

RC Helicopter

THE WORLD'S BEST-SELLING RC HELICOPTER MAGAZINE

STAR STRUCK!

CENTURY'S new AStar
LOOKS JUST LIKE
THE REAL THING.

TESTED:

- » ALIGN TREX 250SE
- » THUNDER TIGER AH-IW SUPER COBRA E325
- » ELYQ VISION 50 COMPETITION
- » ICHARGER 206B
- » PROTEKRC iCHECKER
- » REALFLIGHT G5



ElyQ Vision 50



JUNE 2010 / ISSUE 47

0 6

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12

 Tips to Bring It Back in One Piece!

HOW-TO:

- Put it in Reverse!
- Do The Diamond Loop
- Set up a 3-Blade Head

GOTCHA! 2010 April Fools Funfly



JUST ADD

Try a different approach to Radio Control Helicopters

FUEL

Raptor 50 2.4GHz Ready-To-Fly

Specifications:
 Full Length of Fuselage: 48.03"
 Full Width of Fuselage: 5.51"
 Total Height: 15.74"
 Main Rotor Dia.: 52.95"
 Tail Rotor Dia.: 9.29"
 Gear Ratio: 8.5:1:4.56
 Full Equipped Weight: 6.60 lbs.
 Ask for TTR4853-F08M2A1



Items Included:
RedLine Pipe
 High performance tuned pipe


Sky Tech TS6i
 ACE8608 2.4GHz 6 CH Digital Radio

(4x) S1807MG
 Control surface servos
 ACE8120


TG-7000
 Heading lock gyro
 ACE8070


DS0606
 Digital rudder servo
 ACE8130


TRS60100
 2.4GHz 6CH Receiver
 ACEAQ2257


RL-53HX
 Powerful Redline Engine

FEATURES:

- Radio pre-programmed for a truly Ready-to-Fly helicopter
- 2.4GHz programmable radio system with pitch control, idle up, and throttle hold
- Redline 53HX exclusive power system
- CNC rotor head and hardened main shaft
- Fiberglass canopy
- Includes fiberglass main rotor blades
- Longer tail boom to fit 620mm blades
- Stainless steel flybar & linkage rods
- Heavy-duty clutch bell
- Push-pull control on cyclic and collective



Elevator push-pull control system



600mm fiberglass main blades



Metal rotor head and 10mm main shaft



Pitch push-pull control system



High performance Redline tuned pipe



Rear mounted DS0606 rudder servo



Pre-painted Fiberglass Canopy



TORQ

ADVANCED HIGH VOLTAGE DIGITAL SERVO

BRUSHLESS DIGITAL SERVO

HIGH VOLTAGE



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WWW.OUTRAGERC.COM



BL SERIES

BL 9088 BL 9080

Size: 1.57"x0.79"x1.52" Weight: 2.15 oz

7.4 VOLT RATED
(2 CELL LIPOS)

BL 9088 TAIL Servo 760/560Hz

Speed / Torque

6.0 v : 0.05 / 63.48 oz

7.4 v : 0.04 / 78.53 oz

8.4 v : 0.03 / 91.64 oz

BL 9080 CYCLIC Servo

Speed / Torque

6.0 v : 0.07 / 88.32 oz

7.4 v : 0.06 / 112.35 oz

8.4 v : 0.05 / 132.86 oz

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PRO 10 POWER SUPPLY (10A)



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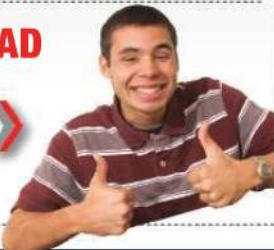
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RC Helicopter (ISSN 1559-7903) is published monthly by Think Omnimedia LLC at 13401 Yorba Avenue, Chino, CA 91710, tel: 909-517-3366. Subscription rates are \$24.99 for 12 issues (one year), \$49.99 per year for foreign airmail, \$29.99 for Canada and Mexico. Periodicals Postage paid at Chino, CA, and additional mailing offices. Postmaster: send all address changes to RC Helicopter PO Box 469063, Escondido, CA 92046-9488. Printed and produced in the U.S.A.

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CHOICES



WITH AN ECONOMIC RECOVERY UNDERWAY, ALBEIT A SMALL ONE, COMPANIES THAT HAVE BEEN SITTING ON NEW DESIGNS AND INNOVATIONS ARE BEGINNING TO LET LOOSE WITH THEIR CREATIONS. That's never been so apparent than now. In every single product category in the RC helicopter market have there been so many choices. And so many of them are actually really good products, and their not just simple clones of each other. Take the 50-Size nitro category, companies like Thunder Tiger, Align, Outrage, Hirobo, Miniature Aircraft, Ely.Q, Century, JR Heli, Kyosho, JS Model, and soon CY and Synergy will also have quality offerings in this category as well. I'm sure there are a few I missed What's a pilot to do? Back in the old days, before the Internet, I would recommend pilots stick with the brand that their local hobby shop stocked. That way getting parts and help would be easier. That's still good advice in my book, however with on-line retailers it's much easier to get parts and service on a more exotic brand. When picking out your next helicopter stick to some simple rules; is it a brand you can trust? Do they appear to stand behind their product? Are they going to be in business next week? Does anyone at my field fly it? What does RC Heli think of it? What's the buzz on the forums? Can I afford it? Is it a new design or an evolution? Some of these questions are easier to answer than others. But now more than ever it's important to be a wise shopper and do your research. Also, because of the better availability of replacement parts on-line and through well-stocked hobby shops it's a little easier to take the leap of faith and try out a new company. Remember, knowledge is power, so soak it up.

Fly Safe,

Mike Velez

Publisher/ Editor-in-Chief
mikev@rchelimag.com



CHATTER BOX

WHICH HELI DO YOU WANT NEXT AND WHY?



MIKE VELEZ - Publisher/Editor-In-Chief
 Airwolf. Not a kit, the real thing. I'm saving up.



RYAN KEPHART - Associate Editor
 I want a WiFi enabled mobile webcam helicopter that can fly around my house over the internet!



BRANDON UPDIKE - Editorial Assistant
 I want an Apache for the Scale Masters.



JIM INNES - Editor-At-Large
 I would love to have a Trex 550. I love that size of helicopter and the power to weight ratio should be fantastic!



SHAWN KITCHEN - Editor-At-Large
 Hard to choose. Either a Hirobo F3C machine or a 90-size scale Hughes 500. I love a well-built Contest machine, but I've been a closet scale fan for years.



CHUCK BASSANI - Contributor
 I always wanted to do a super scale Blue Thunder. So based on the fuse I end up with, I'm guessing a TRex 600E or 700E may be in order.



ART KORAL - Contributor
 Logo 700, Probably will be the lightest helicopter to handle 5+ horsepower and anything you could throw at it!

ART & PHOTOGRAPHY

Art Director
 Dave Palacios
Art Department Manager
 Joanna Buono
Senior Staff Photographer
 Carl Hyndman
Staff Photographer
 Jason Boulanger

CONTRIBUTING WRITERS:

Dave Yost, Mark Madsen, Dr. Tim Dawson, Dan Goldstien, Mark Fadely

PRODUCTION/ADVERTISING

Production Director
 Bob Mackey
Advertising Account Exec
 Zary Lahouti
Circulation Managers
 Tom Ferruggia
Circulation Assistant
 Sonya Velez

CHANGE OF ADDRESS & SUBSCRIPTIONS

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BACK ISSUES/SALES INFO

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ADVERTISING RATES AVAILABLE UPON REQUEST, CONTACT:

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SCALE

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30/50/60



Schweizer 300 50



Long Ranger 30/50



Ecureuil A-Star A5350 50



Hughes MD500



Hughes 500E 30



BlackHawk 60



Hughes 500E 50/60



Agusta 109 30/50



Robinson R22 50



Bell Jet Ranger 60

AIRWOLF

A fantastic high gloss painted AirWolf modeled after the star of the popular 80s television show. The AirWolf is available in kit version with mechanics and in 90% ARF version that is completely pre-painted with mechanics.

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Experience the real life adrenaline pump of scale helicopter flight. There's nothing closer to actually sitting in the pilots seat when it comes to these hovering birds. Century Helicopter products offers a full line of 30/50/60 Scale ARF and Scale Fuselage Kits. Our kits come in high quality, pre-cut fiberglass that possess a level of detail that will satisfy the most discriminating builder. You can choose between

non-painted or fully hand painted fuel resistant bodies. In addition, many kits come with all mechanics necessary to complete assembly including landing gear where applicable.

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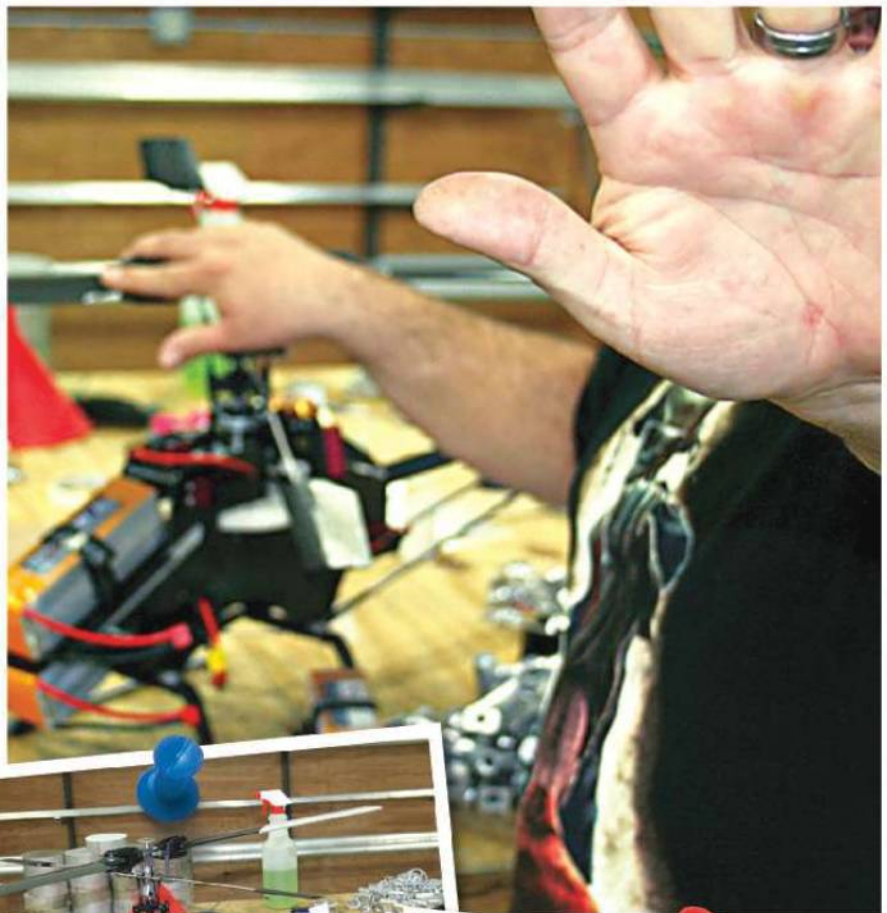
CENTURY
HELICOPTER PRODUCTS

MINIATURE AIRCRAFT'S NEW **FURION 600**

We called it a Fury on the cover to get your attention, and it worked.

One of our moles shot this pic and submitted a report. While everyone else is tapping into the 700e market, Miniature is seizing the opportunity to be different and is developing a 600e. The Furion 600 shares many of the familiar features as its nitro cousin - the Fury 55. It's capable of using both a 6S and a 10S power system. The frame layout looks unique, with the wiring routed through grommets to prevent chaffing. The motor **output** shaft is also bearing supported to help eliminate side-to-side play. The spy states that the performance on 10S is "ballistic."

WWW.MINIATUREAIRCRAFTUSA.COM



1ST ANNUAL HELIPROZ **FUN FLY** JULY 9th-11th

In issue 43, Mike took a trip to Montana to check out the grand opening of the new HeliProz headquarters. Now HeliProz is inviting everyone to their shop for their first annual Fun Fly. The Fun Fly will be in Billings, Montana on a field right behind their shop. The event will be completely free and there will also be a big sale in the store to replenish your parts supply. With an on-site BBQ and full size helicopter rides, the HeliProz Fun Fly seems to be gearing up as a top-tier event, so be sure to mark your calendars.

WWW.HELIPROZ.COM



JR 11X DETAILS REVEALED

There has been much speculation about JR's new flagship radio. Now the official specs and price has been released. The 11X will be sold for \$750 and is due around June. The 11X packs quite a punch with its feature-filled, 2048-step resolution.

KEY FEATURES

- Ultra-smooth, dual bearing stick assemblies
- Refined 2048 resolution
- AutoAssign™ switch selection
- Fastest-response processor, for an unprecedented connection with your model
- All 11 channels function at identical speed and resolution
- Backlit, high resolution, 4 gray-scale display for optimum clarity in all light conditions
- Access all Function and System menus without turning the transmitter off
- Easy access, back-mounted levers
- RF status light; Blue—RF on, Red—RF off, Green—warning
- SD card slot for expanded memory and future software updates
- 30-model memory expandable with SD Card slot
- 3+1 Digital/Analog Trims
- Programming for all model types: planes, helis and sailplanes
- Exclusive, proven JR rolling selector data input
- Custom naming for flight modes

It sure looks nice so we're eager to see how it performs.

WWW.HORIZONHOBBY.COM

LINK MAKER **9000**

Although it sounds like a Benford tool from Tool Time, this amazing product is brought to you by Model Avionics. We received this tool from HeliProz and will be giving it a workout here in the next issue of RC Heli magazine. The unit is comprised of an aluminum base plate that is anodized blue with painted measurement marks. What looks like a servo sits on top with a special driver designed for a ball link? This tool will surely save your fingers.

WWW.MODELAVIONICS.COM, WWW.HELIPROZ.COM



V-BLADES CLOSER TO PRODUCTION

The "Traveling Man", Alan Szabo Jr., has made a temporary stop in Missouri to test out the new V-Blades. V-Blades has been on long hiatus, and we were all glad to hear of V-Blades' return to the States and to see Alan and Vic work hard to get them back into production status. The new blades now have a CNC designed, reinforced blade root for extra durability.

WWW.VBLADES.COM



T-REX 700E READY FOR PRODUCTION

After several months of testing, the Align T-Rex 700e has now entered production and is ready to be sold in two variants. There is the typical kit that comes with the motor, and then there's the 3G bundle. The 3G bundle comes with blades, servos, and the 3G flybarless system. The price for the bundle will be around \$1300 while the kit itself will be around \$899.

WWW.ALIGN.COM.TW



JR VIBE 90 E12

It seems like everyone is getting into the 90-size electric market. JR has joined the fray with their Vibe e12. The design is derived from the Vibe 90 SG. It capable of handling a 12S power system, so expect it to be a performer.

WWW.HORIZONHOBBY.COM



FUTABA NEW GY701

There has been some recent buzz about Futaba's newest entry into the gyro market. The new GY701 is allegedly a governor and gyro in one unit. Not much is known about this new item, so be on the lookout for some more information in the future.

WWW.FUTABA-RC.COM



Lots of new electrics.

RADIX FLYBARLESS BLADES

Now that flybarless has become more commonplace, we're beginning to see blade manufactures come out with dedicated flybarless blades. Curtis Youngblood is developing a blade to compliment his new flybarless system. These flybarless blades feature a weighted tip for added stability. Radix has always made quality blades, so we look forward to seeing these in action.

WWW.CURTISYOUNGBLOOD.COM



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NANO
Length: 174mm
Height: 47mm
Main Rotor Diameter: 210mm
Weight: approximately 60g



HELICOPTER FOR BEGINNERS

TANDEM ROTOR
Length: 251mm
Height: 153mm
Main Rotor Diameter: 210mm
Weight: approximately 145g



HELICOPTER FOR BEGINNERS

A-300
Length: 380mm
Height: 180mm
Main Rotor Diameter: 340mm
Weight: approximately 230g



HELICOPTER FOR BEGINNERS

LAMA V4
Length: 408mm
Height: 180mm
Main Rotor Diameter: 340mm
Weight: approximately 290g



HELICOPTER FOR BEGINNERS

E-500
Length: 427mm
Height: 280mm
Main Rotor Diameter: 460mm
Weight: approximately 408g



HELICOPTER FOR ENTERTAINMENT

BIG LAMA
Length: 510mm
Height: 260mm
Main Rotor Diameter: 460mm
Weight: approximately 410g



HELICOPTER FOR ENTERTAINMENT

HONEY BEE CP 3
Length: 525mm
Height: 185mm
Main Rotor Diameter: 540mm
Weight: approximately 149g



3D AEROBATIC FLIGHT UPGRADES

HONEY BEE 2
Length: 510mm
Height: 165mm
Main Rotor Diameter: 510mm
Weight: approximately 320g



TRAINER HELICOPTER FOR BEGINNERS

HONEY BEE CPX
Length: 525mm
Height: 185mm
Main Rotor Diameter: 540mm
Weight: approximately 420g



3D AEROBATIC HELI

HONEY BEE CT
Length: 525mm
Height: 185mm
Main Rotor Diameter: 540mm
Weight: approximately 440g



3D AEROBATIC HELI

HONEY BEE KING4
Length: 550mm
Height: 200mm
Main Rotor Diameter: 600mm
Weight: approximately 530g



3D AEROBATIC HELI

HONEY BEE KING3
Length: 550mm
Height: 200mm
Main Rotor Diameter: 600mm
Weight: approximately 390g



3D AEROBATIC HELI

BELT-CP V2
Length: 650mm
Height: 230mm
Main Rotor Diameter: 680mm
Weight: approximately 670g



3D AEROBATIC HELI

BELT-CP X
Length: 650mm
Height: 230mm
Main Rotor Diameter: 680mm
Weight: approximately 670g



3D PRO AEROBATIC HELI

BELT-CP CX
Length: 650mm
Height: 230mm
Main Rotor Diameter: 680mm
Weight: approximately 670g



3D AEROBATIC HELI

ESKY 900
Length: 620mm
Height: 311mm
Main Rotor Diameter: 929mm
Weight: approximately 850g



3D AEROBATIC HELI

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HS-35HD ULTRA NANO SERVO

Hitec paved the way with their micro servos and now they're taking it one step further with the HS-35HD. The HS-35HD is an ultra micro servo for all those small helicopter applications. Hitec states that this servo uses their trademarked Metal Karbonite gear train system. Hitec promises both longevity and efficiency unlike seen before in this market. It is rated at both 4.8v and 6.0v with a speed of .12 and .10 respectively. With helicopters continuing to get smaller and smaller its nice to see Hitec offer a valid option for purchase.

WWW.HITECRCD.COM



Brandon got tired of flying the models and decided to fly in the real thing.

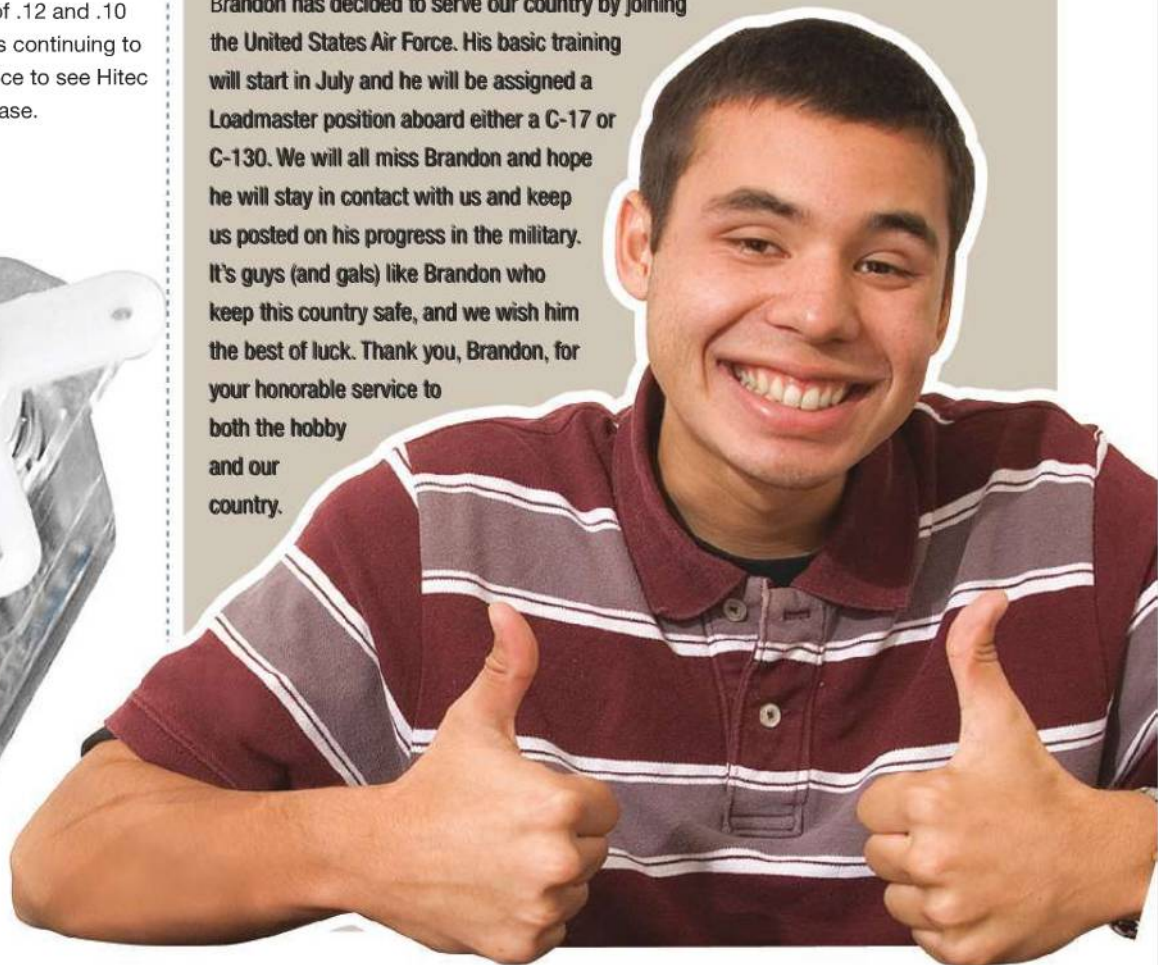
WE SAY **FAREWELL** TO OUR ASSISTANT EDITOR



BRANDON UPDIKE

Over the last few years, you may have known Brandon Updike as our in-house flight instructor, as he has written every Flight School article since he started working for the magazine. Brandon is a well-known sponsored pilot in the US and has helped many beginner pilots learn new and exciting maneuvers.

Brandon has decided to serve our country by joining the United States Air Force. His basic training will start in July and he will be assigned a Loadmaster position aboard either a C-17 or C-130. We will all miss Brandon and hope he will stay in contact with us and keep us posted on his progress in the military. It's guys (and gals) like Brandon who keep this country safe, and we wish him the best of luck. Thank you, Brandon, for your honorable service to both the hobby and our country.



ELY Q VISION COMPETITION 90

Ely Q has been steadily increasing their fleet size and now has a new 90 on the way. It's currently being tested in Italy and looks quite promising. There have been videos circulating on the web and it looks like it performs well. It borrows many of the same features of the Vision 50 Competition. We look forward to seeing it in action.

WWW.ELYQ.COM



X-Cell FURY 55

STEP UP TO EXCELLENCE WITH X-CELL



FURY 55 SPECIFICATIONS

- Length: 47.875" - 1216mm
- Height: 16.625" - 422mm
- Rotor Span: 1365-1405mm - 600-620mm Blades
- Tail Rotor Span: 260mm - 95mm Blades
- Avg. Kit contents Weight: 5.4lbs - 2.45kg (includes painted canopy)
- Avg. Ready-to-Fly Weight: 7.3-7.5lbs - 3.31-3.4kg (less fuel)
- Main Drive Ratio: 8.538:1
- Tail Drive Ratio: 4.61:1
- Bearings: 4-Thrust Bearings, 1-German Heim Ball, 38-Ball Bearings, 2-Torrington One-way Clutch Bearings



Graphite chassis that assembles easily and is supported by CNC aluminum frame braces



High Visibility Painted Epoxy-Glass Canopy by CanoMOD™



Rotor head is a new lighter design made just for this model. All aluminum flybar control assembly and ball bearings throughout.



New tail rotor transmission is simple to assemble and maintain with high efficiency, low drag belt drive system.

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**AMERICA'S
BEST R/C SALE!**

Great Planes and Hobbico are starting off the summer with a big sale giving new or seasoned pilots a break. Rebates are being offered on several hot items like the RealFlight G5 simulator reviewed this month. The sale starts May 1 through June 30 at participating hobby stores around the US.

WWW.GREATPLANES.COM

WWW.HOBBICO.COM



**MIKADO
LOGO 600 SE**

Mikado has been working diligently on several new products, which include the new Logo 700, and now the Logo 600 SE. The Logo 600 SE utilizes an extended boom allowing you to run up to 690mm blades. Your current Logo can be upgraded by purchasing the 6 cm longer tail boom, and the longer tail boom supports. Logo's running a 10s battery system will benefit with much longer flight times, which reach up to 15 min.

