30C	17.7	Zippy Flightmax 22003S 40C	22	Hyperion HP45C	55.99	Zippy Flightmax 22003S 40C	22
Total Cost (without radio transmitter or receiver)			**207.65**		**347.94**		**735.95**		**483.99**

This spreadsheet gives you idea of what it will cost to put together your own flying eggbeater

Dave Harding – Editor
4948 Jefferson Drive
Brookhaven, Pa. 19015
610-872-1457

Propstoppers R.C. M.A.C

Peter's P40 prepares for a strafing run at the June 19th Picnic

There were lots of planes to see on the ground, as well as the air at the picnic. Don't miss the next one on July 17th!