PART NUMBER: MIK2242

STREET PRICE: \$670

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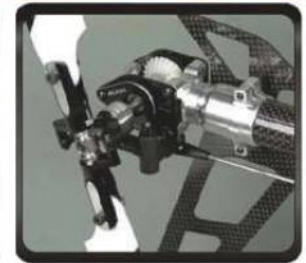


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Nitro T-REX 700

Go Flybarless



Design Features:

- *Simple and light weight design provides awesome flight performance.
- *+/-14 collective pitch is possible for extreme 3D performance.
- *Heavy duty tail thrust bearings.
- *Clutch, Fan and Bell assembly provide a very smooth operation even at high RPM.
- *Forward mounted tail servo helps to keep exhaust oil from entering servo also improves the CG.
- *Battery tray designed for easy and clean radio gear installation.
- *Fuel Tank Capacity 630c.c.
- *Heavy duty tail with thrust bearings.
- *Torque Tube driven tail for incredible 90 Sized performance.
- *Rigid frame design that can also handle hard crashes without damage.
- *Super engine cooling system very efficient airflow to provide unequalled cooling and hourspower.
- *New main gear with one-way bearing design for high torque.
- *Ready to fly weight(no fuel) is an incredible 4.2Kg.

Specification:

- *Length: 1335mm.
- *Height: 450mm.
- *Main Blade Length: 690mm.
- *Main Rotor Diameter: 1562mm.
- *Tail Rotor Diameter: 281mm.
- *Motor Pinion Gear: 20T.
- *Autorotation Tail Drive Gear: 150T.
- *Drive Gear Ratio: 8.2:1:4.54(E:M:T)
- *Flying Weight: 4.35kg

Accessories:

- *T-REX 700 Nitro 3G Kits Set x 1
- *690D Carbon Blades x 1set
- *RCE-G600 Governor x 1
- *2 IN 1 Voltage regulator combo x 1
- *Flybarless System x 1set
- *DS650 Digital servo x 1
- *DS610 Digital servo x 3


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LETTERS

WATT'S THE DIFFERENCE?

If you haven't heard from other readers by now, you will – the formula that was used on page 12 in the March issue to figure horsepower for the Scorpion HK-4225-610 is not correct. You state that the 3000 watt motor has “roughly 6.5 peak horsepower.” That's off by a lot. 3000 watts actually equals 4.02 horsepower (approx.), which sounds more realistic. A 6.5 horsepower motor is 4.85 kilowatts. So...how much power does it really have? Don't you just hate math?

Mark C. Willacker

■ *Hi Mark, thanks for pointing that out. The qualifying word in that small write up is “peak.” According to Scorpion: “This motor is capable of running continuously at an input power of 3000 watts at 80 amps, and can handle peak inputs of 4800 watts and 130 amps.” That would equal to 6.43 HP at peak, which is what we reported. We could have provided a bit more detail instead of just that qualifying phrase.*

Thanks for reading and for keeping an eye out.

- Mike

REPRESENTAR AHORA!

A few weeks ago, I was vacationing in Puerto Vallarta, Mexico. While sitting at the



pool, I was reading your ‘Raising Awareness’ article and started thinking about a simple way to promote this great hobby.

At the hotel, there was a local Mexican artist who was painting T-shirts with a spray gun. He did not have any helicopter pictures in his sample book. However, I provided him with a small picture of an RC helicopter and within a couple hours, he painted this amazing RC helicopter on a T-shirt (for \$25 canadian).

Now, when people ask me about my T-shirt, I tell them my story to help raise awareness and promote this great hobby.

Your magazine is excellent - keep up the great work!

Wes Speerbrecker
Port Coquitlam, BC, Canada

SWEET PAINT!

First, I'd like to say “Hats off” to you guys. I love the magazine and look forward to it every month. Here are a couple pictures of my T-REX 600 nitro. It's powered by an O.S. 50 Hyper engine with MP5 muffler. On the cyclics are three Futaba S9351 servos, and the tail is held steady by a Futaba GY401 gyro and S9254 servo. A Lightning Power 7.4V, 2500mAh Li-Po and Align RCE-B6X regulator supply the servos and receiver with power. I painted the canopy myself and I am awaiting the arrival of my Spectrum DX7SE. Thanks for a great magazine and keep up the great work.

Oscar Sifuentes
Fresno, CA



WANT TO SEE YOUR HELI IN THE MAGAZINE?

Send us pictures of your heli along with a description of what it's got. We prefer digital files (no zip files please) in a **HIGH RESOLUTION**, so be sure to flip that switch on your camera to the “fine” setting. One submission per month will receive a full-year subscription to **RC Heli Magazine!** **Void where prohibited. Subscription offer is valid for U.S. residents only!**

Digital files should be sent to:
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Please put “Feedback” in the subject line. If you still want to send film, please send your photos to:

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Did the painter make any copies?

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WE'VE GOT THE ALIGN GOLD CARD

Hey guys, my uncle and I love your magazine so we thought we would share our Align fleet. The Align 700N, 600N and 450 belong to my uncle and the Align Trex 500 belongs to me. This is the fleet of heli's we take to the field with us every Sunday (along with the JR Vibe 50 which isn't shown). We both enjoy reading your magazines, keep up the good work!

Thanks,
Eddie Calzaretta
Phil Haberstroh (Flyin Phil)



WIN BIG!

If you haven't sent us pictures of you, your heli, your work room, flying field or anything cool and heli related, now is the time to do so. From now until the end of June we're going to randomly select five winners among all the "Feedback" submissions we collect. Each winner will receive their choice of a "Scale" or "3D" RC Heli magazine T-shirt, and one will win a copy of Ray's Authoritative DVD Series: Shop & Field Companion!



Make them good, and email them to feedback@rchelimag.com. High-res photos, please.

THIS OLD HELI

First of all, I would like to thank you for making a great magazine; you help newcomers a lot. Here is my old TREX 450SE. It has Hitec 65MG servos for the

cyclic, Align RCE-600 and Hitec 8054MG on the tail, Castle Creations Phoenix 45 and BEC, Beam swashplate, RoterTech 325 blades and KDDDB tail blades.

I hope you like the shot. Love the magazine, keep up good work.

Thanks,
Jitavits Singharprink
Australia

■ *She doesn't look that old, and great photos by the way!*

- Mike



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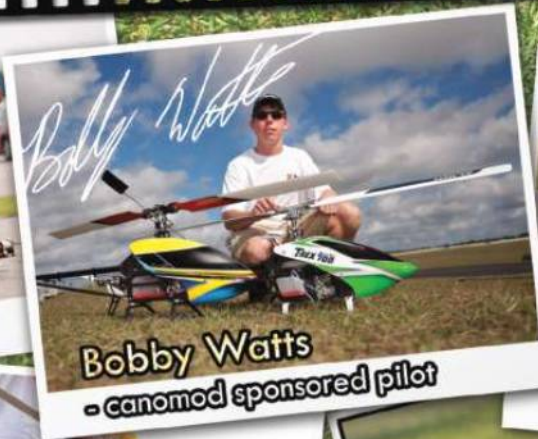
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QUICK TIPS

SPONSORED BY: **Ely.Q**

SAVE A BLADE

The hobby knife is a frequently used tool. The blades are sharply pointed, and the tip is the most useful part of the blade and should be well protected. After you're finished using your knife, take the blade out and flip it around. The holder will now become a sheath for that sharp point and extend the life of the blade.



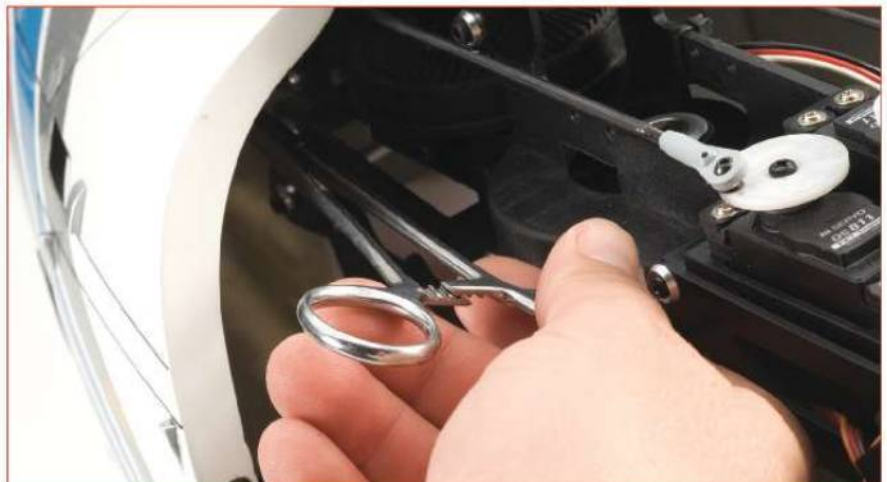
IDENTIFY THAT LEAD

Have you ever tentatively wired up your helicopter to make sure everything is working correctly, and then disassembled all of it to tidy up the wiring? If you did, you probably lost track of which connector goes to what channel. To save time and headache, several companies make servo lead identifiers. These little tags can help identify each lead and can make installation and maintenance a breeze.



TWO TOOLS ARE BETTER THAN ONE!

When building scale helicopters we find ourselves having to reach in places that our hands do not often fit. Sometimes we are faced with a hard to reach area that even our tools can't get to. In cases where a nut must be attached to a screw that is facing the back of the fuselage for example the top mount, there is a simple trick that can help you get that nut on without trying to go from the back. Take a small nut driver and a pair of hemostats and link them together by grabbing the nut driver in a way that the driver can apply the nut. This will allow you to reach back there and hold down the nut while you tighten the screw.



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Length: 1180 mm Height: 420 mm
Main Blade length: 600/620 mm
Main Rotor Diameter: 1335 mm
Motor Pignon Gear: 11T

Autorotation Tail Drive Gear: 41T
Flying weight: 2,920 Kg (no fuel)
Fuel Tank Capacity: 490 cc
Main Frame: Carbon Fiber 2 mm



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FREQUENTLY ASKED QUESTIONS

Q: I have a Li-Po charger, but it only puts out 2200mAh. Can I charge a 3800mAh Lipo with my charger? **-fernandezsraptor**

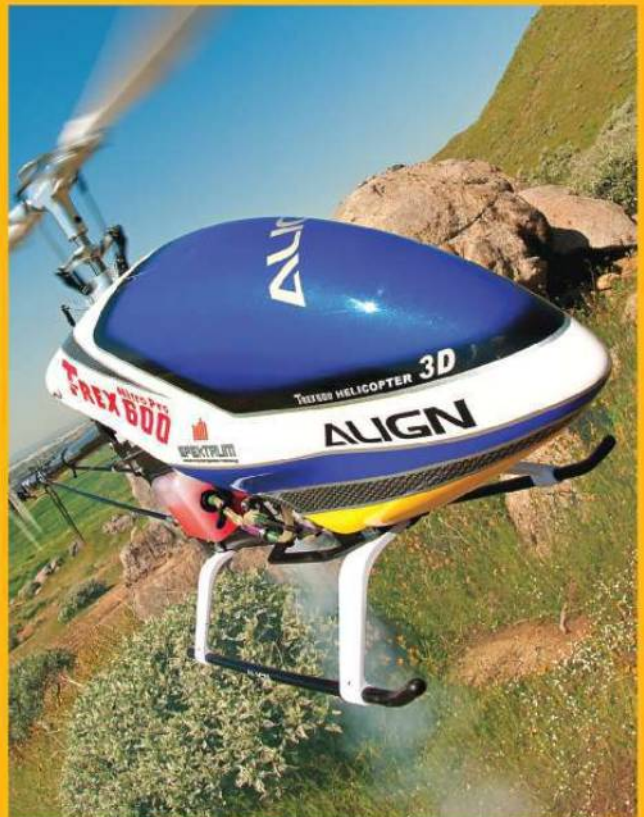
A: Yes. Your charger will output a maximum of 2.2 amps. Li-Po batteries are charged by monitoring the voltage of the pack throughout the charge. Most battery manufacturers say to charge the packs at a "1C" rating, which means that your 3800mAh pack should be charged at a maximum of 3.8 amps. Lowering the charge rate will increase the time to complete the charge, however. Since your charger has a maximum output of 2.2 amps and you have a 3800mAh capacity battery, it will take approximately an hour and 45 minutes to charge your pack. **-Rkephart**



Just pretend that the 6S pack is a 3 cell.

Q: I just got a great a Trex 600n Super Pro, which comes with Align's 3G system. I think it's nice having the newest technology, but I don't know if it's best for me in this situation. This will be my first nitro heli. I have flown the Dominion 90 flybarless on G4.5 a bit and I really like it, but that one comes with unlimited replacements. So my question is, would it be worth the money to set it up with a traditional flybar equipped rotor head, or is it something I could get set up and learn to fly the way it comes? **-mikewetzel**

A: Hey Mike, that is one great flying helicopter, as you can tell in the last issue of RCHELI. Align does offer a flybar conversion for the 3G version, but I don't think you need to do that. Replacing the 3G system would be expensive, as you have to purchase the head and a separate gyro for the tail. That can really add up depending on which gyro you plan on using. The 3G system works well and can be dialed down to a nice comfortable feel that somewhat rivals a flybar equipped head. It may take a little more to set up and understand how to program, but I think that would be the way to go. Get some advice from a fellow pilot, or give Align a call and talk to their customer service reps. You can even shoot me an email if you need some help. (ryank@rachelimag.com) **-RKephart**





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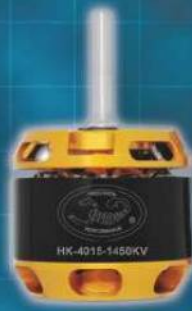
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Great Planes RealFlight G5

RealFlight's newest version

WORDS: Brandon Updike

REALFLIGHT HAS BEEN STEADILY UPGRADING THEIR SIMULATOR TO KEEP IT COMPETITIVE WITH THE COMPETITION. A new edition of RealFlight is starting to become common practice, like a yearly Madden NFL game release. RealFlight has released their newest edition, commonly known as G5. Change is good for a simulator, but it can be hard to justify the cost of upgrading if the changes are minimal. I've always considered the physics in RealFlight to be pretty good, so I don't want to see much change in that area. This leaves the question of how good the new bonus features are and if it makes the purchase worth it.

FEATURES

With the varied editions of RealFlight over the years, there have come a wide variety of added features. Having flown RealFlight simulators since the G2 era, I have seen the simulator evolve quite a bit through the years. The physics alone have grown tremendously and has evolved with the changing times in our hobby. There have also been a barrage of new features, some good and some bad. Even though the physics on G5 has been left largely unchanged, there has been a large addition of new flight modes.

With the popularity of online gaming exploding on consoles, RealFlight has decided to tap into that market a little more. They have always had the ability to fly with fellow pilots online, but they have expanded on the available options. With the combat scene being so big in the airplane world, they've added that to the multiplayer function. There is the traditional combat with streamers, and a dogfight style combat with missiles and guns. The dogfight combat takes a chase cam approach as you try to lock in to your enemies and shoot them out of the sky. They have also improved the onboard

camera to give you an actual cockpit view. You can now fly in the aircraft as if it were an actual airplane. I do recall G2 having similar camera options, but I haven't seen it in recent renditions. It's nice to see the added camera options back and better than before.

Editing your aircraft has always been easy with RealFlight and G5 expands on this heritage. You can adjust nearly anything on your aircraft now. There is the full version of G5 that comes with a transmitter and then there is the upgrade edition, which only includes the discs if you have any edition from G3-G4.5.

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INSTALLATION AND TESTING

I received the upgrade copy rather than the full version because I already have a G4 transmitter. The simulator comes in a 4-disc configuration for installation. When installing, I noticed that the previous version did not need to be installed in order for the upgrade disc to work. It works more like a stand-alone game and the only thing the previous version is used for is the transmitter. Installation went without any problems and was relatively quick.

After installation I immediately ran the program to see if everything was running smoothly. The simulator ran without a hitch and I immediately began flying the helicopters. I used my trusty Expansion Disc 2 because it has some good helicopters on it. Overall, the simulator has the same trusty feel that I've become accustomed to with G4. The physics have been largely unchanged, which is a good thing because I've always liked the physics. The tail seems to perform a little bit better than past

versions. That was always my one gripe with RealFlight—that sometimes the tail would exhibit odd behavior.

Once again, the simulator comes standard with a wide range of aircraft that each have its own unique style. They've even made a flybarless version of the Dominion 90 that flies decently in its stock setting. I've found that if you reduce paddle weight you can make any helicopter feel similar to a flybarless setup. The multiplayer additions are actually kind of fun and I enjoyed messing around with it. I've always liked combat simulators, and even though this one is far from perfect it is still pretty fun. I also used my USB microphone to see how the communication works, and it seems to work just fine. It's a nice touch that RealFlight added to improve communication in the online community.

CONCLUSION

Overall, the simulator ran very well on my computer but still needs a decent setup to run optimally. We tried running it on our

office laptop and the lack of a dedicated video card really hurt the performance. If you have anything but an integrated video card, your simulator should run just fine. RealFlight has always required a decent setup (but nothing too out of control) to run properly. Its not a huge improvement over 4.5, but the new features are fun to play with. If you have 4.5 and you're happy then it might be difficult to justify, but if you're in the market for a new simulator then this one is a great option. **FTR**



Shown actual size!

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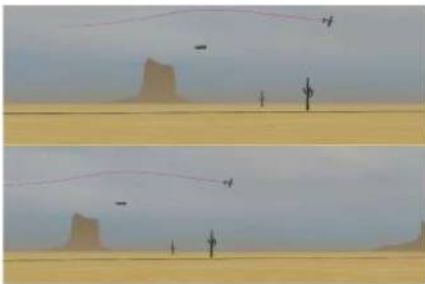
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THE GOOD

- Good physics
- Tons of bonus material
- Good multiplayer

THE BAD

- Not much has changed
- Tough to justify if you're happy with 4.5

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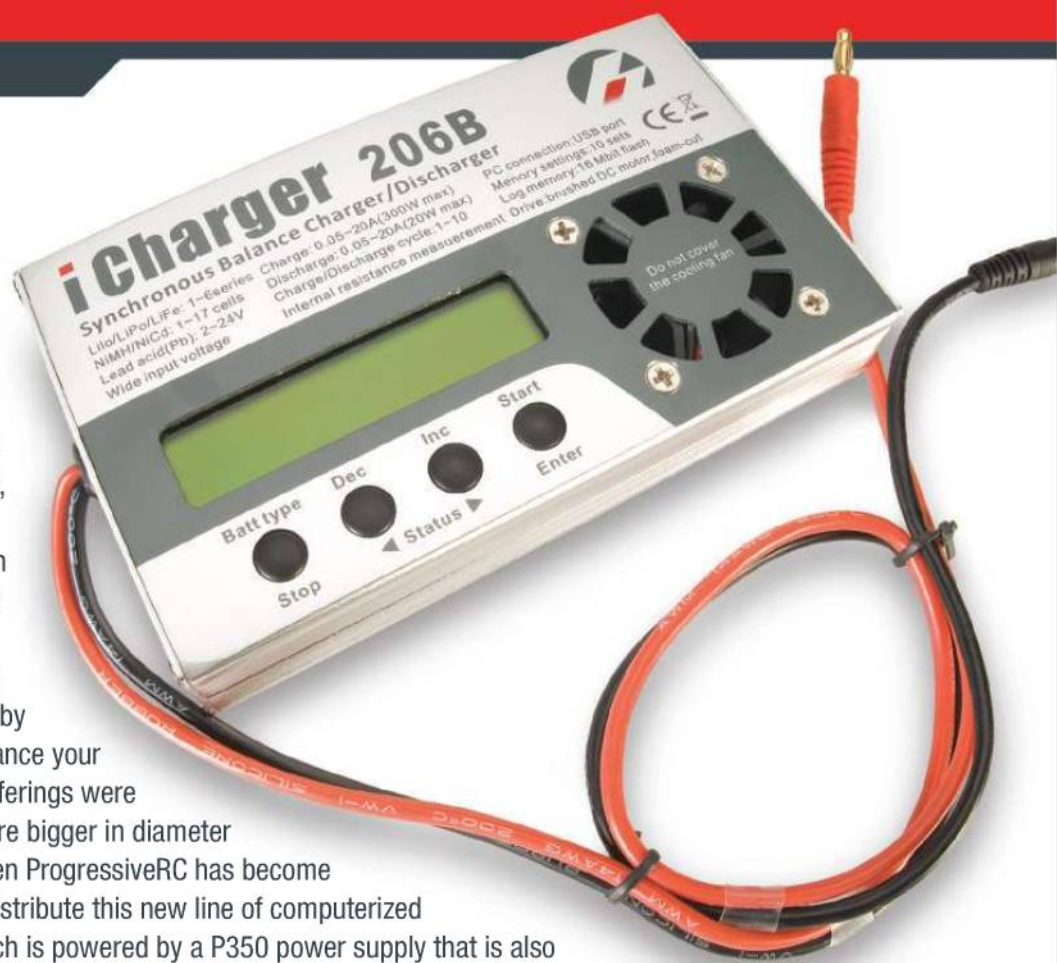
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iCharger 206B

The Silver Bullet

WORDS: Ryan Kephart

ProgressiveRC is distributing the newest of the iChargers, the 206B. This month we are giving you the full run down on this new type of charger that does much more than just charge your batteries. ProgressiveRC company that has taken pride in this hobby by offering unique products that enhance your experience as a pilot. Their first offerings were transmitter stick adapters that were bigger in diameter for the pinch style flyers. Since then ProgressiveRC has become much larger and has decided to distribute this new line of computerized chargers. The iCharger 206B, which is powered by a P350 power supply that is also carried by ProgressiveRC can output a maximum of 25 amps.



The most powerful iCharger yet.



THE GOOD

- Can charge new cells fast
- Has extra features
- Multiple adapters for balance tabs

THE BAD

- No multi type charge lead

CONNECT

MANUFACTURER:	iCharger
WEBSITE:	www.progressiveRC.com
PART NUMBER:	IC-206B
STREET PRICE:	\$150

FEATURES

The iCharger series of chargers use an advanced DC/DC converter that can reach up to 90% efficiency. This saves power and reduces heat, which can also make the charger more compact. The 206B has an input voltage range of 10 to 28 volts DC giving you a wide range of input options. The charge function of the 206B is able to charge LiPo, Lilo, LiFe, NiCd, NiMH, and lead acid (Pb). This gives you the ability to charge everything in your arsenal up to a 6s LiPo or 17 cell NiCd/NiMH. The iCharger has a built in fan that is controlled by temperature. The fan only kicks on when needed. A 10 battery profile keeps your batteries charge rate conveniently stored into its memory bank to allow for quick battery charges. The charger has a nice backlit screen that provides 2 lines both 16 characters long. The screen displays a wealth of information including the active mode, current, voltage, total charge in mah, charging time, and balance status of each cell. The new 206B is different then the older 1010B+ which we reviewed in a previous issue. This charger can really output the amps. Rated at double the amps of the 1010 the iCharger can output a max of 20 amps to a 6 cell battery. Why would you charge your LiPos that fast you ask? Well the newer cell chemistry allows you to charge your packs up to 6C. Meaning you can charge that 3 cell 2200mah LiPo and balance it in a matter of 15 minutes.

TESTING

We tested all the functions of the new iCharger and must say that every function worked well. Much of the features of this charger were carried over from the 1010. We also wanted to test the fast charging ability and find out how well it can balance and charge a pack at the 6C rating. Staring up the charger ramps up the amps taking careful note at how high the voltage is in each cell. As the battery pack reaches the optimal voltage for each cell it starts to back off the amps and keep the voltage at 4.2 volts per cell. This feature worked beautifully and never made the cells go over the maximum voltage. I tested a single Thunder Power 2200mAh 11.1v battery to find out if any adverse effects were noticed. I am pleased to find that after about 30 cycles the pack is still strong and I was charging the pack in about 10-15 minutes.

CONCLUSION

Overall the iCharger 206B from Progressive RC has been as easy as any other charger I have ever used. The charge rate if phenomenal and the safety features work great. If you have batteries that can handle the charge rate, then this charger is what you need. You can fly and charge, then be back in the air in a matter of minutes. **TBR**



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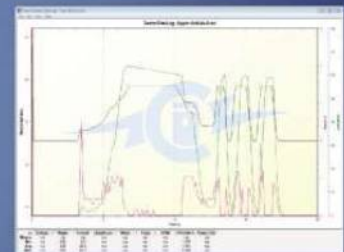


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REGULAR GUY INTERVIEW

with **JOHN MORGAN**

Welcome to the first RC Heli Magazine “Regular Guy” interview. We will be conducting a short interview with an unknown, non-sponsored pilot that is one of the “good guys” at their local field. We hope to shed some light on what I consider the lifeblood of this hobby—those pilots who train and help new pilots succeed and do so with no fanfare or payment. We are looking for the unsung heroes in the hobby, if you know of such a person we could interview in your area, please email me at rchelijim@gmail.com.

PILOT **INTRO**

 Our first “Regular Guy” interview is someone very important to me, John Morgan. John is the guy who took me under his wing and helped me get started in the hobby. John enjoys teaching new pilots and he continues to do so every chance he gets. In fact, we had to reschedule our interview a handful of times because every time we were about to talk, he would end up helping someone at the field.

RCH: TELL US A LITTLE BIT ABOUT YOURSELF. WHAT DO YOU DO? WHERE DO YOU LIVE, ETC?

JOHN: My name is John Morgan and I was born in Provo, Utah. I fix the mail trucks for the U.S. Postal Service in Orem, UT and have worked for the Postal Service most of my adult life. I currently live in Pleasant Grove, UT.

RCH: HOW DID YOU GET STARTED INTO RC HELIS?

JOHN: I have always loved anything that flies, and I was into flying RC planes when I came across a heli sitting in a hobby shop for sale and I just had to take it home with me. I knew nothing about them and didn't know anybody who knew anything about them, either.

The helicopter was a Kalt Baron 50 and although I was very frustrated trying to learn my way around it, I was fascinated by it. I eventually gave up on getting it flying and put it away for a while, but that didn't last long and I went back to it.

RCH: WHAT ARE SOME OF THE MANEUVERS YOU ARE CURRENTLY WORKING ON? WHAT ARE YOUR FAVORITES?

JOHN: My favorite maneuvers are Tic-tocs, and I also love to shoot autos. I am working on learning inverted forward flight right now.

RCH: WHAT'S YOUR ADVICE FOR NEW PILOTS?

JOHN: My advice to new pilots would be

to learn all the orientations of flight, both inverted and upright, before learning 3D.

RCH: WHY DO YOU FLY HELIS NOW AND WHAT ARE YOUR FUTURE PLANS WITH THE HOBBY?

JOHN: I love to meet with the boys every Saturday for breakfast and go flying all day. I think we "B.S." more than we fly, but that's part of the fun. I plan to fly helis for quite some time. I started our heli club some years back and it is fun to meet new members and watch the club grow. Our club has come a long way and I am very proud of it and our members.

RCH: THANKS FOR YOUR TIME, JOHN, AND FOR YOUR DEDICATION TO THE HOBBY!

CONCLUSION

Pilots like John Morgan are the backbone of the heli community. They are willing to go out of their way and sacrifice their own flying time to help another guy out. I think most of us that have been in the hobby for an extended time have been influenced by someone like John and hopefully we can all "pay it forward" by helping a new guy ourselves. See you at the field! *(TBL)*



Even the cops are interested about the hobby and John is there to provide the info.



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You can do a lot with 40 Amps!



POWER SUPPLIES

Power Up, and Charge Out!

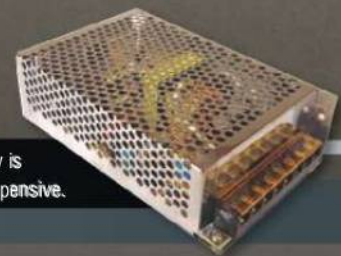
WORDS: Chuck Bassani

I'M OFTEN ASKED THE QUESTION, "WHAT IS THE BEST POWER SUPPLY?" That question can only honestly be answered one way, and that is, "It depends on what you're going to do with it."

When we talk about power supplies, we're generally referring to something that is going to be used to power our battery chargers. Technically, a power supply can be either a battery itself (as when you connect a charger to your car's battery) or some sort of AC to DC converter; the latter of which will be the topic of this month's "Tools of the Trade".



The sky's the limit.



A modern switching power supply is small, efficient, and relatively inexpensive.

» WHAT IS A POWER SUPPLY?

More specifically the question should be "What is a DC Power Supply?" The DC power supplies we're interested in have two primary functions; converting alternating current (AC) to direct current (DC) and decreasing the voltage. In this country, the ones we use typically have 110v or 220v AC input and output 12v or 24v DC.

Furthermore, a power supply's output voltage may be either regulated or non-regulated. A regulated power supply actively works at keeping the output voltage constant, regardless of the load

placed on it (up to its specified maximum current, of course.) The output voltage of an unregulated power supply cannot be expected to remain constant; it generally will fluctuate based on the load.

There are two types of power supply designs; linear and switching. A linear power supply uses a transformer to step down the AC voltage and then uses a rectifier circuit (typically diodes) to convert the AC to DC. Filters capacitors are used to smooth out the waveform. A regulator circuit then monitors and adjusts the output voltage, keeping it

stable. Linear power supplies are heavier and less efficient than a switching power supply of equal specifications.

Switching power supplies, on the other hand, rapidly switch the full input voltage on and off. The ratio of the on-time to off-time (called the duty cycle) is used to regulate the output voltage. The regulator circuit controls this duty cycle. The main advantage of a switching power supply is that it doesn't need to dissipate the excess voltage, making it the more efficient of the two types. Most power supplies used today are of this type.

THE CHARGE PROCESS

A power supply must be capable of delivering the power demanded by your charging needs. Knowing a little bit about how various types of batteries are charged will help you determine those needs. Regardless of what brand and model battery charger you use, the charging techniques described here are generally the same.

Today's chargers can be pretty power hungry when charging multi-cell, high-capacity batteries. Make sure your power supply is up to the task.



NICKEL BASED CHEMISTRY

- **NICKEL-CADMIUM (NICKD) AND NICKEL-METAL HYDRIDE (NIMH)** batteries are charged using a 'constant current' charge technique. The charger controls the current by varying the voltage across the battery.
- **PEAK DETECTION** chargers take this one step further and keep track of the voltage during charge. The voltage will 'peak' when the battery is fully charged and then begin to decay. The detection of this peak is what terminates the charge.
- **THE MAXIMUM POWER REQUIRED** when charging nickel chemistry packs will be the maximum voltage applied across the pack (typically around 1.5 volts per cell) multiplied by the charge current.

LITHIUM BASED CHEMISTRY

- **LITHIUM POLYMER (LI-PO), LITHIUM-ION (LI-ION), AND LITHIUM-IRON PHOSPHATE (LIFEPO4)** all use a similar constant current technique. The difference is that when the battery reaches a pre-determined voltage, the charge switches to a 'constant voltage' charge. During this final phase of the charge, the charger monitors the current and terminates the charge when the current approaches zero amps.
- **THE MAXIMUM POWER** required when charging lithium chemistry packs will be the maximum voltage applied across the pack (typically around 4.2 volts per cell for LiPo and Li-Ion batteries, and 3.6 volts per cell for LiFePO4 batteries) multiplied by the charge current.

Keep in mind what you might be charging in the future.

SELECTING A POWER SUPPLY

Power supplies are rated by their output voltage and the amount of current they can supply, the product of those two being its power rating. There may be two power ratings, one for 'burst' and one for 'continuous'. It's the 'continuous' rating you should look at. For example, a 12V power supply that can provide 5 amps continuous current is effectively a 60 watt power supply (see sidebar on Ohm's Law & Power).

Using our knowledge of how a battery is charged, we can determine how much power is required to charge it. The best way to demonstrate this is by yet another example. Let's say you want to charge a 5,000 mAh, 6S LiPo pack at a 1C rate. This equates to a charge current of 5 amps. When our 6S pack reaches its maximum charge voltage of 25.2V (4.2V x 6) and is drawing

5 amps of current, the power supply will be delivering 126 watts of power.

From the power supply's perspective, you're asking it to supply 126 watts. If you're using a 12V output supply, dividing 126 watts by 12V tells us that it must be capable of delivering 10.5 amps of current. If you're using a 24V supply, the power supply would only need to deliver 5.25 amps.

Generally speaking, the lower the power supply's current rating, the less it's going to cost. So if your charger has a rather flexible input voltage range, it'll be cost effective for you to buy a power supply

with an output voltage towards the higher end of that range. Why? You can buy a supply with a lower current rating and still fulfill your power requirements.



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THE BLING FACTOR

One other thing I'd like to talk about is what I'll call the 'bells & whistles'. All a power supply really needs to do is supply power. However, supplies are available that include additional features such as input voltage meters, output voltage meter, output current meter, adjustable output voltage, current limiting control, etc.. You can also purchase laboratory grade supplies that hold very tight tolerances.

For charging batteries, these simply aren't needed, and they only add to the price. As long as you've done the math and are sure that your supply is capable of delivering the power you need, there's really no pressing need to monitor or control it. It's basic functionality is good enough for our needs.

Ah, brings me back to Science class.



Lab grade power supplies are awesome for sure, but they're not necessary for charging batteries.

OHM'S LAW & POWER

Ohm's Law defines the relationship between voltage (E), resistance (R), and current (I). The following formula shows this relationship:

$$E = I \times R$$

- OR -

VOLTAGE = CURRENT X RESISTANCE

Essentially, it takes a voltage (E) of one volt applied across a conductor having a resistance (R) of one ohm to produce a current (I) of one ampere.

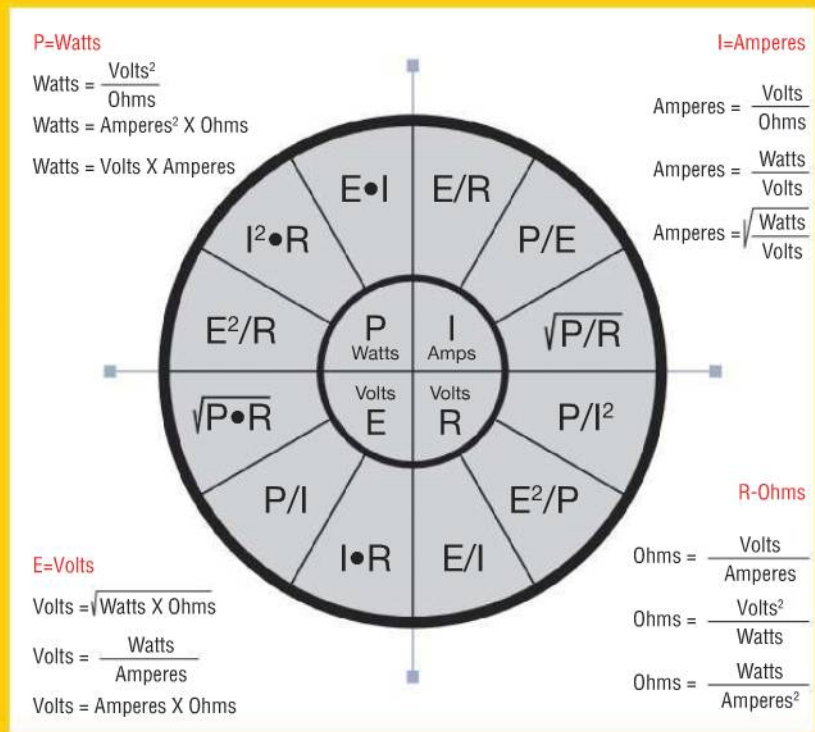
Using another formula, we can calculate power (P) as follows:

$$P = I \times E$$

- OR -

WATTAGE = CURRENT X VOLTAGE

We can combine and rearrange these two formulas and solve for any one of the terms. The following chart depicts the derivatives:



This chart shows all the relationships between voltage, current, resistance, and power.

CONCLUSION

Selecting a power supply that meets your needs is easy when you know how to determine what those needs are. Hopefully, this article detailed how to do exactly that. One other thing I'd like to add is that you don't have to pay a lot of money for a good power supply. eBay is chocked full of very good quality switching power supplies at remarkably good prices. You just need to know what you're looking for.

Happy Flying ...

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HEIGHT : 378MM

WIDTH : 203MM



VELOCITY 50



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► Torque tube tail drive
► Full metal tail unit



► Full programmable rotor head
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► 3.6Kg ready to fly
► Ultra rigid compact frame design

- Main Rotor Blade Size 600-630mm
- Main Rotor Diameter: 1355mm -1415mm

- Tail Blade Length: 95mm
- Tail Rotor Diameter: 250mm

- Main Gear ratio: 8.6:1 (8.8:1 Optional)
- Tail Rotor Ratio 4.583:1
- Approximate Flying Weight with Fuel: 3.6kg / 7.936 Lbs. (depends on equipment used)

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TORQUE TUBES

That tail rotor needs to spin, too!

WORDS: Shawn Kitchen | PHOTOS: Jason Boulanger

ASSEMBLE ANY GROUP OF HELI PILOTS, AND CERTAIN DEBATES ARE BOUND TO COME UP. Mechanical mix or CCPM? JR or Futaba? (I always messed up that debate, since I'm an Airtronics guy.) Nitro or electric? Scale or 3D? The list is nearly endless.

Depending on the style of flying preferred, another common item of debate arises over getting the power to the rear rotor. Is a belt-driven tail rotor the best, or is a torque tube head-and-shoulders above the rest? Well, there's an old saying about opinions and... well... you-know-whats, but we can take a look at some of the particulars of these drive systems and see the benefits for ourselves. In this month's Anatomy, we'll dissect the torque tube and see what makes it work.

ALMOST TOO SIMPLE **TO BE TRUE**

Basic RC helicopter design hasn't changed much in the last 30-plus years. We know that the main rotor goes on top and is driven by a gear that meshes with the engine. We also know that the tail rotor goes out back on the end of the tail boom, and it's usually driven by the same engine that powers the main rotor. (We won't get into the electric helis that use dedicated motors for the tail rotor, since that's a

"fringe minority" compared to the overall market. Besides, in this author's opinion, it's just unnatural. I'm kidding...)

In the early days of RC helicopters, stiff "piano wire" was used between a couple of bevel gears, and this was how power was transmitted to the tail rotor. When the state of flying was such that a 5-minute hover was considered Advanced and tail gyros had spinning flywheels, piano wire was an acceptable choice. However, as gyro technology improved and aerobatic flight became the norm, it was found that piano wire would "wind up" and cause

fluctuations in tail rotor speed. This would play havoc with gyros, to say nothing of causing inconsistent tail rotor performance. What was needed was something with the availability of piano wire, but didn't have the springy torsional characteristics.

What was used was a hollow rod. Basic engineering teaches us that hollow tubes tend to be stronger than their solid counterparts because of the mechanical leverage that their outside diameters exert against the stress applied. Rather than using thin pieces of piano wire, a larger diameter tube could be substituted which virtually eliminates the wind-up of wire. It also happens that as the diameter is increased, the wall thickness decreases to handle a given stress, which tends to make the tube lighter. Stronger, stiffer, and lighter... what's not to like?

Tubes can have many different ends.



HOW THEY'RE USED

Torque tubes are simplicity itself. The shaft itself is simply that—a long, hollow shaft. They're made of aluminum or carbon composite. They're not much different from the stock that's used to make hunting arrows (in fact, this author had purchased bulk, blemished Easton carbon arrow shafts for use in his helis with no problems whatsoever, and for a fraction of the cost of buying pre-packaged torque tubes from a hobby store). Each end of the shaft has a bevel gear inserted into it, and these gears are what mesh with the drive system up front and the tail output shaft at the rear. The gears up front are turned by the engine, which then spins the torque tube, which spins the rear gearbox, which spins the main rotor. It doesn't get much simpler.

One area where torque tubes can differ is in the method used to attach the bevel gears to the hollow shaft. Some manufacturers use a molded plastic gear (usually Delrin) that slides into the end of the shaft, and then a hole is bored through the entire assembly and a pin is pushed through to lock everything into place. In most of these cases, a grub screw is threaded lengthwise through the end of the bevel gear, which tightens against the locating pin and keeps it from sliding out. (If the pin did slide out, the gear would no longer be tied to the shaft, and you'd lose power to the tail rotor.) Other companies will use a similar bevel gear, but will then use a collar to secure the gear to the shaft. The collar will have at least one or two grub screws in it, which will lock the gear to the shaft by either compressing one against the other or by keying to the gear through a small hole drilled through the shaft. Regardless of the particular setup used in your helicopter, manufacturers have refined this technology over four decades or more of helicopter design, and you can rest certain that if assembled to the manufacturer's specifications, your torque tube will provide excellent, reliable service.

» NOT QUITE **PLUG-N-PLAY,** **BUT PRETTY CLOSE**

Before you start slapping pieces together and expecting everything to work, there are a couple of small issues to be considered for best results. The most significant—in this author's opinion—is the trueness of the shaft. As torque tubes are installed in the tail boom, they are often made to pass through at least two or three bearing holders. While this could give the impression that the torque tube is forced to run straight-and-true, that's not always the case. If you have a torque tube that's bowed in any way, installing it in the tail boom and forcing it into a straight position adds stress to the shaft. Stress that is put into a piece is always looking for a way to get out of that piece. This can show up as a vibration as bearings and bearing holders get loose from use and the shaft is allowed to wiggle around. If you make the mistake of spacing your bearing holders at exactly even points in the tail boom, an out-of-true shaft can actually cause a vibration in the torque tube assembly that's similar to plucking a guitar string. Does it happen every day? No. Has it happened before? It has to me. Are we splitting hairs? Possibly, but if you're a certifiable Type A nitpicker like me, why leave anything to chance? Take a couple minutes to make sure that you're getting a nice, straight shaft, and you'll save yourself a lot of potential for trouble. The smoother you can make your helicopter, the better.


The other issue to consider while building your torque tube and tail boom assembly is something that's just been alluded to—placement of the bearings and bearing holders. Some people make a point to put their bearing holders at symmetrical points in the tail boom. (For example, if they only have one bearing, they'll put it directly in the center of the tail boom. If they have two bearings, they'll put the holders at exactly 1/3 and 2/3 of the length of the tail boom.) The problem is that a torque tube is essentially a long rod, and any vibration that creeps into the helicopter is looking for a place to express itself. In the case of a torque tube, that vibration can actually cause the torque tube to resonate because the bearing holders are at the vibratory "nodes" of the torque tube. How do you eliminate this possibility? Easy... just move the bearing holders slightly to one side or the other of that symmetrical point.



This torque tube is bent and cannot be used. Do not try and bend it back.

Even some of the smallest helicopters use a torque tube.

CONCLUSION

Torque tubes are almost as reliable as a stone hammer, they've been in common use for decades, they're inexpensive to make, and in many cases the sizes of the shafts are similar to common off-the-shelf items from other areas of life. Torque tube tail drives are found in nearly every manufacturer's lineup because of their service record and ease of manufacture. The next time you're building a new machine with a torque tube tail, take a minute to appreciate the simplistic beauty of this age-proven design. 

12 TIPS

HOW-TO BRING YOUR HELICOPTER BACK SAFELY

Your Anti-Crash Regimen-

WORDS: Brandon Updike | PHOTOS: Staff

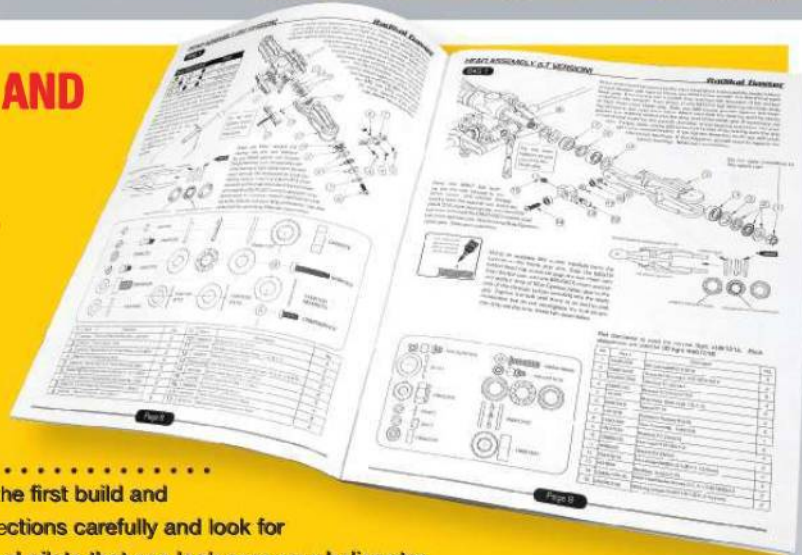
Flying RC helicopters is an exciting hobby because of the inherent risk. We're a strange bunch; we like to fly expensive and complicated machinery even though one wrong move can make it all come crashing down. Crash costs are often factored into the thought process when purchasing a new helicopter. Even though crashing is part of the hobby, you can always minimize the possibility of a crash by following an "anti-crash" regimen to prevent possible error. In this article we'll give you a nice list of what to do before, during, and after a flight to limit your crash causes to just your thumbs.



Dumb thumbs can be expensive too.



THE FIRST - AND PROBABLY MOST IMPORTANT - ASPECT OF FLYING HELICOPTERS IS THE ASSEMBLY PROCESS.



If you are new to the hobby, then take your time on the **first build** and make sure that you do things correctly. Read the directions **carefully** and look for other resources for build tips. It also helps to find **local pilots** that can look over your helicopter before you fly it for the first time. Setup is a difficult **procedure** to learn on your own, so seek help if possible.



BEFORE EACH FLIGHT, PERFORM A PRE-FLIGHT INSPECTION OF THE HELICOPTER.

Take the canopy off and give everything a once over. Move the bellcranks by hand and check all of the rotor head linkages to make sure nothing is loose. Make sure that there aren't any loose bolts and that the tail assembly is in proper working order. Check your dampers for proper stiffness and no signs of damage. I've had a few occasions where my dampers were worn out and I caught it before I flew, which helped prevent a possible boom strike. Check your radio system and make sure that your controls are operating in the proper direction.



BEFORE STARTING THE HELI, MAKE SURE THAT THE RECEIVER IS IN THE ON POSITION.



Surprisingly, I've seen people start their helicopter without even turning on the power. Have your throttle all the way down and make sure that your Idle-up switches are off as well. Be sure to always keep a firm grasp on the rotor head to be able to contain a sudden spool up.



Hot starts are considered pilot error.



WATCH YOUR HELICOPTER WHEN YOU SPOOL UP THE ROTOR HEAD.

A helicopter can exhibit problems during spool up if there is something mechanically wrong with it. Check to see if there are any vibrations and if the clutch is engaging normally. If your gyro is backwards, your helicopter will pirouette on the ground.



ONCE YOUR HELICOPTER IS IN THE AIR THIS IS THE TIME TO MAKE SURE EVERYTHING FEELS OKAY.

Feel the trim and adjust it if the heli starts drifting. Check the tracking by watching the blade disc. If you see a gap between the blade tips, then your tracking is off. If your blade disc looks flat, your tracking is perfect.



BEGIN FLYING AROUND. ALWAYS KEEP ALERT JUST IN CASE SOMETHING HAPPENS.

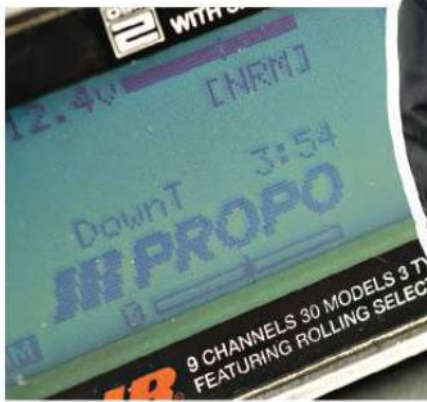
Listen to any sounds that the helicopter exhibits. If something sounds out of the ordinary, bring it in for evaluation. Also, bring your helicopter back into a hover at some point during the flight to see if your trim changed. If it was altered during flight, you might have a mechanical problem with the helicopter.





7 SET THE TIMER ON YOUR TRANSMITTER SO THAT YOU DON'T RUN OUT OF FUEL DURING THE FLIGHT.

It will also help prolong the life of your batteries if you fly an electric heli.



8 IF YOU HAVE A FAILURE DURING THE FLIGHT, THE ONE THING YOU CAN'T DO IS PANIC.

Develop the habit of hitting Throttle Hold to minimize damage and regain control of the helicopter. Both mechanical and electrical failures are possible, with electrical failures being a little harder to diagnose. Electrical failures usually exhibit strange behaviors and are hard to get under control.



9 LANDING IS A REALLY EASY TASK BUT SOMETIMES THINGS CAN GO WRONG.

On those rare occasions that you're landing on concrete, the helicopter may shake suddenly on spool down. Just remember to ease out of the collective to make the transition back to idle a smooth process. A nice way to land is to do an easy auto to a few feet off the ground. This allows for a smooth landing with the engine in Throttle Hold.



10 CLEAN YOUR HELICOPTER WHEN YOU'RE DONE FOR THE DAY.

This helps keep the grime off the electronics.



11 WHILE CLEANING YOUR HELICOPTER, PERFORM A POST-FLIGHT INSPECTION.

Check everything over to make sure that nothing happened during the flight.



12 STORE YOUR HELICOPTER IN A SAFE PLACE AT YOUR HOUSE.

Properly charge batteries and store them in a safe area to prevent possible future battery failures.



CONCLUSION

Even though crashes are inevitable, you'll quickly learn that with proper maintenance the likelihood of crashing is reduced. Just keep your guard up and crash your helicopter the old fashioned way... with your thumbs. *[T.H.L.]*

Scale fuselages can increase ground resonance.

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CHOOSING THE RIGHT GLOWPLUG

Which one works and which one doesn't?

WORDS: Jim Innes | PHOTOS: Jason Boulanger

NITRO HELI ENGINES ARE AMAZINGLY SIMPLE AND STRONG PIECES OF MACHINERY. They create relatively large amounts of power with just a single piston—and one that's usually small. The whole combustion process in these little wonders depends greatly on the lowly glow plug. Glow plugs are available in numerous ratings and are made by numerous manufacturers. How do you decide which of the many glow plugs out there will work best in your heli? This basic overview should help answer that question.

Hey, where did all the gaskets go?



» WHAT IS A GLOW PLUG?

A glow plug looks similar to, and performs much like a spark plug found in an automobile. It's a threaded piece of metal with a hole containing a coil inside. This coil, or filament, is the bread and butter of the plug. In modern glow plugs, the filament is usually coated with or made purely of platinum. The top of the plug has an adapter for a glow starter to attach to. A washer on the threaded end is meant to seal the plug, while the motor head rounds out the unit. The glow plug is truly a simple device.



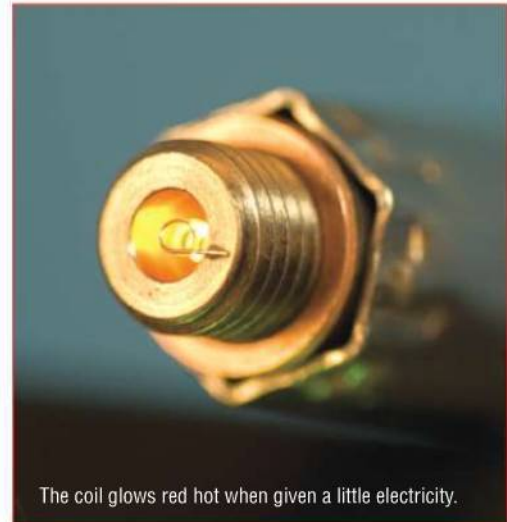
RECEPTACLE: The top of the plug is set so that a glow adapter can be connected with one polarity going to the center and the other connecting to the outside of the plug.

PLUG BODY: The shell of the plug threads to the engine head and contains the coil. The threaded portion often has a washer to seal leaks from the combustion chamber.

COIL OR FILAMENT: The working part of a glow plug. The coil heats up and glows when given power. The coil then stays glowing due to the combustion process and ignites the fuel mixture each cycle.

HOW DO THEY WORK?

Glow plugs keep the fire going in a nitro motor. Their primary function is to ignite the fuel as it is compressed in the combustion chamber by the piston. The resulting explosion forces the piston down and produces motion for another cycle. Like a spark plug in your car, the glow plug needs electricity to heat up when starting the motor. This is usually applied via a one-cell Ni-Cd or Ni-MH battery. The coil in the plug will glow red from the current passing through it and will ignite the fuel/air mixture in the motor as it is started. Once the motor is running, the power can be removed from the glow plug and the motor will keep going. How does it do this? The answer to this is simple: platinum. The platinum used in our glow plug coils reacts catalytically with the methanol in the fuel so that the coil is heated with each combustion cycle, negating the need for outside power to the plug. The plug will stay hot as long as the motor is running and fuel is present.



The coil glows red hot when given a little electricity.

HOTTER OR COLDER – HOW TO DECIDE?

You may have noticed that there are MANY glow plugs available out there. They are usually numbered with a simple single digit. This number is the manufacturer's mark showing the heat range of that plug. (The numbers used differ between brands, so there is no standard system; see the manufacturer's documentation for details.) Glow plugs are generally categorized into three groups: hot, medium, and cold. Here is a simple description of what those ratings mean:

1. HOT PLUGS:

A hot plug will advance the motor timing by igniting the fuel mixture earlier in the compression stroke. It simply achieves this by using a thinner filament coil. The thinner coil heats up quicker and gets hotter, which ignites the mixture faster with each stroke. When a plug is too hot for the application, pre-ignition (combustion happens too early), detonation (burns too fast), or overheating may occur.

2. MEDIUM PLUGS:

Medium plugs have a slightly thicker coil and will ignite a little later than the hot plugs do. Medium plugs tend to be a good compromise between power and reliability, and will work well in most engine/fuel combinations.

3. COLD PLUGS:

A cold plug has a very thick coil. The large coil retards the engine timing. Colder plugs tend to generate less power, cause a rough idle, and can make the engine much harder to start. Most modern heli engines do not run as well with a cold plug, and few pilots now use them in helicopter applications.



Here is an example of the coil thicknesses of some hot, medium, and cold plugs. Hot is on the left and cold is on the right. Notice the thinner filament on the hot plug.

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SKILLS

Modern helicopter engines and fuels make the plug choice for most helicopter pilots easy. If you were to survey all the heli pilots you could, you would find that the vast majority of them use one of these two plugs (or a clone thereof): the Enya #3 and the O.S. #8. The Enya #3 is considered a "hot" plug, and the O.S. #8 is often called a "medium-hot" plug. Both these plugs have very similar coil sizes, and most pilots cannot tell the difference between them when compared in flight. The reason hot plugs are often used in a model helicopter is because of how rich we run our motors when compared to an airplane using an engine of the same size. (The general rule of thumb with airplane engines is that you use a cooler plug with high nitro and larger displacement motors.)

Most heli-specific motors in use today will run great on a hot/medium-hot plug. You can do some experimenting on your own by using any plug in these two ranges. You will want to use the plug that gives the most power while still running smoothly and reliably in the idle.



These are the two most commonly used glow plugs in helis today. Either one should work well in most applications.

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- Length: 1200mm(47.25 in)
- Main Drive Gear: 170T
- Height: 388/405mm(15.25 in/16 in)
- Autorotation Tail Drive Gear: 180T
- Main Blade Length: 600mm
- Tail Drive Gear: 40T
- Weight(w/o main blade): 1340g
- Drive Gear Ratio: 1:17.0; 1.5:1; 1.8:1; 4.5:1
- Tail Rotor: 240mm(9.45 in)
- Main Rotor Diameter: 1350mm(53.15 in)
- Motor Drive Gear: 10T(11T optional)
- Flying Weight: Approx 3600g(6.6 lbs).



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BASIC GLOW PLUG MAINTENANCE

There is not much to take care of in a glow plug. A glow plug can run through 15 gallons of fuel or more in a properly tuned engine without needing replacement. You can look at a plug to check its operating conditions. The coil will stay dry and shiny in an engine that is tuned right. You should replace a glow plug if the coil is bent, compressed, or if it does not glow at the end when given power. Foreign elements such as dirt in an engine can kill a glow plug very fast. Another all-too-common plug killer is silicon. Many pilots use high temp silicon to seal their engines and mufflers together. If any of this silicon gets inside the engine, it can kill the glow plug. To avoid this, use only a small amount of silicon (VERY small amount) on the outside areas of the flanges, or better yet, use an alternate sealing method. There are some great soft metal gaskets available from the hobby shop that will seal the engine nicely.

If a motor won't start up after a successful flight, check the plug (after checking that your glow starter is not dead). Glow plugs can fail in flight but still function normally until the motor is turned off. Glow plugs are inexpensive enough to replace whenever you feel in doubt about their performance. I personally replace mine every few months just to be on the safe side.



Example of a plug pulled from a well-tuned engine.



A blown plug is often the result of a foreign particle getting into the combustion chamber. As long as the coil remains intact, the engine should run until the motor is turned off for that flight.

CONCLUSION

The small simple unit called a glow plug is the heart of each nitro motor. Our helicopters rely on their exact and continuous operation flight after flight. They are often so reliable that they are forgotten in our maintenance schedules and routines. Choosing the right plug for most helicopters is an easy task; anything in the medium-hot to hot range should work well. A tuned engine with a healthy plug will run smoothly, start easily, and give a long service life. Keep those rotors turning! **FHL**

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SET UP AND PHASE A THREE-BLADED ROTOR HEAD

Three blades are better than two?

WORDS: Ryan Kephart | PHOTOS: Carl Hyndman



WHEN WE THINK BACK TO HOW WE ENTERED THE HOBBY, WE USUALLY REFERENCE A REAL HELICOPTER THAT STUCK IN OUR MIND THROUGHOUT OUR CHILDHOOD. This is why scale helicopters have such a loyal following. When we look at building a scale helicopter, every detail counts from the rivets to the main rotor blades. This article will explain how to set up and phase a three-blade rotor head like the one seen in this month's Century A-Star review.

A true scale accessory.

BUYING THE PARTS

Most helicopter kits come only with flybar-specific rotor head parts. For this How-To, we'll be using Century's three-blade rotor head kit, which includes the head block, spindles, linkage balls, and blade grips. This kit makes it easy for any 30 or 50-sized helicopters to be converted to a scale rotor head. The headblock can be used with both a 10mm and 12mm main shaft. The remaining items must also be purchased, which include a multi-blade swashplate and a swash follower. Keep in mind that a three-bladed rotor head requires a special swash follower and swashplate. The part numbers we used for the A-Star, which you can find on Century's website, are:
Swash Follower: CN1108A,
3 Blade Full Metal 2BB
Swashplate: CN1117-3.

These few items are required to finish off your scale rotor head.



» SKILL LEVEL

SCALE RATING: 1=EASY 5=ADVANCED

3.0 **RC-Heli**

» TIME TO COMPLETE

 **2** Hours

» TOOLS NEEDED

-  ■ HEX WRENCHES/DRIVERS
-  ■ PITCH GAUGE
-  ■ BALL LINK PLIERS

INSTALLATION



1 Install the ball links to the swashplate at 120° intervals. You will notice a few extra holes that have been tapped out for the swash follower. Keep these holes open, as we will figure out which one to use after we install the rest of the head.

2 Slide the swashplate over the main shaft.

3 Assemble the swash follower and slide it over the main shaft.



4 Assemble the rotor head by installing the spindles and then the blade grips. Then, slide the assembly over the shaft and secure the Jesus bolt.

5 Assemble the linkages that run from the swashplate to the blade grips. The linkages should be connected to the grips in leading-edge configuration.



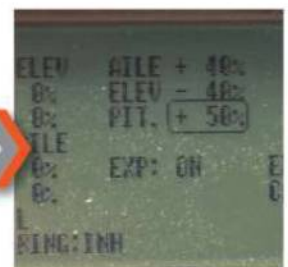
6 Next, locate the best hole to use for the linkage ball for the swash follower. The main links should not interfere with the swash follower. Slightly tighten the swash follower so that it can still be moved around to adjust the phasing.



RADIO SETUP AND PHASING

1 Turn your radio on and zero your collective stick. Adjust the links to the main blades so that the three rotor blades are at zero degrees of pitch at half stick.

2 You must reduce the overall pitch of the cyclic and collective when converting to a three-bladed rotor head, as the additional blade area produces more lift. Give the helicopter about 8 degrees positive and negative pitch.



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3. Next, we will adjust the phasing so that the swash controls the correct blade when applying a forward cyclic command. Align one of the blades perpendicularly to the tail boom and on the left side of the helicopter.



4. Next, rotate the swash follower so that the ball link connected to blade is aligned with either the anti-rotation pin or the elevator ball link. You may need to raise or lower the swash follower at this point to provide a 90° connection to the swash plate. After you are finished moving the swash follower, you will have to fully secure the follower to the main shaft by removing the link and tightening the screw.

5. Verify that your phasing is correct by applying a right or left cyclic command and inspecting the rotor blades, making sure that the blade on the left side of the helicopter is not moving. If the blade moves, the phasing may be off a little and you must adjust the swash follower until this interaction is eliminated.



6. Adjust your transmitter pitch curves to give you about -4 degrees at low stick, 0 degrees at mid, and 8 degrees at the high position.

TEST FLIGHT

When adjusting or installing anything new on your helicopter, it's a good idea to test fly the helicopter outside of the scale fuselage. This will prevent any mishaps from destroying both the helicopter and the scale body. The test hop should be performed in an open area away from people or obstacles. Gently lift the helicopter to a low hover and apply a small amount of forward cyclic input to make sure that the helicopter will move in the correct direction without any roll interaction. If you are comfortable with the performance, then bring the helicopter up to an eye level hover and check the tracking. If you notice that the blades are out of track, then land and mark a blade to signify that that is the master blade. Then adjust the other blades until they match the master blade in flight. After the blades are tracked properly, fly a few circuits to get comfortable the way a scale head flies. It may take some time, but once you're use to it you can install your scale fuselage and be on your way.

CONCLUSION

Flying a scale rotor head and seeing the three-bladed head spinning around is something that is very exhilarating. The scale head makes your helicopter feel like the real deal and not just your old helicopter with the extra weight of the fuselage. With this simple How To, you will be in the air in no time. I remember when I first set up a scale head; I was as lost as you might have been before reading this. Keep an eye out in a future issue of RC Heli on a How-To detailing five-blade rotor head setup and phasing. [TRH](#)



BENCHMARK!



Mikado
Model Helicopters

ProtekRC iCHECKER

iChargers little buddy

WORDS: Ryan Kephart

PROTEKRC AND A-MAIN HOBBIES HAVE COME TOGETHER AND CREATED SOME USEFUL PRODUCTS FOR THE RC HELICOPTER INDUSTRY. Among these are the iChargers and power supplies. This month we take a look at a smaller piece of equipment that can be just as important as a charger, the iChecker Battery Tester.



Check One Two, check, check.



+ THE GOOD

- Crystal clear backlit screen
- Big voltage range
- Includes overall pack voltage adapter

- THE BAD

- Can only be used with standard balance tab (adapter not included)

CONNECT

MANUFACTURER:	ProtekRC
WEBSITE:	www.amainobbies.com
PART NUMBER:	PTK-209
STREET PRICE:	\$49

FEATURES

The PTK-209 iChecker is a small, lightweight unit that can be carried in your flight box. The unit features a 35x11mm LCD backlit screen that can be seen clearly outdoors. The iChecker can display the voltage of a 2S to 6S battery pack or to a maximum of 28 volts. Along with checking the overall voltage, the iChecker can display individual cell voltage by connecting it to a balance tab. The balance tab connector works well with the standard balance tab that you would find on Protek LiPo batteries. An adapter can be used to convert a Thunder Power tab to the standard tab.

The iChecker comes with an overall voltage adapter that connects to the outer most pins of the unit and leads to a male Deans Ultra connector. This can be plugged directly into any battery. The unit also has a built-in failsafe to prevent a battery short from destroying the unit. If you plug the balance tab in the wrong way, neither the unit nor battery will be

harmd; the iChecker will not function until you plug the battery in the correct way. This unit uses several screens to give you a complete readout of the pack condition, including total voltage, all cell voltages as a bar graph, all cells in digital readout, and individual cells in digital readout.

TESTING

We tested this unit on multiple batteries, including some LiPos that we knew were way out of balance. The unit performed flawlessly in all our tests and gave us an accurate reading every time. The PTK-209 displayed up to three decimal places, giving us the exact voltage of each cell. The screen is nice and clear and allowed us to easily read the voltage even when the unit was displaying all the voltages at once. If your eyes are not good at seeing small numbers, there is no need to fear, as this unit will display each cell voltage by cycling through them using the full screen.

CONCLUSION

If you're looking to keep your batteries in check (which we all should do), then this unit can provide you with the information needed. It's small, lightweight, and can be stored in nearly any flight box or transmitter case. The iChecker can provide you with the safety of knowing that your flight pack will last. **TIBI**



This adapter is included to check the overall voltage of any flight pack.

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Ely.Q VISION 50 COMPETITION

Vision 2.0

WORDS: Jim Innes | PHOTOS: Jason Boulanger

Jim always does a great job cleaning a heli up.

ITALIAN BASED ELYQ IS A RELATIVE NEWCOMER TO THE RC HELICOPTER WORLD. Their first model, the Vision 50, was released as an attractively priced competitor in the plastic framed 50-size nitro class. It borrowed a number of design ideas from other helis and topped it off with a unique moving flybar head design. Move forward about two years and now there's the Vision 50 Competition model. This heli is a new design from ElyQ, made almost entirely of carbon and aluminum components. While it retains some of the features from the previous Vision, a lot has been changed or updated.

» AT A GLANCE

SIZE: 50

POWER: Nitro

TYPE: Pod & Boom

BUILD TYPE: Kit

TAIL DRIVE: Belt



You can just see how different the head is in this picture.

FEATURES

The Vision 50 Competition, or V50C for short, is a pro-level 50-size nitro bird. There is very little plastic on this machine, just lots of shiny aluminum and polished carbon, which makes it perfect for bling lovers. Servo placement, drive train, and basic tail design are more or less borrowed from the plastic Vision, but the updated head and optional features really set the V50C apart.

» MAIN FRAME

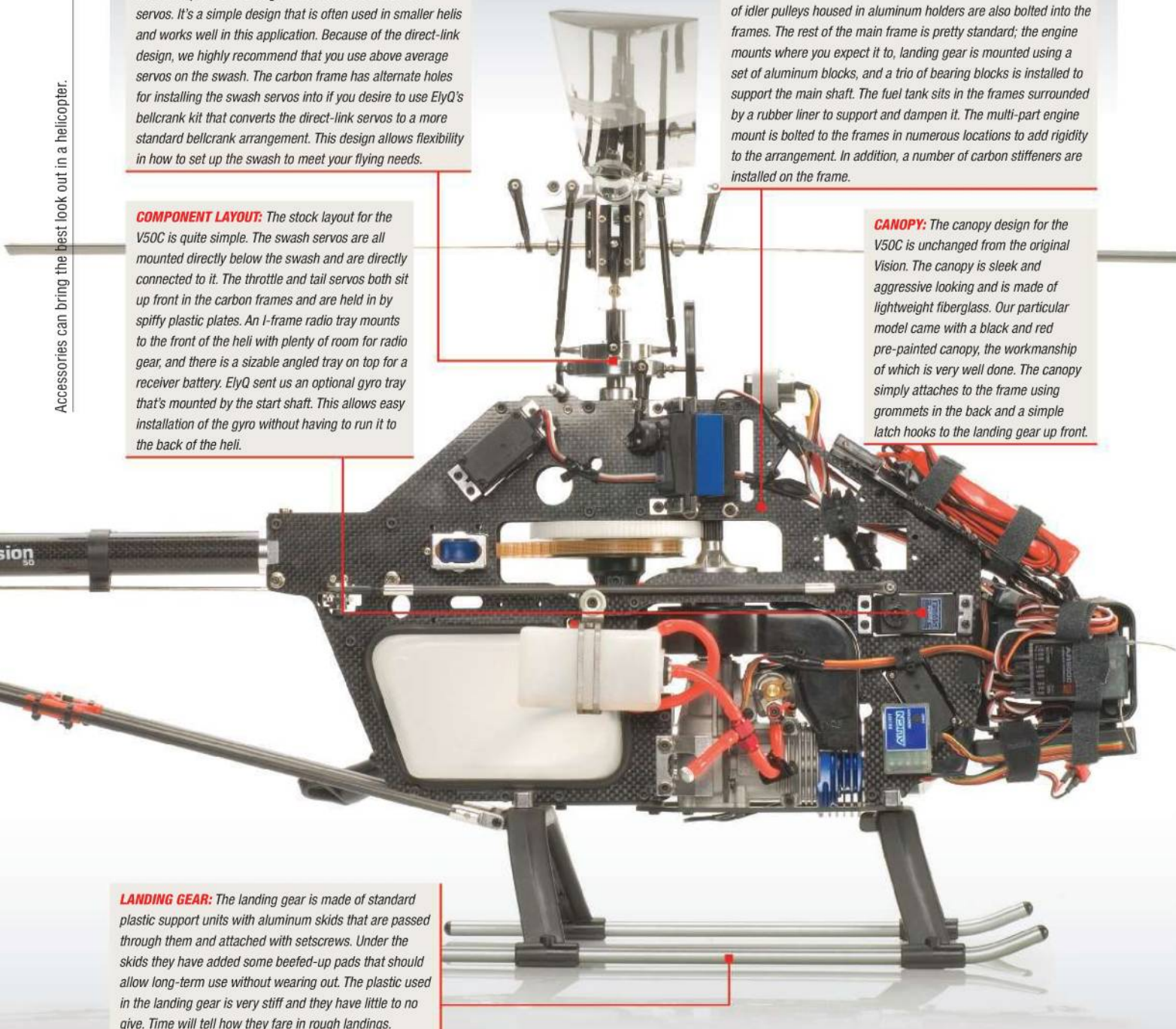
SWASH CONTROL: As mentioned before, the swash arrangement on the V50C is a simple direct-link arrangement. Each swash servo is mounted directly below the swashplate and a single link attaches each of the servos. It's a simple design that is often used in smaller helis and works well in this application. Because of the direct-link design, we highly recommend that you use above average servos on the swash. The carbon frame has alternate holes for installing the swash servos into if you desire to use ElyQ's bellcrank kit that converts the direct-link servos to a more standard bellcrank arrangement. This design allows flexibility in how to set up the swash to meet your flying needs.

COMPONENT LAYOUT: The stock layout for the V50C is quite simple. The swash servos are all mounted directly below the swash and are directly connected to it. The throttle and tail servos both sit up front in the carbon frames and are held in by spiffy plastic plates. An I-frame radio tray mounts to the front of the heli with plenty of room for radio gear, and there is a sizable angled tray on top for a receiver battery. ElyQ sent us an optional gyro tray that's mounted by the start shaft. This allows easy installation of the gyro without having to run it to the back of the heli.

DESIGN: The frames are made of stiff, high quality carbon, and the frameset is designed to be very thin when put together. A number of stiffeners are used throughout the frames to keep the assembly strong. Because of the tail belt design on the V50C, a set of idler pulleys housed in aluminum holders are also bolted into the frames. The rest of the main frame is pretty standard; the engine mounts where you expect it to, landing gear is mounted using a set of aluminum blocks, and a trio of bearing blocks is installed to support the main shaft. The fuel tank sits in the frames surrounded by a rubber liner to support and dampen it. The multi-part engine mount is bolted to the frames in numerous locations to add rigidity to the arrangement. In addition, a number of carbon stiffeners are installed on the frame.

CANOPY: The canopy design for the V50C is unchanged from the original Vision. The canopy is sleek and aggressive looking and is made of lightweight fiberglass. Our particular model came with a black and red pre-painted canopy, the workmanship of which is very well done. The canopy simply attaches to the frame using grommets in the back and a simple latch hooks to the landing gear up front.

LANDING GEAR: The landing gear is made of standard plastic support units with aluminum skids that are passed through them and attached with setscrews. Under the skids they have added some beefed-up pads that should allow long-term use without wearing out. The plastic used in the landing gear is very stiff and they have little to no give. Time will tell how they fare in rough landings.



Accessories can bring the best look out in a helicopter.

» DRIVE TRAIN

ENGINE MOUNT: The engine mount is made of three aluminum pieces. A large center bulkhead resides in the main frames. The engine mounts to two side pieces that bolt to the outside of the frames and are attached to the center bulkhead. The engine mount is set up so that the engine can be moved up and down and front to back to allow for gear mesh adjustment.

CLUTCH: The clutch is a pretty standard design. It bolts to the top of the cooling fan assembly and contains a one-way bearing in it that allows the start shaft to spin freely when the engine is running. The clutch liner is not installed at the factory, but ElyQ includes a nifty little installation tool that keeps pressure on the liner as the epoxy dries.

COOLING FAN AND SHROUD: The cooling fan is plastic and is bolted to an aluminum center hub. The center hub threads onto the engine crankshaft and the engine bolt tops off the assembly. The fan has a hole in it for a governor magnet, and they even added a vent in the hole to allow the air to escape when installing the magnet. The shroud is a two-piece plastic unit that is installed around the finished fan assembly in the frames. I noticed that the shroud does not extend all the way over the engine head, but so far cooling has been adequate.

MAIN GEAR: The white main gear in the test kit was perfectly round with no high or low spots in it. Gear mesh on the V50C is adjustable and you need to set the gear mesh with the pinion. It is suggested that you set this mesh "tight" on initial install, allowing little to no backlash. The main gear will wear in after a few flights and a good mesh will result.

AUTOROTATION DRIVE: The auto drive is pretty robust. A large one-way bearing resides in the main gear hub with ball bearings on either side. A beefy auto sleeve is installed into the bearing; the sleeve is then engaged to the main shaft using a 3mm bolt and locknut.

TAIL DRIVE: A large belt pulley is installed under the main gear to drive the tail rotor. The pulley attaches to the autorotation sleeve and it spins freely over the main gear hub. Two smaller idler wheels are mounted to the frames just behind the tail gear to guide the belt into the tail boom.



“It seems that ElyQ takes the time to fix issues as they arise and most importantly, the helicopter flies well.”



ElyQ VISION 50 COMPETITION

MODEL SPECIFICATIONS

CLASS:	50-size nitro
BUILD:	KIT
BLADE SIZE:	600-620mm
LEVEL:	Beginner and up

FRAME

MATERIAL:	Carbon & aluminum
TYPE:	Dual side plate
SERVO TO SWASH LINKAGE:	Direct Link (stock) Push-pull (optional)
SERVO SIZE:	Standard

ROTOR HEAD

GRIPS:	Aluminum
HEAD BLOCK:	Aluminum
LINKS:	Ball
SWASH:	Aluminum
CONTROL:	120° CCPM

TAIL

DRIVE SYSTEM:	Belt
AUTO DRIVEN:	Yes
TAIL PITCH SLIDER:	Single-point
TAIL BLADE GRIPS:	Plastic
TAIL CASE:	Aluminum
BOOM STRUT MATERIAL:	Carbon with aluminum ends

GEARING

MAIN ROTOR TO PINION RATIO:	1:8.7
MAIN ROTOR TO TAIL RATIO:	1:4.5

WEIGHT

EMPTY:	5 lbs., 5 oz. (2,414g)
WITHOUT FUEL:	7 lbs., 10 oz. (3,480g)
FULLY LOADED: (Includes fuel)	8 lbs., 9 oz. (3,900g)

DIMENSIONS

HEIGHT (A):	15.5 in (393mm)
CANOPY WIDTH (B):	4.25 in (107mm)
LANDING GEAR (C):	9 in (228mm)
PADDLE TO PADDLE DIA. (D):	24 in (609mm)
MAIN ROTOR (E):	52.75 in (1340mm)
TAIL ROTOR (F):	9.5 in (241mm)
LENGTH (G):	47.5 in (1206mm)

FEATURES CONTINUED

» TAIL & BOOM



TAIL CASE: Two plastic halves form the tail case on the V50C. A ball bearing is pressed into each side of the case and the halves are bolted together around the tail shaft, belt, and boom. The rear of the tail case is open. The tail pitch slider and vertical fin are bolted to the tail case. ElyQ sent an upgraded aluminum tail case with the review kit, which is pictured here.

TAIL BLADE GRIPS: The grips on the V50C are simple two-piece plastic units that are installed around a set of bearings. ElyQ has updated the V50C to use angular bearings on the tail in place of a set of thrust bearings. Using angular bearings removes play in the system while still giving the load carrying needs that thrust bearings usually provide.

PITCH ACTUATOR SYSTEM: Tail control on the V50C is performed through a pitch fork on the tail shaft connected to a control ball. The control ball is attached to a pitch arm on the tail case. A standard metal rod runs the length of the boom and attaches to a bellcrank under the boom block. A smaller carbon control rod connects to the other side of the bellcrank and connects to the servo up front.



BOOM: The boom is an all carbon unit and the dimensions and details carry over from the Vision. It is 640mm in length and about 22mm in diameter. It has holes in the end to lock the tail case in place and a slot in the front that is not used in the V50C.

» ROTOR HEAD

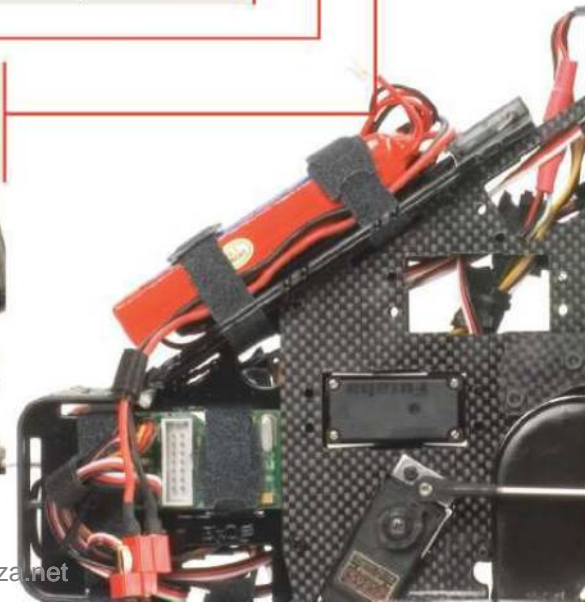
HEADBLOCK: The headblock on this heli is quite large and complex compared to other designs. There are slots in all four sides of the block to install the flybar and flybar control links. Then, four plastic guides are bolted on these slots to tighten up the assembly. The whole flybar setup floats inside the headblock. A set of very stiff dampers are pressed into the block to house the 6mm spindle. The whole assembly is clamped and bolted to the main shaft using a single 3mm shouldered bolt and nut.



BELL/HILLER ARMS: The mixing arms on the V50C are mounted at the end of each blade grip. The arms have optional mounting points to adjust the cyclic speed and stability of the model. Because the levers are attached at the grip, one link goes from the mixer to the flybar and another connects directly to the swash. Further adjustment to flight characteristics can be made by moving the flybar link further out on the flybar itself.

WASHOUT ARMS: Because the V50C uses a floating flybar style head, there is no need for a washout unit on the helicopter. Washout duties are accomplished via the recessed slots in the headblock that allow the flybar assembly to rise and lower inside the head.

PHASING: Phasing is accomplished on this heli naturally as the flybar and headblock are one unit and the washout assembly is omitted. A set of rigid flybar control guides ride on the flybar and help keep the swashplate rotating in place with the head.



Nice wiring job Jim.

» INSTRUCTIONS & BUILDING TIPS

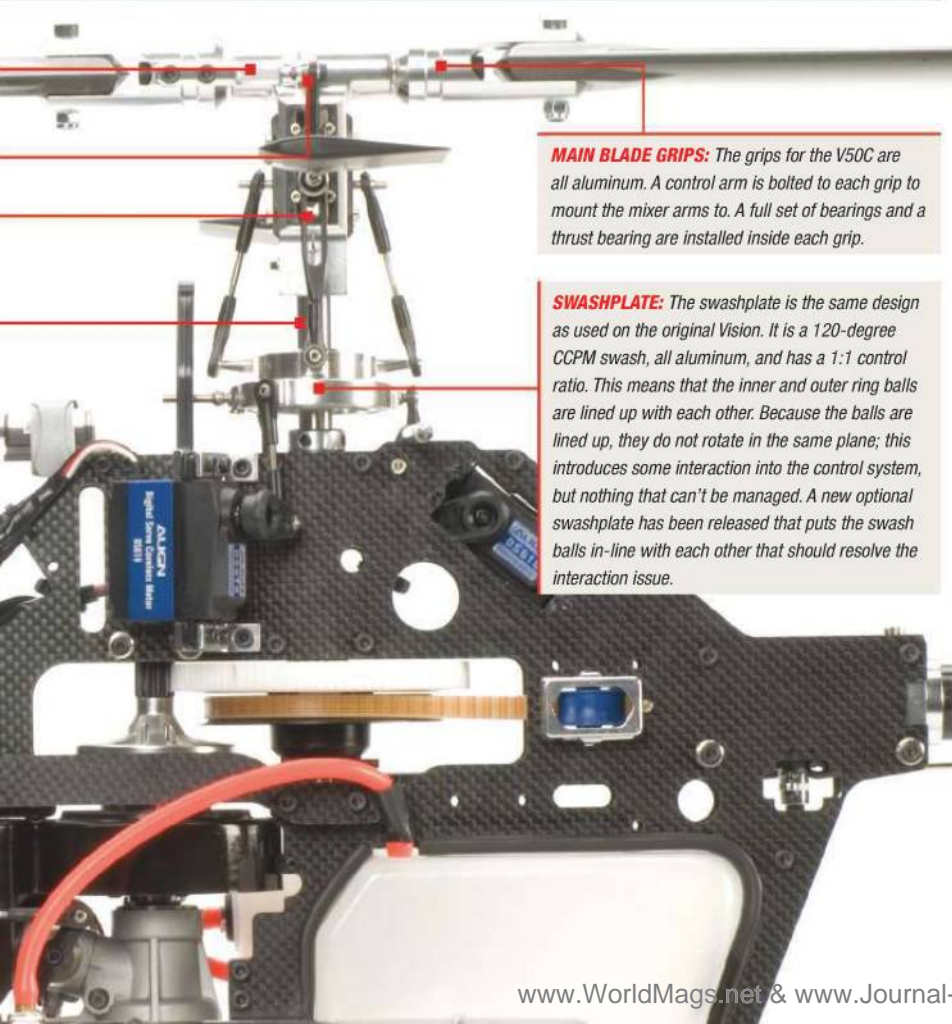
WHEN YOU OPEN THE BOX

Upon opening the box, I first noticed the beautiful pre-painted canopy. The parts are all bagged according to assembly order and everything is easy to find. There is nothing out of the ordinary to report about the packaging. A good quality printed manual is included.

MANUAL AND BUILD

The manual is well made and has good diagrams throughout. You do need to be careful, though, as a small number of

bolt placements and sizes can be confusing in the diagrams. Read all the text and study the diagrams and what parts you have together and you should be fine. Also, newer revisions of the manual will have the updates at the back by the notes pages, be sure to check those pages out. There are some crucial build tips I would add for this heli. You can check those tips out on page 100.



MAIN BLADE GRIPS: The grips for the V50C are all aluminum. A control arm is bolted to each grip to mount the mixer arms to. A full set of bearings and a thrust bearing are installed inside each grip.

SWASHPLATE: The swashplate is the same design as used on the original Vision. It is a 120-degree CCPM swash, all aluminum, and has a 1:1 control ratio. This means that the inner and outer ring balls are lined up with each other. Because the balls are lined up, they do not rotate in the same plane; this introduces some interaction into the control system, but nothing that can't be managed. A new optional swashplate has been released that puts the swash balls in-line with each other that should resolve the interaction issue.

EvoQ VISION 50 COMPETITION

RTF & TEST GEAR

» TEST GEAR

-  **RADIO:** JR X8303 2.4, JRP2925, \$629
-  **RECEIVER:** JR R921, 9 channel 2.4 RX, JRPR921, \$169, .64oz (18g)
-  **CYCLIC SERVOS:** Align DS610 Digital, K10425A, \$67, 1.8oz (52g)
-  **TAIL SERVO:** Futaba S9254 Digital, FUTM0224, \$119, 1.7oz (49g)
-  **GYRO:** Align GP780, HEG78001, \$177, .48oz (14g)
-  **THROTTLE SERVO:** Futaba S9252, FUTM0222, \$79, 1.8oz (50g)
-  **ENGINE:** OS Hyper 50, OSMG1951, \$169, 14.3oz (406g)
-  **MUFFLER:** Outrage RC Hyper Rage 50, HR1099, \$65, 7oz (200g)
-  **GOVERNOR:** Aerospire MultiGov, \$94, .35oz (10g)
-  **REGULATOR:** Align 2in1 Regulator and Glow Driver, HE50H10 B6T, \$55, 1.9oz (53g)
-  **RECEIVER BATTERY:** Outrage 2500mah 2S Li-Po, OXPRX-25002, \$34, 3.9oz (110g)
-  **BLADES:** SAB 600mm Carbons, ART0330, \$84, 5.1oz (145g)
-  **FUEL:** Magnum Heli-Plus 30%, \$25per gallon

Hey Align components can be used on any helicopter.

TESTING

I built the V50C up as per the manual, and left the mixer settings in their stock locations. I used a new OS Hyper 50, Align 610 servos, and SAB 600mm blades. During testing I did switch the flybar paddles out with the 12 gram ElyQ paddles to note the effect on flight. Everything else was left as stock.

HOVERING • The Vision 50 Competition, with its stock swashplate and direct link servos, is designed for aerobatics. I went into the testing expecting it to be a bit twitchy in the hover and was pleasantly surprised that it hovers quite well. It sticks in place well and exhibits no really bad habits. I will say that you can notice a tiny bit of a centering issue in that the swash does not always return to perfect center, but I feel that may be more an indicator on the servo selection than anything. A set of high-end swash servos would probably do best here when using the direct link setup.

Rating: 4

FORWARD FLIGHT • The V50C tracks really well in the air; I can point the bird and fly it without having to make major corrections in flight. The heli does not exhibit any bad habits during normal flight.

Rating: 4.5

CYCLIC PITCH RESPONSE • This helicopter was made for 3D flight. The cyclic responds quickly and accurately to inputs. Rolls and flips are tight and have a lot of bite to them. When I put on the 12 gram paddles it livened up even more and I had a lot of fun with it!

Rating: 5

COLLECTIVE PITCH RESPONSE •

Collective inputs are crisp and immediate with the V50C. The climbouts are superb and the heli shows no poor tendencies in regards to its pitch. No corrections are required due to wind, and you feel connected to the sticks with this heli.

Rating: 5

TAIL ROTOR RESPONSE • The tail system takes its design from already well proven setups. The long boom and solid control rod setup work great for holding the tail through all flight orientations and speeds. I would recommend not mounting the gyro on the front of the plastic radio tray, as there is just too much flex there that translates into strange tail behavior. If you mount the gyro to the solid tray behind the main shaft or to the optional tray up front, you should have no issues with the tail.

Rating: 4.5

AUTOROTATION CAPABILITIES • The V50C autos fantastically. The belt drive is smooth and runs efficiently, and there is plenty of hang time in the blades for aerobatic autos or for extended sliding autos. I imagine that the new torque tube upgrade kit for this heli might free up even a little more energy during autos.

Rating: 5

POST FLIGHT INSPECTION • After numerous flights with the helicopter, it was thoroughly checked over for any signs of wear or loose parts. Everything is just as

it was when the heli was built. The only things I noticed was that the bolts holding the horizontal fin had loosened slightly, but that was easily fixed. Everything else is running well.

Rating: 4.5

CONCLUSION

I think the Vision 50 Competition is a great heli, especially in its price range. It seems that ElyQ takes the time to fix issues as they arise and most importantly, the helicopter flies really well. The build was pretty straightforward and easy and flying has been fun. I think for my flying style that the addition of the bellcrank kit, the new FAI swashplate, and the torque tube will make me like the bird even more. Look for a long-term review of this heli in the future where we compare all these setup and upgrade options in one place. See you at the field! *TBH*

Can you spot anything wrong with this picture? Threadlock!



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HELI DIRECT

TESTING SPECS

ElyQ VISION 50 COMPETITION

Part #: V50C
Distributor: A-Main Hobbies
Web: www.elyq.com

Street Price: \$399
Price as Tested: \$1657
Build/Setup Time: 12-15 hours

PERFORMANCE

MODE FLOWN: Normal, idle up 1, idle up 2
RPM OF EACH MODE: Normal: 1850
 Idle Up 1: 2050
 Idle Up 2: 2100
ENGINE TEMP (after flight): 185° F
FLIGHT TIME: 9-10 minutes
CRASH COST: \$50
 *MSRP of landing gear, main shaft, spindle, flybar, and tailboom.

TEST CONDITIONS

WEATHER: Sunny/Overcast
TEMP / HUMIDITY: 80° F / 57%
BAROMETRIC PRESSURE: Unknown
WIND SPEED: 15 mph
VISIBILITY: Unlimited
ALTITUDE: 4771 feet

PITCH CURVES

NORMAL: -12, 0, 12
IDLE-UP 1: -12, 0, 12
IDLE-UP 2: -12, 0, 12

REQUIRED TO FLY

Transmitter, receiver, gyro, servos, engine, muffler, receiver battery, main blades.

WHO'S IT FOR?

The V50C is designed as a 3D competition level machine, but it can be set up to work great for anyone from beginners to stick-bangers. The pricing makes it an affordable option in its class.

» SCORECARD

SCALE RATING: 1=POOR 5=EXCELLENT

3.5	Instructions
4	Parts Quality/Fit
4	Durability
4.5	Tunability
4.5	Overall Performance
4	Value

+ THE GOOD

- The heli builds well and the parts fit correctly.
- There is enough adjustability in the model to suit almost anyone.
- Aerobatics are predictable and precise.
- The price is very competitive.

- THE BAD

- The headblock needs modifying out of the box to fit right.
- The swashplate introduces interaction into the system that has to be programmed out.
- A couple of upgrades are recommended right out of the box.

(Continued on page 101.)



Ya it wasn't inverted!

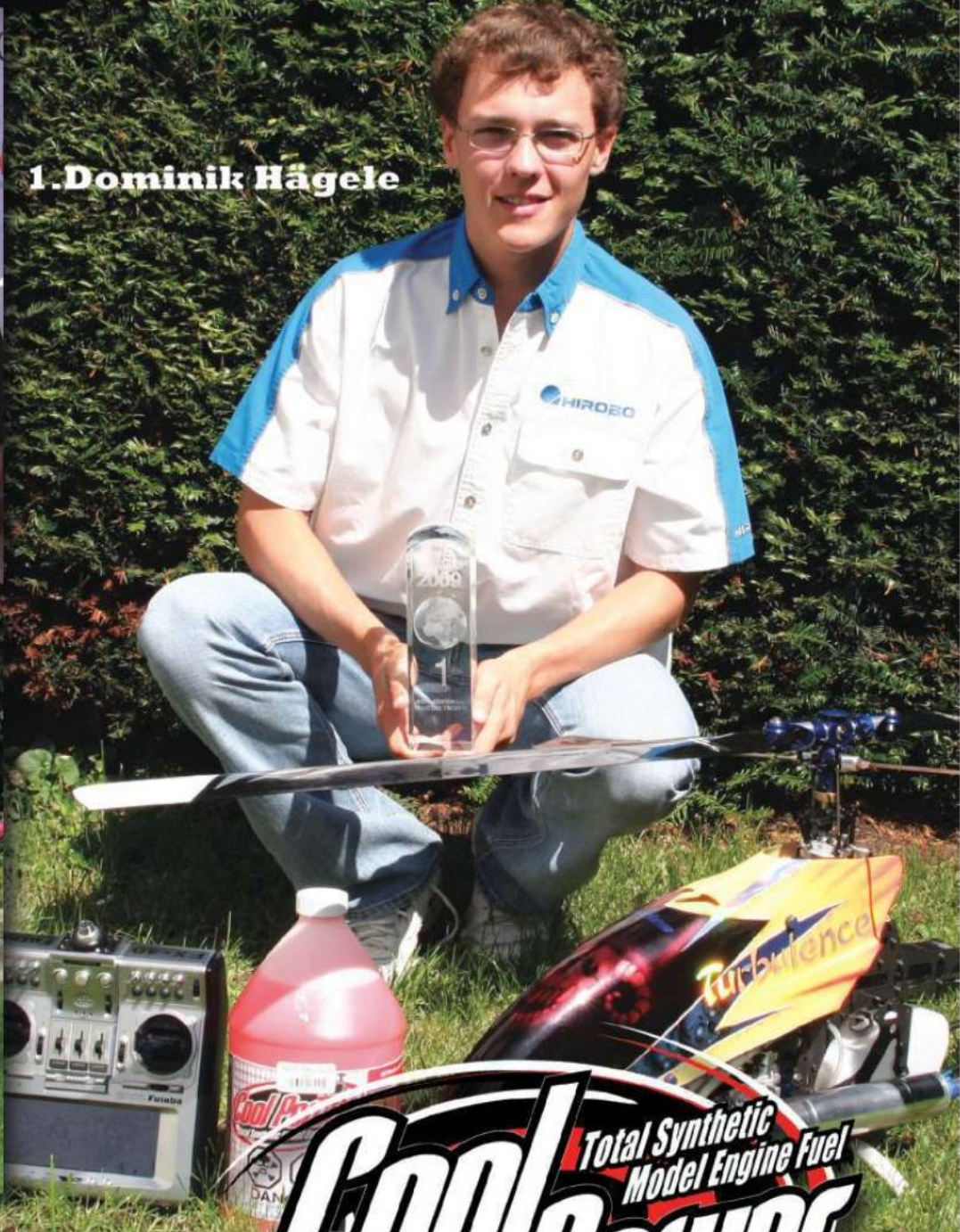
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'02 '03 '04 '05 '06 '07 '09



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1. Dominik Hägele



3. Eric Weber

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3. Eric Weber on their First, Second,
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Thunder Tiger AH-1W SUPER COBRA E325

Take out the baddies Super Cobra style!

WORDS: Dan Goldstein | PHOTOS: Jason Boulanger

Thunder Tiger brings you an easy way to get behind the controls of the Whiskey version of the iconic Bell Super Cobra without having to enlist!



» AT A GLANCE

SIZE:	450
POWER:	Electric
TYPE:	Scale
BUILD TYPE:	RTF
TAIL DRIVE:	Belt

Actually the full name is: Thunder Tiger AH-1W Super Cobra E325 2.4GHz Blue Super Combo



But that was too long to fit in the title of this spread so we shortened.

FEATURES

This model is based on the capable Thunder Tiger E325 Mini Titan airframe. The most attractive feature is the one you buy this model for, the outstandingly detailed Super Cobra fuselage. Thunder Tiger went all out and provided a high level of scale detail in a small format. From the cable cutter blade to the radio antennae to the panel lines, you have to be careful not to fly too close to yourself in order to stare at the scale details.

» MAIN FRAME

DESIGN: The airframe is constructed of molded fiber reinforced plastic. The motor mount is stamped aluminum. The main shaft bearing blocks are plastic. The angled battery tray is located on the front of the air frame via two side members. The cyclic servo mounts attach on the frame sides, while the elevator servo sits atop a platform behind the main shaft. The tail boom gear and pulley system are modular and can be separated from the frame without disturbing the belt tension. Thunder Tiger created an angled tail belt drive system to faithfully reproduce the upward angle of the full-scale Cobra's tail rotor position.

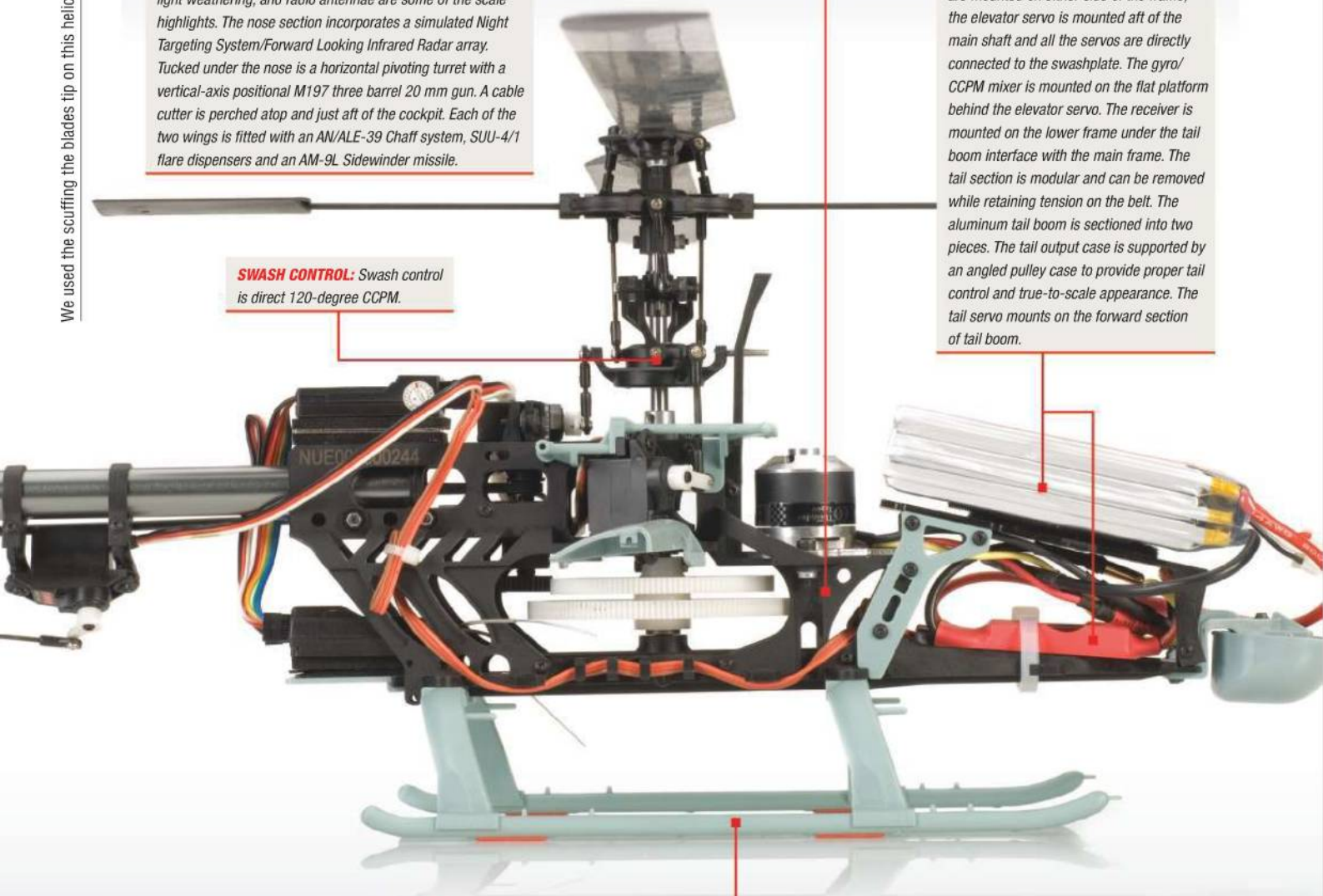
CANOPY: The airframe is encapsulated within a highly detailed, true-to-scale fuselage of the Bell Cobra AH-1W attack helicopter. Painted camouflage with panel lines, light weathering, and radio antennae are some of the scale highlights. The nose section incorporates a simulated Night Targeting System/Forward Looking Infrared Radar array. Tucked under the nose is a horizontal pivoting turret with a vertical-axis positional M197 three barrel 20 mm gun. A cable cutter is perched atop and just aft of the cockpit. Each of the two wings is fitted with an AN/ALE-39 Chaff system, SUU-4/1 flare dispensers and an AM-9L Sidewinder missile.

COMPONENT LAYOUT: The battery mounts on an angled plastic tray that attaches to the base airframe. The ESC is mounted on the lower frame under the battery tray. The motor is mounted ahead of the main shaft on an aluminum plate that allows you to easily adjust the gear mesh via two cap head screws without having to reapply thread lock. The two cyclic servos are mounted on either side of the frame, the elevator servo is mounted aft of the main shaft and all the servos are directly connected to the swashplate. The gyro/CCPM mixer is mounted on the flat platform behind the elevator servo. The receiver is mounted on the lower frame under the tail boom interface with the main frame. The tail section is modular and can be removed while retaining tension on the belt. The aluminum tail boom is sectioned into two pieces. The tail output case is supported by an angled pulley case to provide proper tail control and true-to-scale appearance. The tail servo mounts on the forward section of tail boom.

SWASH CONTROL: Swash control is direct 120-degree CCPM.

LANDING GEAR: The landing gear is a one-piece, molded, colored plastic scale reproduction of the full-scale Bell Cobra AH-1W landing gear.

We used the scuffing the blades tip on this helicopter.



» DRIVE TRAIN

ENGINE/MOTOR MOUNT: The motor is easily adjusted for accurate gear mesh via two cap head screws. The motor is mounted forward of the main shaft to an aluminum plate.

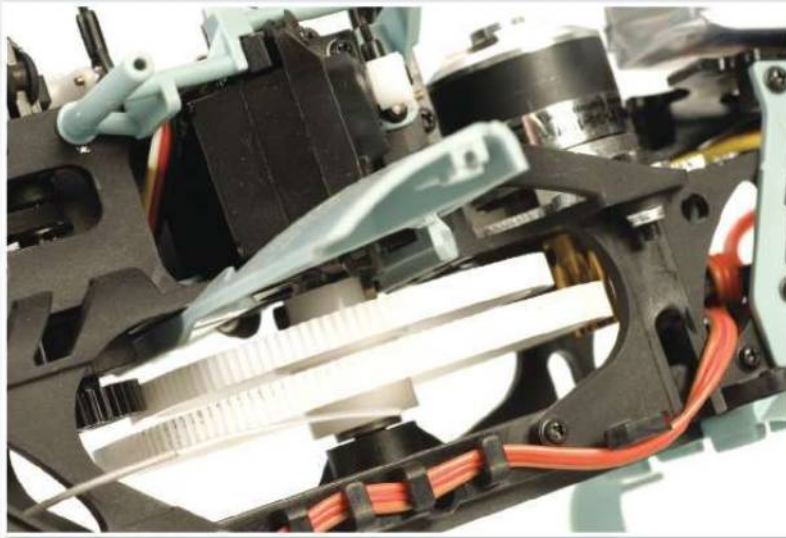
CLUTCH/PINION: The motor has a 3.175mm motor shaft. A 13-tooth, 0.5-module pinion is included.

MAIN GEAR: The plastic main gear is

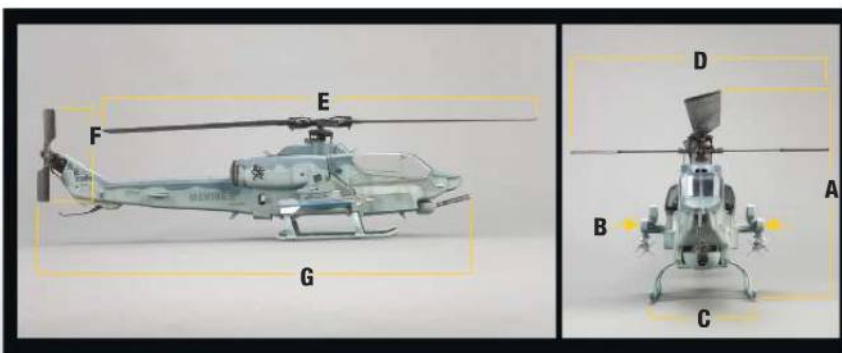
150-tooth, 0.5-module.

AUTOROTATION DRIVE: The one-way bearing is press fit into the molded plastic main gear.

TAIL DRIVE: The tail is belt driven by a gear assembly that meshes with a second lower gear on the main shaft. The tail belt travels through an angled guide housing up to the tail output shaft.



“COMPLETE, METICULOUSLY DETAILED, ARMED TO THE TEETH AND EXCITING!”



Thunder Tiger SUPER COBRA E325

MODEL SPECIFICATIONS

CLASS:	450 electric
BUILD:	RTF
BLADE SIZE:	325 mm
LEVEL:	Inter.-Adv.

FRAME

MATERIAL:	Plastic
TYPE:	One-piece
SERVO TO SWASH LINKAGE:	Direct
SERVO SIZE:	Mini

ROTOR HEAD

GRIPS:	Plastic
HEAD BLOCK:	Plastic
LINKS:	Ball
SWASH:	Plastic
CONTROL:	eCCPM 120°

TAIL

DRIVE SYSTEM:	Belt
AUTO DRIVEN:	Yes
TAIL PITCH SLIDER:	Dual point
TAIL BLADE GRIPS:	Plastic
TAIL CASE:	Plastic
BOOM STRUT	
MATERIAL:	Plastic

GEARING

MAIN ROTOR TO PINION RATIO:	1:11.5
MAIN ROTOR TO TAIL RATIO:	1:4.4

WEIGHT

EMPTY:	26.6 oz. (756g)
FULLY LOADED: (includes battery)	31.7 oz. (900g)

DIMENSIONS

HEIGHT (A):	7.95 in (202mm)
CANOPY WIDTH (B):	4.8 in (122mm)
LANDING GEAR (C):	4.6 in (119mm)
PADDLE TO PADDLE DIA. (D):	15.7 in (400mm)
MAIN ROTOR (E):	37.2 in (945mm)
TAIL ROTOR (F):	7.0 in (180mm)
LENGTH (G):	30.71 in (780mm)

Put side quote here please.

FEATURES CONTINUED

» TAIL & BOOM

TAIL CASE: The tail case is constructed from plastic. The output shaft has a plastic belt pulley and is supported by two radial bearings.



TAIL BLADE GRIPS: The plastic blade grips contain radial bearings.

PITCH ACTUATOR SYSTEM: The pitch actuator system components are constructed primarily of plastic. All moving components are supported by radial bearings. This model utilizes a dual-pin actuator for bind-free control of the pitch slider.



BOOM: The boom is silver aluminum and segmented into two pieces. The boom has an outside diameter of 14 mm and an overall length of 400 mm.

» ROTOR HEAD

HEAD BLOCK: The head block is one piece of molded plastic and has no provisions for a head button. It uses a single Jesus bolt for attachment to the main shaft.



BELL/HILLER ARMS: The arms are constructed from plastic and supported by radial bearings.

PHASING: Phasing is non-adjustable.

WASHOUT ARMS: The washout arm assembly utilizes a molded plastic base and mixing arms with pinned plastic radius arms. Dual radial bearings support each mixing arm. The mixing arms have two linkage ball settings for adjusting stability.



A conversion set can also be purchased for this model to make it a Huey.

» INSTRUCTIONS & BUILDING TIPS

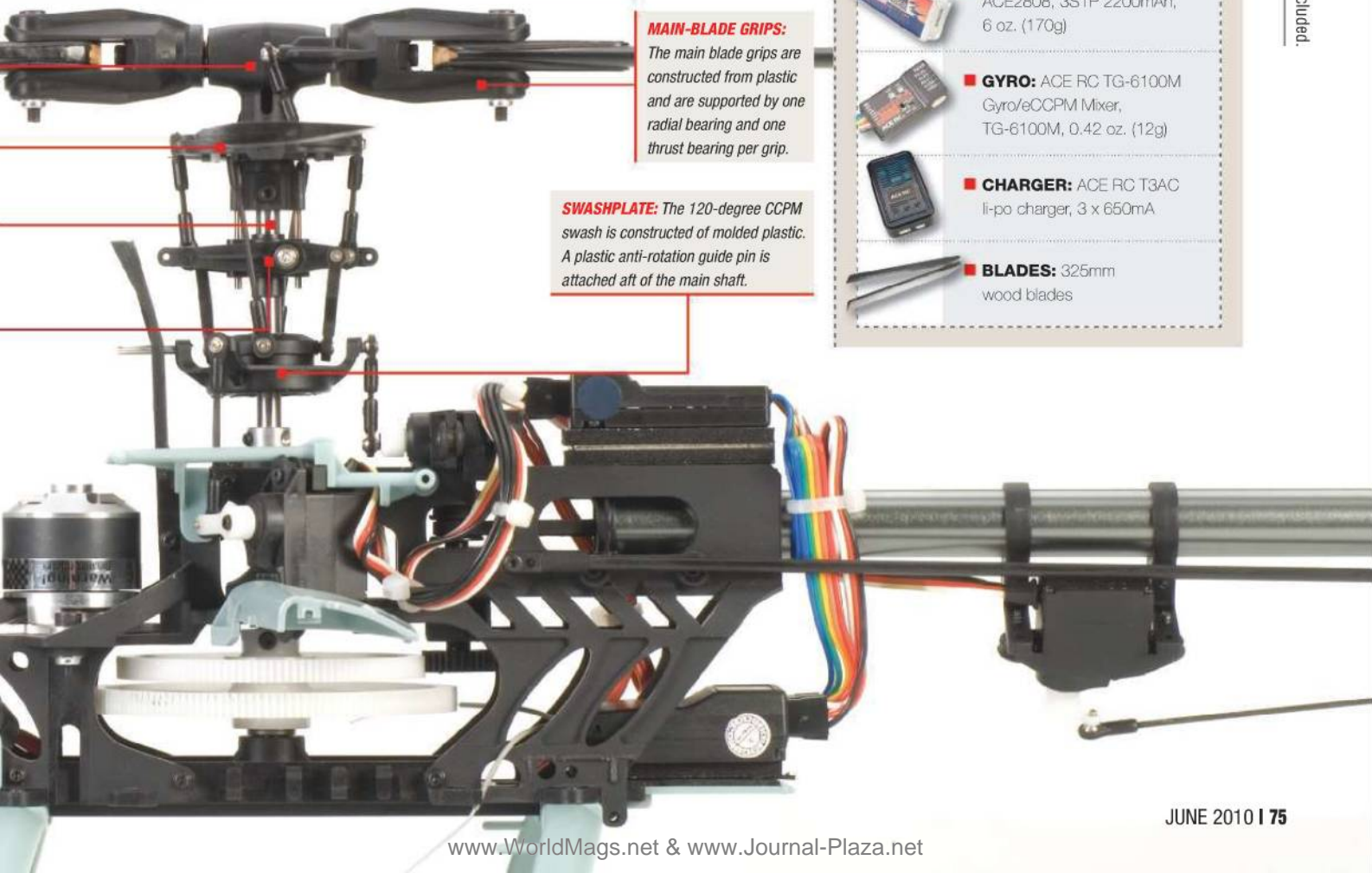
WHEN YOU OPEN THE BOX

This model comes assembled in a decorated, windowed display box. All you need to do to get airborne is to charge the transmitter's 9.6V 1100mAh Ni-MH battery and the 3S 2200mAh Li-Po battery with the included chargers. After about an hour you should be set to go.

MANUAL AND BUILD

The included manuals for the Mini Titan airframe, Super Cobra fuselage conversion and the TG-6100M Gyro/eCCPM mixer are very detailed. The front section of the fuselage comes off easily by prying and bowing out the aft edges. Then ease it down and over the front gun. While you have the front section off you may want to unscrew

the Phillips screw that attaches the front gun turret to its mount, apply a small drop of medium CA to the threads and then reinstall the screw. This will keep the screw from loosening and the turret from swiveling around while in flight. Other than checking and adjusting the tracking in flight, there isn't much else that really needs adjustment. I did check the balance of the included wood blades and had to add 0.30g to the CG spot on the lighter blade to bring it into balance. Once flown and tracking adjusted, there was nary a vibration.



MAIN-BLADE GRIPS:

The main blade grips are constructed from plastic and are supported by one radial bearing and one thrust bearing per grip.

SWASHPLATE: The 120-degree CCPM swash is constructed of molded plastic. A plastic anti-rotation guide pin is attached aft of the main shaft.

Thunder Tiger SUPER COBRA E325 RTF & TEST GEAR

» SUPPLIED GEAR



■ **RADIO:** ACE RC Sky Master TS6, 6 channel 2.4 GHz



■ **RECEIVER:** Sky Master TRS601DD, 0.25 oz. (7.1g)



■ **SERVOS (CYCLIC):** ACE RC, C1016, 0.32 oz. (9g)



■ **SERVO (TAIL):** ACE RC, C0915, 0.32 oz. (9g)



■ **SPEED CONTROL:** ACE RC ESC, BLC-40, 0.95 oz. (27g)



■ **MOTOR:** Thunder Tiger Ripper, OBL 29/35-10H, 1.94 oz. (55g)



■ **BATTERY:** ACE RC, ACE2808, 3S1P 2200mAh, 6 oz. (170g)



■ **GYRO:** ACE RC TG-6100M Gyro/eCCPM Mixer, TG-6100M, 0.42 oz. (12g)



■ **CHARGER:** ACE RC T3AC li-po charger, 3 x 650mA



■ **BLADES:** 325mm wood blades

Everything you need is included.

TESTING

The model comes with two flight modes preset by the factory and selectable by the top left AUX switch on the transmitter. To engage the Idle-Up flight mode, you must first be flying at or above 35% throttle in Normal mode and then flip the AUX switch. You will hear the head speed increase and your pitch range will be expanded. You can return to the Normal mode by flipping the same switch back to its original position. There is no throttle hold function. Be aware of this while you're plugging in the battery or walking out to the flight line. You have to be diligent in keeping the throttle stick at full low until you're ready to fly, otherwise you might get caught off guard by the blades spooling up.

The Gear/CH5 switch changes the gyro between rate and heading hold mode. Before you take off, make sure that the gyro is in heading hold mode by confirming that the red LED is illuminated on the gyro/mixer unit. After setting the model down to start my testing and stepping clear, I looked back on his little Super Cobra and felt excited! Having recently had some in-person experience with two full-scale AH-1W Super Cobras at a helicopter museum, I was thrilled to take up this miniature rendition without having to go through boot camp! I also anticipated that the capable Mini Titan airframe would carry the scale skin rather effortlessly.

HOVERING • Despite the enlarged size resultant from the angled tail drive extension and mass of the scale fuselage, the model is still relatively small and is affected by a breeze. The model settles into a stable hover in dead calm conditions and only requires minor corrections to keep it in place. However, as typical with 450-size models and exaggerated by the wind buffeting properties of the fuselage, the model does balloon and move around a bit when it encounters any amount of wind. Unfortunately, there is no exponential programming, so sensitivity around center can't be softened. As a result, if you're trying to fly in a scale fashion you must really keep to smooth, small inputs. Either way, hovering the Cobra feels great! I loved just looking at it and letting my imagination run away with some mission-like dreams.

Rating: 3.5

FORWARD FLIGHT • The Cobra tracked very well in forward flight thanks to its increased mass, large fly bar paddles and relatively decent trim. Once in forward flight, the model builds up speed quickly. If you need to turn the model around or come to a stop, you need to anticipate the momentum and make it smooth. This model is not set up to be flung around, Tic-tocked, or Rainbow. It flies in a spirited manner, but its flight characteristics are genuinely scale.

Rating: 4

CYCLIC PITCH RESPONSE • The cyclic response is commensurate with scale flying, which is to say deliberate and limited. The servos included are analog,

aren't blazing fast or powerful, and the cyclic pitch range is toned down from what this airframe's 3D counterpart is capable of. For the purpose of this model, the cyclic pitch response is appropriate and requires you to smoothly fly through big loops and elongated rolls. Snappiness is not in this heli's lexicon.

Rating: 3.5

COLLECTIVE PITCH RESPONSE • While the collective pitch range is expanded to 22° in Idle-Up mode, the response is sluggish, due mostly to the overall weight of the model, scale-appropriate head speed, and limited power. Again, you're not going to be doing piro flips! I was able to pull some nice, illegal-scale loops and rolls that would otherwise earn me a dishonorable discharge in the real machine. Due to the limited power and

diminished response, I had to give myself a lot of room for the simple aerobatics. Even so, it was fun to see the Cobra go over and around through the flight!

Rating: 3.5

TAIL ROTOR RESPONSE • The piro rate is relatively consistent, however the tail holding leaves a bit to be desired. Before I went airborne I ensured that the gyro was in heading hold mode by peering into the top rear peep hole in the fuse and observing a red LED lit up on the gyro/mixer unit. If you try to fly in rate mode by moving the AUX switch on the transmitter, be prepared to essentially fly the tail manually. In heading hold mode, the model holds much better, but isn't up to par with most other mid-range gyros.

Rating: 2.5



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TESTING SPECS

Thunder Tiger **SUPER COBRA E325**

Part #: TTR3870F06M2A1L
Distributor: ACE Hobby
Web: www.acehobby.com

Street Price: \$539
Price as Tested: \$539
Build/Setup Time: 1.5 hours

PERFORMANCE

MODE FLOWN: Normal, idle up 1
RPM OF EACH: Normal: 2550
MODE: Idle Up 1: 2750
MOTOR TEMP
 (after flight): 122° F
BATTERY TEMP
 (after flight): 71° F
FLIGHT TIME: 5 minutes
CRASH COST: \$39
*MSRP of landing gear, main shaft, spindle, flybar, and tailboom.

TEST CONDITIONS

WEATHER: Sunny
TEMP / HUMIDITY: 64° F/ 48%
BAROMETRIC PRESSURE: 30.11 in.
WIND SPEED: 3 mph
VISIBILITY: 9 miles
ALTITUDE: 56 feet

PITCH CURVES

NORMAL: -6, 0, 11
IDLE-UP 1: -11, 0, 11

REQUIRED TO FLY

Nothing. All the necessary components are included. Charge the included batteries with the included chargers and fly!

WHO'S IT FOR?

The Thunder Tiger AH-1W Super Cobra E325 is a fantastic ready-to-fly scale model for anyone looking to get into scale flying without the otherwise typical large investment of time and money. Since it comes with everything you need to start flying, there is no need to piece anything together. Thunder Tiger parts can be ordered from nearly any hobby shop, ensuring minimal down time.

SCORECARD

SCALE RATING: 1=POOR 5=EXCELLENT

5	Instructions
4	Parts Quality/Fit
4	Durability
2	Tunability
3	Overall Performance
4.5	Value

+ THE GOOD

- Highly detailed scale fuselage
- Comprehensive instruction manual and Quick Start Guide
- Truly complete, Ready to Fly package

- THE BAD

- Poor tail gyro performance
- Non-computerized radio
- No throttle hold function

Detailed to Dan's liking.

AUTOROTATION CAPABILITIES • No way!

This model has no throttle-hold function. My advice, if for some reason you do have to attempt an auto, is to try to maintain as much as head speed as possible. Make your flare about two feet or so off the deck as best as you can or aim for tall grass, a bush, hedge or some other foliage to dampen the fall.

Rating: N/A

POST-FLIGHT INSPECTION • After several

flights, I checked over the model and found no loose or broken parts. If you fly the model as intended, it should hold up very well for many missions before requiring service. Regular oiling of the main shaft and tail output shaft should be done every ten flights or as needed to ensure smooth operation. While a bit of an inconvenience, when the weather changes I'd advise pulling off the fuselage and checking/adjusting the belt tension. This would also be a good time to grease all of the bearings, lube all the shafts, and tweak

the gyro's gain and end-point adjustments if so desired.

Rating: 4

CONCLUSION

This model flies very well out of the box. Thunder Tiger includes everything you need, negating the need to run out and buy anything else short of additional flight packs. Much to my delight, they have executed a superbly detailed scale reproduction based on a solid, reliable and affordable airframe. The model performs

scale-like maneuvers with relative ease. While more expensive electronics would improve much of the control characteristics, the stock equipment provides a realistic and satisfying experience. Overall, Thunder Tiger provides a complete and fun package that emulates one of the most famous war fighting helicopters for all enlisted and non-enlisted people to enjoy! *TTR!*



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WARHAWK300 M3

Specification:

- Main Rotor Diameter: 340mm (13.8 inch)
- Overall Length: 418mm (16.4 inch)
- Flying Weight: 248gg (8.7 oz)
- Driven system: 2X 180SH carbon brushed main motor
- Servo: 2X 8.5g servos (speed 0.11sec/600(4.8V); torque 0.30kg/cm(4.8V); dimension 17.5X6.5X21.5mm)
- Battery: 7.4V 800mAh Li-Polymer
- 4 Channel 2.4 GHz Spread Spectrum Multifunctional R/C LCD Transmitter

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FLIGHT CHECK

Do not try this at home.



Align TREX 250SE

Subtle Differences

WORDS: Ryan Kephart | PHOTOS: Jason Boulanger

Align continues to refine its helicopters. The SE models are marketed as a higher-spec kit, and although they do not include some of the upgrades available, they do include the key components that allow the helicopter to perform well. The trend continues with the TREX 250SE. Align knows its audience and has responded with this new kit incorporating subtle yet effective improvements.

» AT A GLANCE

SIZE:	250
POWER:	Electric
TYPE:	Pod and Boom
BUILD TYPE:	Kit
TAIL DRIVE:	Belt

Red Hill Park, Rancho Cucamonga, CA

FEATURES

The TREX 250SE features a new look with subtle differences that many people might not notice at first glance. The first thing you'll notice is the bright, high contrast canopy that comes standard in this kit.

» MAIN FRAME



SWASH CONTROL: The 120° CCPM swashplate has a direct connection to the three servos. This provides the best slop-free connection possible. The swashplate has been redesigned for durability. The posts that the servos connect to are more robust.

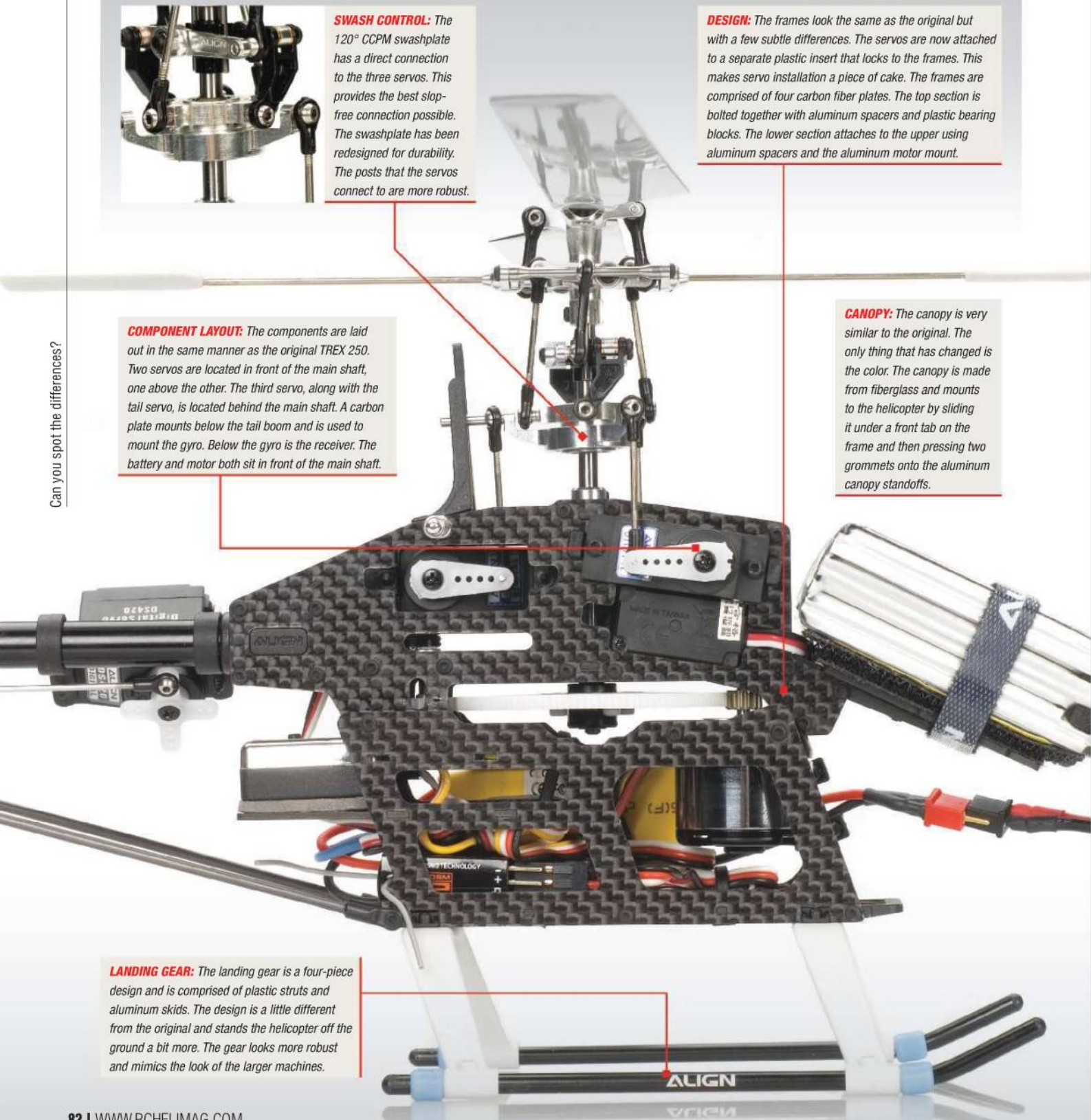
DESIGN: The frames look the same as the original but with a few subtle differences. The servos are now attached to a separate plastic insert that locks to the frames. This makes servo installation a piece of cake. The frames are comprised of four carbon fiber plates. The top section is bolted together with aluminum spacers and plastic bearing blocks. The lower section attaches to the upper using aluminum spacers and the aluminum motor mount.

COMPONENT LAYOUT: The components are laid out in the same manner as the original TREX 250. Two servos are located in front of the main shaft, one above the other. The third servo, along with the tail servo, is located behind the main shaft. A carbon plate mounts below the tail boom and is used to mount the gyro. Below the gyro is the receiver. The battery and motor both sit in front of the main shaft.

CANOPY: The canopy is very similar to the original. The only thing that has changed is the color. The canopy is made from fiberglass and mounts to the helicopter by sliding it under a front tab on the frame and then pressing two grommets onto the aluminum canopy standoff.

LANDING GEAR: The landing gear is a four-piece design and is comprised of plastic struts and aluminum skids. The design is a little different from the original and stands the helicopter off the ground a bit more. The gear looks more robust and mimics the look of the larger machines.

Can you spot the differences?



» DRIVE TRAIN

MOTOR MOUNT: No change here. The aluminum mount is a solid piece and attaches to the frames using four screws. Two channels are cut out to provide adjustable gear mesh.

PINION: The kit includes a 15-tooth pinion. The pinion is attached to the motor using the supplied green thread locking compound.

MAIN GEAR: The main gear is another area of change from the original 250. The gear has been redesigned and looks much like that of the 450. An aluminum hub has been added and attaches to the plastic main gear with four screws.

AUTOROTATION DRIVE: A one-way bearing is press fit into the aluminum hub on the main gear. The one-way allows the main shaft to freewheel when power is cut to the main rotor and does not drive the tail rotor.

TAIL DRIVE: A secondary gear is used and is much like that of the original. Align includes the metal pulley in this kit, which has been known to be more robust and provide better grip to the belt.



“THE INCREASED PITCH IS REALLY NICE FOR 3D AND CAN ALLOW YOU TO CHANGE DIRECTIONS QUICKLY OR STOP A MANEUVER DEAD IN ITS TRACKS.”



Align TREX 250SE MODEL SPECIFICATIONS

CLASS:	250 Electric
BUILD:	Kit
BLADE SIZE:	200mm
LEVEL:	Inter.-Adv.

FRAME

MATERIAL:	Carbon fiber
TYPE:	Stacked
SERVO TO SWASH LINKAGE:	Direct
SERVO SIZE:	Micro

ROTOR HEAD

GRIPS:	Aluminum
HEAD BLOCK:	Aluminum
LINKS:	Ball
SWASH:	Aluminum
CONTROL:	120° CGPM

TAIL

DRIVE SYSTEM:	Belt drive
AUTO DRIVEN:	No
TAIL PITCH SLIDER:	Single Point
TAIL BLADE GRIPS:	Aluminum
TAIL CASE:	Aluminum
BOOM STRUT	
MATERIAL:	Carbon

GEARING

MAIN ROTOR TO PINION RATIO:	1:8
MAIN ROTOR TO TAIL RATIO:	1:4,28

WEIGHT

EMPTY:	0lbs, 5oz (139.5g)
FULLY LOADED:	0lbs, 12oz (342g)

DIMENSIONS

HEIGHT (A):	6.50 in (165mm)
CANOPY WIDTH (B):	2.25 in. (57mm)
LANDING GEAR (C):	3.25 in. (82mm)
PADDLE TO PADDLE DIA. (D):	8.25 in (210mm)
MAIN ROTOR (E):	18.11 in. (460mm)
TAIL ROTOR (F):	4 in. (101mm)
LENGTH (G):	17 in. (431mm)

Small and lightweight.

FEATURES CONTINUED

» TAIL & BOOM



TAIL CASE: The tail case is constructed from aluminum and attaches to the tail boom using a clamp. A plastic spacer with an extruded pin aligns the tail case to the boom. The case is also machined with a standoff for the tail control bellcrank.

TAIL BLADE GRIPS: Align includes the new style tail blade grips with the SE. The grips are machined with counter weights to reduce the torque needed to change pitch in flight. The grips are single ball bearing supported and attach to the hub using a single screw. The blades are held in place with a machine screw that threads into the back side of the grip.

PITCH ACTUATOR SYSTEM: The pitch is adjusted by a bushing supported plastic bellcrank. The bellcrank attaches to the pushrod and the pitch slider using a plastic ball. The pitch slider has a plastic exterior and an aluminum pitch fork. The links are plastic and attach to the blade grips using a screw for both the connection on the fork and the blade grip.



BOOM: The tail boom is made from aluminum and is anodized black. Two logos are printed on each side. The boom has cutouts that fit into the boom clamp, which keeps the boom from twisting in flight. The boom also has a hole drilled in the proper location for the tail case to key into it. The boom is 8.5mm in diameter and 240mm in length.

» ROTOR HEAD

HEAD BLOCK: The head block remains the same as the original. The block is mounted to the main shaft using a single Jesus bolt that threads into the backside of the head block. The block itself is designed to clamp to the main shaft.



BELL/HILLER ARMS: The Bell/Hiller arms have also been extended to provide additional cyclic pitch and are mounted with the same larger screw. The arms are dual ball bearing supported as well. No input or output options are available.

PHASING: The phasing is accomplished with two steel pins that are press fit to the head block. The aluminum washout base slides on these two pins. Some slop is seen in this in this design when the rotor head spools up.

WASHOUT ARMS: The washout arms on the 250SE have also been redesigned. The arms are now a little bit longer to provide additional pitch and use brass bushings at the link location to provide a better, slop-free fit. The arms are dual ball bearing supported and use a larger screw to attach to the aluminum washout base. No mixing options are available.



Some upgrades not included.

» INSTRUCTIONS & BUILDING TIPS

WHEN YOU OPEN THE BOX

Upon opening the box, you'll first notice that the manual is laid across the top. As you remove the manual you will notice that the canopy is well protected by foam sheeting and is installed on the frame section of the helicopter. The helicopter parts are all housed in a plastic cradle that locks the pieces in place. A separate box separates the small parts from the main items. A bag is also taped to the lid and contains the speed controller and gyro unit.



MANUAL AND BUILD

The build on this 250 went much faster than the original, as the kit includes servo mounts that make installation a much easier task. The factory applied thread lock was in place on every screw, although I checked just to make sure.

MAIN BLADE GRIPS: The main blade grips are exactly the same as the original but use a bigger socket on the ball links. The grips are supported by two ball bearings.

SWASHPLATE: As I mentioned before, the swashplate has been redesigned. It's still made from aluminum, but the arms that attach to the servos have been made larger, providing a more robust system.

Align TREX 250SE RTF & TEST GEAR

» SUPPLIED GEAR



■ **CYCLIC SERVOS:** Align, DS410, K10443A, 0.47 oz. (13.5g)



■ **GYRO COMBO:** Manufacturer, item name, part number, 1.30 oz. (37g)



■ **MOTOR:** Align, 250SP, KX880004, 1 oz. (30g)



■ **SPEED CONTROL:** Align, 15 amp RCE-BL15X, KX880003A, 0.52oz. (15g)



■ **BLADES:** Align, 205mm carbon fiber, H2507

» TEST GEAR



■ **RADIO:** Spektrum, DX6i, SPMR6600, \$150



■ **RECEIVER:** Spektrum, AR6110e, SPMAR6110E, 0.10 oz. (3g), \$50

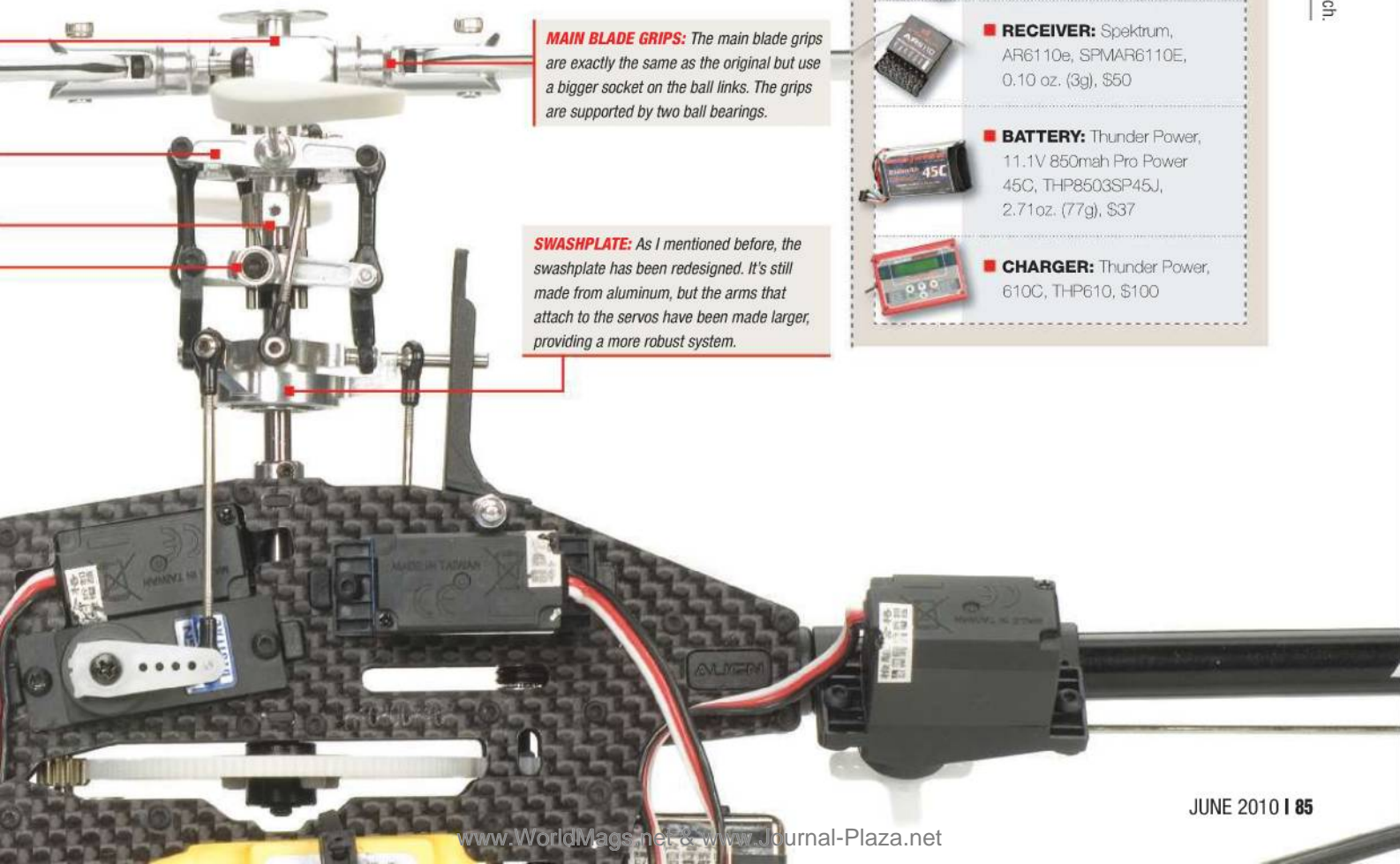


■ **BATTERY:** Thunder Power, 11.1V 850mah Pro Power 45C, THP8503SP45J, 2.71oz. (77g), \$37



■ **CHARGER:** Thunder Power, 610C, THP610, \$100

Those 45C packs really pack a punch.



TESTING

We tested the original TREX 250 in the March issue of 2009 and proved that this size of helicopter can perform 3D without a hitch. Since then, Align has refined some of the parts to make this helicopter an even better performer.

HOVERING • Hovering this TREX is much like the original. The stability seems to be about the same, but what I noticed most was the reactions to my controls. The SE seems to react faster and I feel more connected with the model. Overall, the TREX 250SE is a little twitchy around the center, but once you get a few flights on it everything seems to smooth out and you can hold a stable hover without much effort at all. Hovering in the wind is another story. When running a linear pitch curve the wind seems to blow the helicopter around a bit, but when switching to an Idle-up flight mode the helicopter regains some of its stability. This little helicopter loves high headspeed.

Rating: 4

FORWARD FLIGHT • Once again, the TREX 250SE is a fast and agile machine that can really change flight paths quickly. The SE is a bit of a speed demon and once you figure out how much input is required to keep it in a straight line it becomes second nature. Overall, the forward flight characteristics are fast and it seems to want to pull to one side when really pushing on the collective. I didn't notice any pitching of the elevator, but the roll seemed to be very sensitive.

Rating: 3.5

CYCLIC PITCH RESPONSE • These next two categories are where the SE prevails over the original TREX 250. The cyclic response was off the chart and really performed well. The overall feel of the helicopter is much more aggressive and connected than the original. The new brushless motor included with the SE has no problem keeping up with the cyclic. The only thing I noticed was that when performing quick cyclic stops the head does bobble a little, but nothing extreme.

Rating: 5

COLLECTIVE PITCH RESPONSE • This is probably the most noticeable difference between the two models. Where once

this helicopter felt a little mushy, now it's spot on and stops quickly without any noticeable lag. The increased pitch is really nice for 3D and can allow you to change directions quickly or stop a maneuver dead in its tracks. Overall, the response is fast and the powerful motor easily accomplishes full climb outs.

Rating: 5

TAIL ROTOR RESPONSE • Align has only made things better when it comes to the tail section. The new GP780 gyro combo combined with the new style blade grips and 37mm blades make the tail hold very well during any maneuver. The tail seems to be very consistent and I didn't notice any speed fluctuations when pirouetting.

Rating: 5

AUTOROTATION CAPABILITIES • How is a little 250 suppose to auto? Well in short, it doesn't, unless you call a motor shut off at two feet off the ground an "auto". To rate this helicopter on a 250 level, the TREX 250SE can auto with the best of them. This little guy's motor shuts off in a moment's notice. The landings are a bit rough, but the skids are plenty durable enough to handle this chunky 12-ounce helicopter.

The autorotation drive allows the helicopter to float for about a split second, but still it is better than the blades just stopping.

Rating: N/A

POST FLIGHT INSPECTION • I was impressed with this helicopter's durability. I noticed that it has been slop-free since the day I built it. I didn't get to crash test this helicopter, but from the experience I have had from the original 250, it looks to be more rugged as the screws have all been replaced by a bigger size and the mixing arms are made more rugged. This was one of the major problems with the original and I am happy to see this has been remedied.

Rating: 5

CONCLUSION

Although this helicopter doesn't have a lot of change and nearly any older 250 can be upgraded to meet the SE requirements, this helicopter is a welcome to this class. Align has done a great job of producing a great little product and this should be on everyone's list for a 250 sized helicopter. Flying a helicopter this small is fun and can be much less expensive than its bigger brothers. *TREX*





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TESTING SPECS

Align TREX 250SE

Part #: IXX019006
Distributor: Heliwholesaler
Web: www.heliwholesaler.com

Street Price: \$440
Price as Tested: \$677
Build/Setup Time: 8 hours

PERFORMANCE

MODE FLOWN: Normal, idle up 1, idle up 2
RPM OF EACH: Normal: 3700
MODE: Idle Up 1: 4000
 Idle Up 2: 4100
MOTOR TEMP (after flight): 100° F
BATTERY TEMP (after flight): 75° F
FLIGHT TIME: 5 minutes
CRASH COST: \$28
*MSRP of landing gear, main shaft, spindle, flybar, and tailboom.

REQUIRED TO FLY

Radio transmitter, receiver, battery, battery charger

TEST CONDITIONS

WEATHER: Sunny
TEMP / HUMIDITY: 74° F / 41%
BAROMETRIC PRESSURE: 29.98 in.
WIND SPEED: 10 mph
VISIBILITY: 10 miles
ALTITUDE: 725 feet

PITCH CURVES

NORMAL: -4, 0, 12
IDLE-UP 1: -12, 0, 12
IDLE-UP 2: -12, 0, 12

WHO'S IT FOR?

This helicopter was designed for the average pilot looking to fly in his own backyard. This small helicopter can fly in a confined area and can even be flown 3D in as little as an open front yard. Overall, this little helicopter is not really suited for the beginner but geared to the intermediate to advanced crowd.

SCORECARD

SCALE RATING: 1=POOR 5=EXCELLENT

- 4** Instructions
- 5** Parts Quality/Fit
- 4.5** Durability
- 3** Tunability
- 4.5** Overall Performance
- 4** Value

+ THE GOOD

- More durable helicopter
- Gyro works great
- Increased performance

- THE BAD

- Some upgrades not included with the SE

Even the bees were intrigued.



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2010 APRIL FOOLS FUNFLY

April 2nd-4th, 2010
St. George, Utah

WORDS and PHOTOS: Jim Innes

This year marked the sixth time that Desert-Heliz has held the April Fools funfly in sunny St. George, Utah. The event always takes place the weekend closest to April 1st and for a number of pilots in Utah, Nevada, and Arizona it has become a regular meeting place. This year the event happened to coincide with the Easter holiday.

Not really on April Fools day, but close enough.

AN ANNUAL TRIP FOR ME

I have been coming to this event since its inception in 2005. It is one event that is permanently on my family calendar, and for good reason. The weather and scenery in St. George is fantastic, the field is great, and the flying is always phenomenal. Last year I didn't make it to this funfly due to a scheduling conflict. So when we discovered that this year's event fell on Easter weekend, we decided to make a family trip of it and go. I am glad we did!



Hard to beat that backdrop for a funfly!



Are they RC or are they real?

GREAT PEOPLE AND LOCATION

One of the most important parts of a funfly is the people. For me, the caliber of people at an event determines its success far more than the level of flying. The April Fools funfly delivers in this category. Doug and Peg, the hosts of the event, always try hard to make people feel at home. They take time to talk with everyone and find out what's new. The regular pilots for this funfly are also great people to talk and fly with. Catching up with the guys from Arizona and Nevada is always a highlight.

The event is held on a field at Staheli Farms, a large family farm near St. George. The Staheli family graciously allows pilots to use the farmhouse and all facilities during the event. The flying area faces a beautiful row of red rock cliffs and hills, providing a fantastic backdrop for our flights. There is room for eight or nine flight stations on the field, but this year we only needed three. Another advantage to this location is that it offers things for your family to do while at the field. The farm has a full playground area, lots of shaded grass, a petting zoo, swings, and other distractions. My kids end up having as much fun at the field as I do, and that's pretty rare.



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2010 APRIL FOOLS FUNFLY

NEED FLYING TIME?

Because it was Easter weekend, and due to the possibility of bad weather, a number of pilots opted out of the event. In the end, there were only 14 registered pilots. While this may sound like a bad thing, in the end it was fantastic for those of us who made the event. First off, the weather ended up being perfect throughout the weekend; 70 degree temps and an occasional light breeze. Second, because there was a smaller number of pilots than normal, those of us there got to fly as many times as we could handle. It was fun to watch guys almost get worn out from the constant flying! Luckily, there was power available in the pits to keep everyone's chargers continuously charging the next flight pack.

With the constant flying, I watched guys learn new things and could actually see them progressing throughout the weekend. I must also take a second to thank Ben Storick; this fantastic young pilot with Team Avant spent a lot of his time buddy boxing any pilot who asked. Of course, Ben was able to fly numerous demo flights with his electric and nitro Auroras and he made sure to chop up as much alfalfa from the field as possible while flying.



This auto just missed the edge of the landing pad. No worries, Jonathan's Trex 700 came out unharmed. Top photo: Ben Storick wows the crowd with another demo flight.

SOMETHING FOR EVERYONE

Another positive thing about this event was the variety of machines and flying styles. There was the heavy 3D style of Ben and others, new guys just hovering, plenty of us in the middle, and thanks to Nick with RC Aerodyne, there was a whole fleet of scale ships on display and flying throughout the weekend. Nick had everything from a scale Trex 250, a 500-size U.S. Coast Guard Augusta, and a number of 50-size UH-60s. Nick also put on an aerobatic display with a scale "Red Bull" heli that was fun to watch. No matter what time of day it was, there was fantastic flying going on at this event.



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FunFly regular, Steve Lowe, flies his beautiful Knight 3D in front of the red cliffs.



The author's scale Trex 250 in the MD500 body. I love this heli!

PERKS AND PRIZES

Something Doug and Peg always do at this event is make great food. They make waffles each morning for anyone who wants them and Doug makes his famous "Doug Burgers" at lunch (the burgers alone are usually worth the trip). Due to the economy this year, there were no raffle prizes... that is, until RC Aerodyne graciously donated a pre-painted 500 sized Augusta fuse to give away. I'm not sure how it happened, but I was lucky enough to win that fuse and I look forward to fitting it out.



Jim with his awesome A109 raffle prize donated by RC Aerodyne. "I am looking forward to flying it!"

CONCLUSION

Even though this year's April Fools event had a low pilot turnout, those who did make it were all fantastic pilots and people. We all had a great weekend and I think I can speak for everyone present when I say that we are looking forward to next year's event. If you are within driving distance of St. George Utah, I highly recommend attending the event. The friendly people, great location, and fantastic flying make this event one of my favorites. See you at the field! **TREX**

Century A-STAR

Scaled to the max

WORDS: Ryan Kephart | PHOTOS: Jason Boulanger



Century Helicopters has been in the scale heli market for years. Since the explosion of ARF models, Century has been a leading source for those looking to build a scale model with minimal hassle. This month we'll take a look at one of Century's newest helicopters, the 50-sized A-star.

It rained the second day out on the shoot.




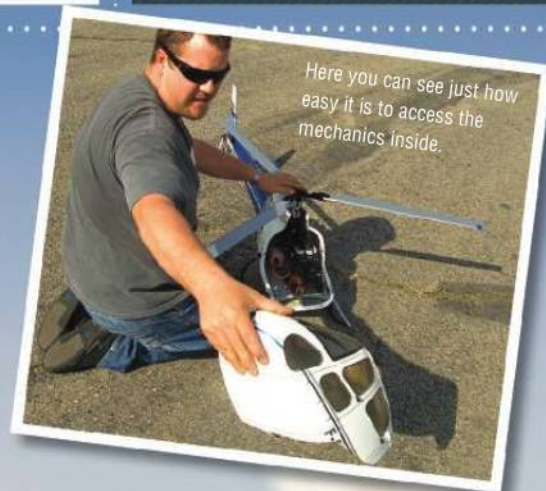
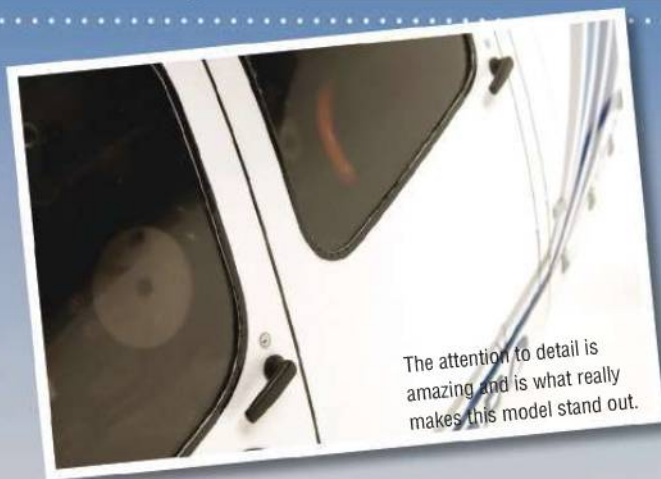
MULTI HELICOPTER PLATFORM

With such a wide variety of helicopter airframes on the market, Century opted to make their scale fuselages universal. The kit includes several different hardware kits for various makes and models of helicopters. This is apparent when you take a look at the pre-installed wooden crutch. The crutch has several pre-drilled holes and some holes even have blind nuts installed to ease the installation of the mechanics. The A-star can be used with any helicopter mechanics in the 50-size range, but has pre-drilled holes for the Century Scale SE, Thunder Tiger Raptor 50, Hirobo Scedu, and Align TREX 600N. We opted to use the Century NX 50 we reviewed previously in RC Heli, as it was a stable platform and would perform well in a scale fuselage.



WHAT IS INCLUDED WITH THE KIT?

 Century includes everything you need in one complete package. When you open the box you'll notice that the main fuselage body is heavily wrapped with foam sheeting and secured to the box using cardboard cutouts that are taped to the side of the box. The accessories are located in a separate section and contain the landing gear, horizontal stab, vertical stab, and the hardware. Inside the fuselage you'll find a bag with the windows, which are all individually bagged to prevent scratching.



As you can tell, it didn't rain the first day.



SCALE FUSELAGE DETAILS

One thing we've noticed from Century is the attention to detail. Every ARF fuselage is hand painted and clear coated to give the helicopter its brilliant looks. The fiberglass fuselage has almost every detail you can want except for the rivets. Panel lines and brackets are installed on the model and complete the look. **(1)** Access ports and a fuel port are also details that Century included. **(2)** Century also installs fillets that finish the appearance of air intake ports. The model also includes screen mesh over the engine cooling section that draws in cool air from the main rotor. **(3)** Light caps are also used for navigation lights and can easily be modified to use LED's to really add some flair. **(4)** A pre-painted scale exhaust is also included. The paint resembles the actual look of a scale exhaust after hours of run time. **(5)** Century also includes scale landing gear made from composite plastic. The landing gear comes with accessories, which include a step and landing gear caps to finish off the look. **(6)** Handlebars, windshield wipers, and radio antennae also add to the appearance and really make this helicopter stand out at the field. **(7)**

Most of the time when flying a scale helicopter with nitro mechanics, it's a pain to hide the switches, remote glow, and other accessories needed to make the helicopter run, but Century has included a fix around this troublesome problem. Two magnetic latches are installed on each side of the fuselage canopy. These latches magnetically close and secure the front section to the rear. When two magnets are placed on these latches, they open up and allow the front section to be removed. This allows you to turn on the helicopter, fuel it up, plug in the glow driver and start the helicopter in a matter of seconds. Simply remove the magnets and replace the front half and you're on your way.



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HELICOPTER PREP

As I mentioned before, we used the Century NX 50, which was not one of the helicopters on the list for the pre-drilled platform. What's nice about this fuselage is that it can be used with virtually any helicopter. I reviewed the detailed manual that shows actual pictures of the installation and soon realized that it was similar to the Century Scale SE. The tail case had to be trimmed and the landing gear removed. The manual says to install the landing gear onto the model, which was a simple process of just sliding on the struts and securing them with a clamp inside the fuselage. The skids are then installed by sliding them into four "T" sections, followed by securing them to the struts using a few self-tapping screws. Then, I removed the blades, landing gear, and tail case, and test fit the mechanics into the fuselage. I marked the location of the landing gear mounts and drilled the holes. A

nice feature about the NX 50 is that the screws thread into aluminum mounts on the frame. I drilled two larger holes on the bottom of the fuselage so I can fit a few supplied screws in and then tighten them down. Two aluminum top brackets are also included and I installed them in the correct location, marked the holes on the fuselage, and then drilled them out. The tail is then assembled to the fuselage using a hose clamp, then secured to a flange built into the mold with a piece of silicone and zip tie. I pulled the helicopter back out and installed the handle grips and the horizontal stabilizer.

The only tools needed to complete the job are a basic set of hand tools, sandpaper, epoxy, drill, and a rotary multi-tool (i.e. Dremel). I fit the helicopter back in the fuselage and installed the rest of the details, which included the step for the landing gear, the windows, window wipers, antennae, and tail skid.



CONNECT

AS350 A-STAR (BLUE)

MANUFACTURER: Century

PART NUMBER: CN4131ABL

MSRP: \$409

SPECIFICATIONS

LENGTH: 56in. (1422mm)

WIDTH: 10in. (254mm)

HEIGHT: 14in. (355mm)



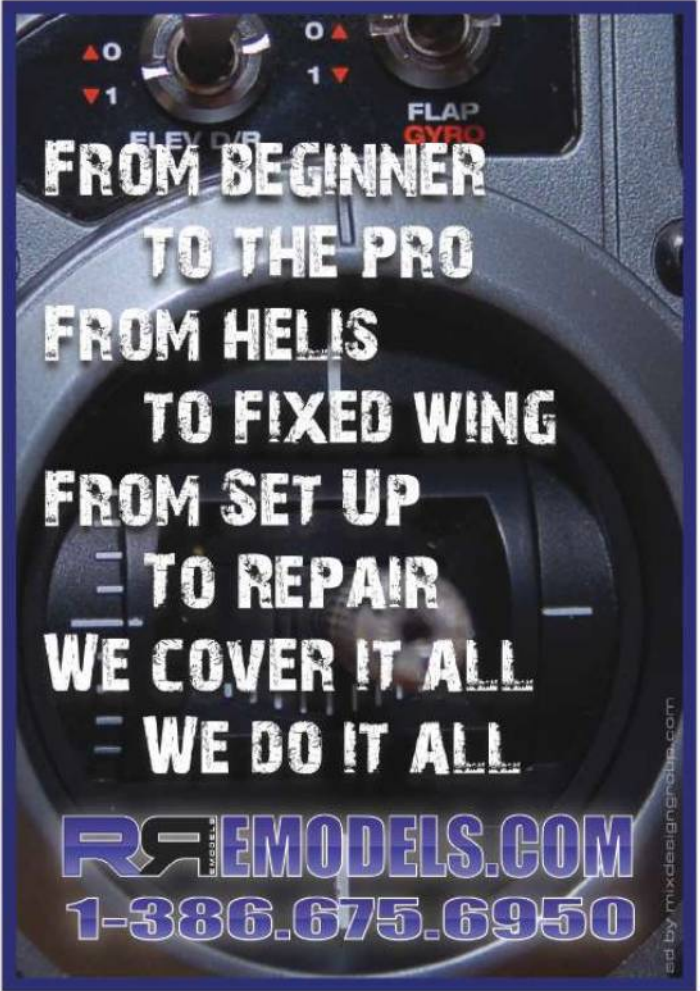
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STEP 2:

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STEP 3:

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STEP 4:

Cram the whole mess into the nearest mailbox and just when you've forgotten about the whole thing, you'll get a bunch of RCH stickers in the mail.

Freakin' easy huh?

ADDING CENTURY'S THREE BLADE ROTOR HEAD

With any scale helicopter there is always one thing that sticks out like a sore thumb—the flybar. Century is known for making multi-blade rotor heads. We opted for a more scale look with this model and installed a three blade head, which can be used with helicopters that have a 10mm or 12mm shaft. The head block is made from aluminum and has three spindles that screw down to the head block. There is no damping in this design, which leaves the blades to do all the work. The grips are made from plastic and three ball links must be installed.

The NX 50 did not have a multi blade swashplate, so we installed one. The difference between a regular swashplate and a multi-blade swashplate is that there is extra threaded portions on the inner race that allow you to install extra ball links for the blades and swash follower. Phasing on a multi-blade head is much different than that of a conventional helicopter. One blade must be positioned on the left side of the helicopter perpendicular to the tail boom. Then the swash follower must be twisted so the forward and aft cyclic only tilts the blade that is perpendicular to the boom. We'll get into details with a how to phase a multi-blade rotor head in a future issue of RC Heli.

It looks so real it just makes you wanna hop in and go!



CONCLUSION

Overall, the Century 50-size A-star is a wonderful looking helicopter in any of its several color schemes. With the addition of the three blade rotor head, this is one of the most scale looking fuselages we have reviewed. Flying the helicopter was a breeze, although it did take some getting used to when flying around in forward flight. I am very pleased with the quality and look of the A-star. *[T.H.]*

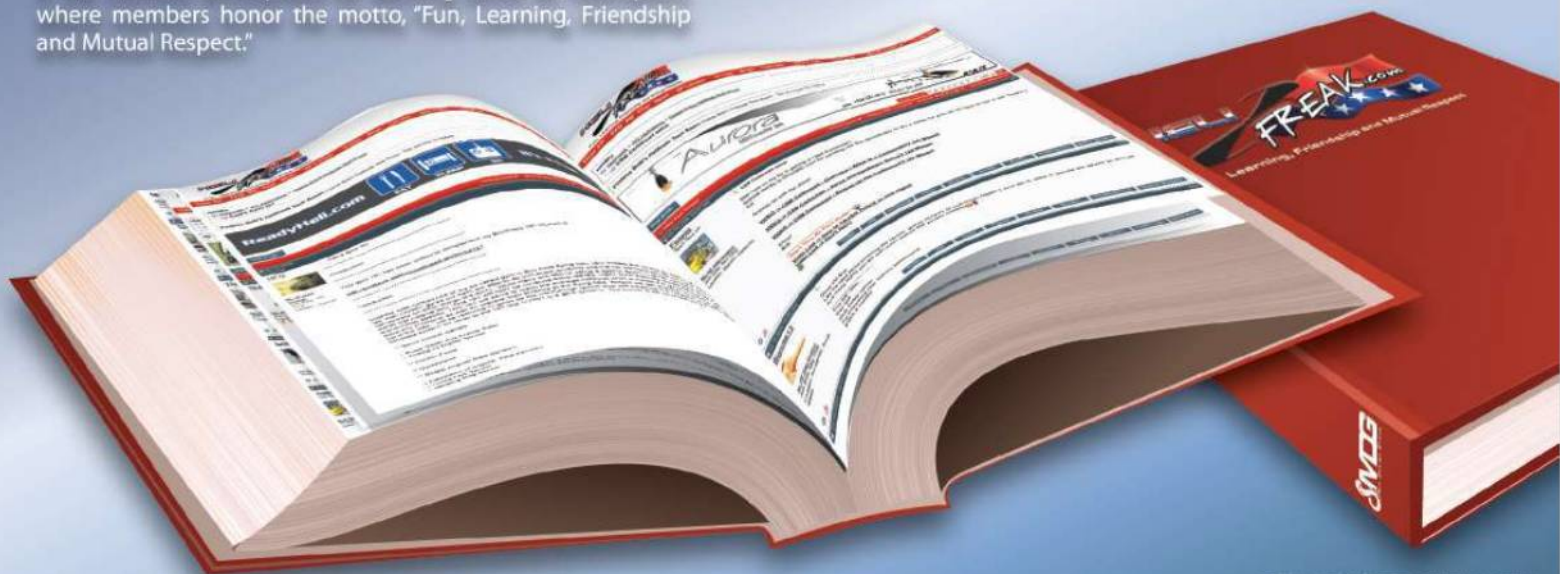
-noun

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Fun, Learning, Friendship and Mutual Respect



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» ELYQ VISION 50 BUILDING TIPS

(Continued from page 68.)

1 The included rubber that is to be used to hold the fuel tank in the frames is far too thick for the application. I ended up taking a run of black fuel tubing, splitting it down the length, and running that over the frame edge instead of using the included stuff.

This allowed the fuel tank to still be securely installed without needing so much force to get it in and out of the frames. An alternative would be to use a few very short pieces of the included rubber in strategic places.

2 The fan and clutch must be balanced and dial indicated to get the best results. I had to remove some material from the fan to get good balance. My clutch stack dial indicated to .001" from the box, but your results may vary.

3 The headblock has a slit in it so that it clamps to the main shaft. This slit is too short and you cannot get a tight seal on the shaft. Some wobble may result. To fix this, I followed the tip of a US ElyQ rep and used my Dremel to cut the slit a few millimeters longer so that a good clamp would result.

4 I had to add some washers to the horizontal boom clamp to take up some slack. When tightened, there is a large gap on either side, which can allow someone to over-tighten the clamp. This could damage the carbon boom. Adding the washers allows me to tighten up the clamp without fear of going too far.

5 It is recommended that you add a frame stiffener at the bottom of the heli to tie the front and back of the frames together. ElyQ makes one, which can be seen in this review, or you could use a stiffener from other helis with some modifications. It is a cheap bit of insurance that helps keep everything tight.

6 It's important that the tail shaft and pulley assembly be put together correctly. My model has the metal pulley with the pin that is held in by a bolt in the end of the shaft. When you install the pin, put a drop of CA on it to hold it in and when you tighten the bolt at the end of the shaft, do not over-tighten it or you can break the pin.

Last, put a piece of heat shrink over the end of the pulley so that it covers the pin on both sides. This will keep the pin in place through just about anything. The manual shows an update with a newer pulley that retains the pin by itself, so this tip may not apply to newer versions of the heli.

7 The mixer arms that attach to the blade grips are quite thin, so when you install the linkage balls to the mixers it is a good idea to add a 2mm nut to the back of the mixer with each bolt to add a little insurance. I did this per the recommendation of other V50C pilots.

8 Do not over-tighten any fasteners. The aluminum threads in the components can strip out if you do. I made the mistake of perhaps putting a bit too much into the head button bolt and the threads gave out on me. I didn't feel that I was over-doing it, so it may also be a sign of soft metal or oversized tapping; I am not sure at this point.

BACKWARDS FLIGHT

Back that heli on up.

WORDS: Brandon Updike | **PHOTOS:** Jason Boulanger

HELICOPTERS ARE UNIQUE IN THAT THEY'RE ABLE TO FLY IN ALL DIFFERENT ORIENTATIONS. Helicopters are even able to fly backwards, much to the envy of our planker cousins. Flying backwards is essential in helping with orientation and increasing flight skills. Whether you want to do precision aerobatics or 3D flight, you'll eventually have to fly backwards. It's better to learn it while working on all the other basics to lay down the proper groundwork for progression. In this Pilot Skills we'll go over performing backward circuits.

FLYING THE MANEUVER (LEFT TURN)

6 Once on the left side of the field make the same inputs as step four to turn back towards the other direction.

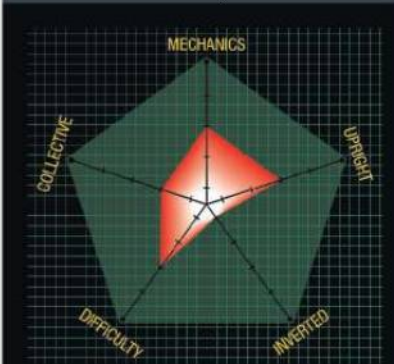
5 Bring your helicopter back across the field making any necessary corrections. Right input will bring the helicopter towards you while a left input will push it away. Make your turn so that your helicopter will cut across the centerline at an angle to set you up for a figure eight.

Back that tail up!

Flight School Training

» SKILLS NEEDED

SCALE RATING: GREEN = Easy / RED = Advanced



WARNING: Only perform these maneuvers under safe conditions and in a large open area or designated flying field away from power lines, building, traffic and populated areas. Make sure you are familiar with your helicopters controls and can perform basic flight maneuvers.

SETUP:

If your helicopter can fly forward, it can fly backwards. One thing that can benefit you is a heading hold gyro, since flying backwards will put a greater load on the tail. Having a good gyro will prevent it from blowing out. Backwards flight can be achieved with even a modest beginner setups (even counter-rotators). If attempting backwards flight for the first time, it's a good idea to try it on a counter-rotator because of its predictable characteristics.

PRACTICING FOR IT:

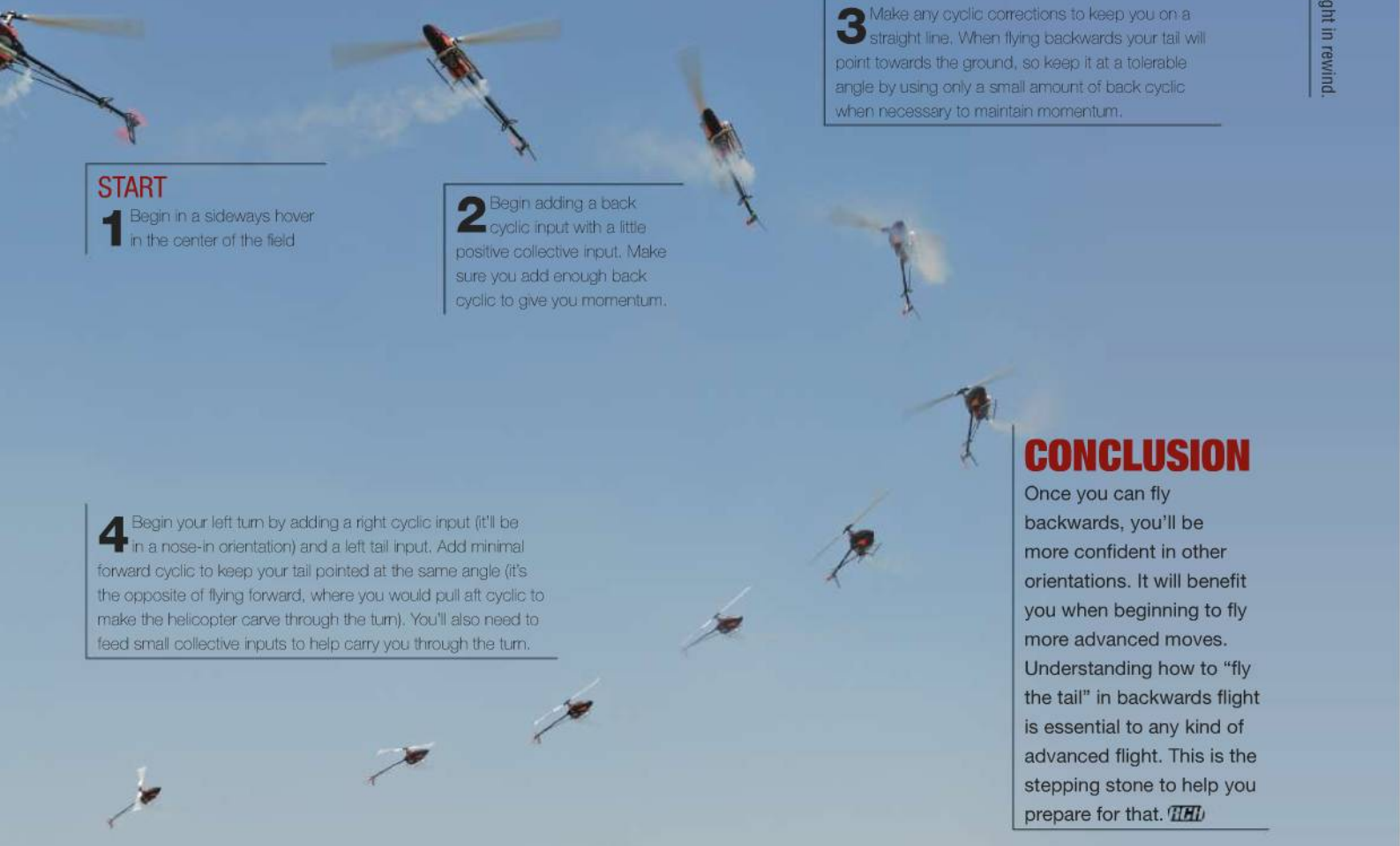
The main way to prepare yourself for backwards flight is to work on your hovering. More specifically, you'll want to work on your sideways orientations because that is where you're going

to spend most of your time. Make exaggerated cyclic inputs to see how your helicopter will react and make sure that you know which way your tail points to corresponding tail inputs.

WHEN TURNING TOWARDS YOURSELF:

In the breakdown we covered how to perform a figure eight by turning away from you. When turning toward you, use the same concept but use opposite cyclic inputs. You'll use left cyclic and right rudder. Use the same correction of forward cyclic to keep the tail at a proper angle and feather the collective through the turn. When turning towards yourself in a circuit, be careful not to turn too far to the point where the helicopter gets behind the flight line. This can be very dangerous.

Forward flight in rewind.



START

1 Begin in a sideways hover in the center of the field

2 Begin adding a back cyclic input with a little positive collective input. Make sure you add enough back cyclic to give you momentum.

3 Make any cyclic corrections to keep you on a straight line. When flying backwards your tail will point towards the ground, so keep it at a tolerable angle by using only a small amount of back cyclic when necessary to maintain momentum.

4 Begin your left turn by adding a right cyclic input (it'll be in a nose-in orientation) and a left tail input. Add minimal forward cyclic to keep your tail pointed at the same angle (it's the opposite of flying forward, where you would pull aft cyclic to make the helicopter carve through the turn). You'll also need to feed small collective inputs to help carry you through the turn.

CONCLUSION

Once you can fly backwards, you'll be more confident in other orientations. It will benefit you when beginning to fly more advanced moves. Understanding how to "fly the tail" in backwards flight is essential to any kind of advanced flight. This is the stepping stone to help you prepare for that. *TREI*

DIAMOND LOOP

A girl's favorite maneuver!

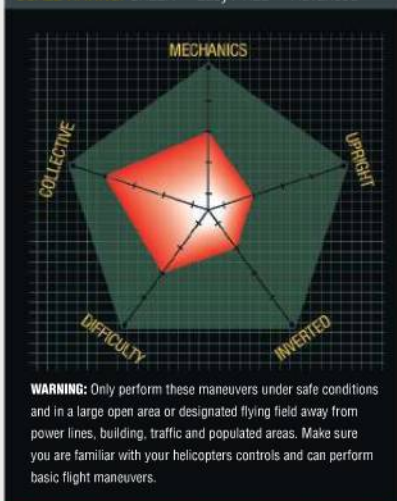
WORDS: Brandon Updike | PHOTOS: Jason Boulanger

IT'S AMAZING HOW SIMPLE COLLECTIVE INPUTS CAN CHANGE THE LOOK OF A MANEUVER. That's a great aspect about 3D flying - that changing standard inputs during maneuvers can create a whole new move. One example of this is the Diamond Loop. A Diamond Loop is essentially a standard loop, but with abrupt collective inputs thrown in to make a diamond-like figure in the air. It's a tricky one to get right, as it's all about the proper collective inputs timed to perfection. In this Pilot Skills we'll dissect the proper way to perform a Diamond Loop.

Flight School Training

» SKILLS NEEDED

SCALE RATING: GREEN = Easy / RED = Advanced



SETUP:

- **YOU'LL WANT** a decent running 3D setup for this maneuver
- **HAVING FAST CYCLIC RATES** will benefit you. Go with a lighter set of carbon fiber blades and light 3D paddles.
- **A GOOD SET** of digital servos will help through all the parts of the diamond.
- **HAVING A PROPERLY TUNED MOTOR** is important, as the helicopter needs to be carried through the move without any bogging.

HOW TO PREPARE FOR IT:

- **THE FIRST THING** to do when preparing for the Diamond Loop is to

perfect your basic loops.

- **ALSO WORK ON YOUR FORWARD LOOPS AND FLIPS.** This isn't necessary, but it will help you be more comfortable in different orientations.
- **WORK ON COLLECTIVE PUMPING.** Try doing large Tic-tocks at a slow rate to get used to easing into the collective. Get used to pumping your collective and watching how your helicopter reacts.


THINGS TO REMEMBER:

- **YOU'LL BE HOLDING** back cyclic throughout the entire maneuver
- **THIS MAKES TIMING THE COLLECTIVE EXTREMELY IMPORTANT.** You want to time it so that you set the helicopter up for the next phase of the diamond before you apply the corresponding input.
- **APPLY COLLECTIVE** at the wrong time and you can find your helicopter buried straight into the ground.
- **KEEP THE HELICOPTER OVER** that imaginary centerline on the runway for a perfectly symmetrical loop.
- **IF YOUR HELICOPTER GETS OFF ANGLE,** bail out because slamming the helicopter back towards the ground at weird angles can be dangerous



Diamonds are forever.

FLYING THE MANEUVER



3 Begin climbing in the backwards-inverted orientation by adding negative collective. Be relatively level so you gain some altitude as you go.

4 Once you've reached a relatively high altitude, continue to hold your cyclic stick back until the nose points back towards the ground and add a positive collective input. This will bring the helicopter back toward the ground similar to a nose down inverted hover funnel orientation.

5 Once you head back toward the ground, continue holding back on the cyclic stick and add a negative collective input to bring the helicopter back to the starting point in an upright position.

2 Begin adding positive collective and back cyclic until your helicopter is in a backwards inverted orientation.

START
1 Start at a hover in the middle of the field.

CONCLUSION

After mastering the Diamond Loop, you'll see that you can use those tactics through many other maneuvers. Doing half a Diamond Loop was once popular, and the sideways Diamond Loop is a popular variant. It's a fun maneuver to perform and expand on to do unique stuff. **TTR**



THE HOVERFLY

It beats the Housefly!

WORDS: Brandon Updike

Igor Sikorsky is regarded as one of the greatest pioneers in helicopter aviation. Not only has he penned many different designs, but he also started one of the largest helicopter corporations which continues to develop helicopters today. One of his earliest, most groundbreaking designs was the R-4. The R-4 was the first helicopter to enter mass production and to go into military service.

BACKGROUND

After the success of Sikorsky's VS-300 helicopter, Igor decided to expand on that design to make an even better helicopter. He wanted something that combined both good performance and manufacturing practicality. After working on a new design, he came up with a prototype version of the R-4 called the VS-316A. It was similar in design as the VS-300 but had many noticeable upgrades. The military was very interested in rotorcraft and the benefits that they presented on the battlefield. VS-316 first flew in 1942. The Army Air Force then got a hold of the helicopter and designated it the XR-4. They put it through numerous performance tests and were pleased with how well it did.

Each branch of the military decided to purchase prototypes for further evaluation. The VS-316 was the first helicopter to land on a carrier and to be used during a search and rescue exercise. All branches were convinced

and decided to make an investment in the helicopter for their specific needs. The R-4 then went into full production to fulfill military orders. Over 100 were built, with the Army Air Force purchasing 20 for an observation role in the field. The production version benefited from a more powerful engine and other minor exterior changes. Even though the helicopter was an initial hit, it didn't remain in service for long and was phased out in favor of the Sikorsky S-51.

FEATURES

The R-4 descended from the VS-300, so it maintained many of the same design features. It used the same tubular fuselage design and the tail section retained its fiber covering. The main difference is the enclosed cabin that could house two pilots side by side with dual controls. The rotor head was a 3-blade design that was covered in fabric. It had a unique 3-wheel landing gear design using steel tubing that extended from the fuselage.

CONCLUSION

Even though the R-4's service was short lived, it opened the door for future endeavors by Sikorsky. The R-4 was the first helicopter to truly exhibit marketable features. It showed what benefits a helicopter could have over fixed wing aircraft. **TRH**

SPECS

CREW: 1
CAPACITY: 1
LENGTH: 33 ft 8 in (10.2 m)
ROTOR DIAMETER: 38 ft (11.5 m)
HEIGHT: 12 ft 5 in (3.8 m)
EMPTY WEIGHT: 2,098 lb (952 kg)
LOADED WEIGHT: 2,581 lb (1,170 kg)
POWERPLANT: 1x Warner R-550 piston, 200 hp (149 kW)

PERFORMANCE

MAXIMUM SPEED: 75 mph (120 km/h)
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- TAIL MOTOR: Direct Drive N60 Brushed (installed)
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