



*“Simplify and Add Lightness” – Ed Heinemann,
Lead Designer, Douglas A-4 Skyhawk*

HOBBY LOBBY

A-4 Skyhawk

by Terry Dunn

Ed Heinemann’s timeless phrase of engineering genius carried the Douglas Aircraft Company into the early years of the jet age—a time when most military aircraft designs were evolving into heavyweights. A self-taught engineer, Heinemann designed the legendary A-4 Skyhawk attack plane, which first flew in June 1954 and was much used during the Vietnam conflict and, later, in wars in which the USA was not involved. It served with the U.S. Navy until 2003 but is now fully retired from U.S. service. It is still used by many of our allies, though—not bad for a design that took form in 1952!

As I examined the kit, it became clear that the R&D guys at Alfa Models followed Heinemann’s goals of simplicity and lightness and applied the principles to their downsized version of “Heinemann’s Hot Rod” (affectionately known as “the Scooter”). This model is a study in minimalist design without compromise to scale appearance. The kit has only the essential parts needed to make it air-worthy, yet it definitely remains true to its roots in shape, proportion, and color. I think Mr. Heinemann would approve.

The A-4 is largely complete right out of the box. The molded-foam fuselage and wings are assembled and nicely painted, and the control horns and pushrods have been installed. You have only to do some minor assembly, install the radio gear and power system and apply the scale markings.



The Alfa A-4 is about as basic as a scale EDF can get, but the finished model is striking. Well-built components and a low parts count keep everything simple and light.



TIPS FOR SUCCESS

Alfa includes written instructions and an exploded, 3-view drawing. They paint a clear picture of how things should go together, and there aren’t any real challenges. I began by applying the water-transfer decals. The kit’s large decal sheet has markings for three different full-scale aircraft. The decals go on pretty easily, but you have to make relief cuts in the few places where a decal covers a compound curve. I damaged one of my “Marines” decals while assembling my Skyhawk and had to remove it. To a lesser degree, I also damaged a few of the other decals just during routine handling. I

PHOTOS BY TERRY DUNN & RANDY STONE



AIRBORNE

Our field’s paved runway is bumpy, rock-strewn asphalt with a strip of smooth concrete down the middle. There’s no provision for steering, so I did a few quick taxi tests to make sure that my Skyhawk wouldn’t stray off the runway. The mostly hidden wheels make the Scooter something of a low-rider, so I definitely wanted to stay on the concrete. My next trip along the strip was the real deal.

With the throttle wide open, the A-4 accelerated quickly and generated an impressive howl. Not all electric models are quiet! A little backpressure lifted the nose, and my aircraft left the runway with tangible chutzpah.

I knew that with its 200-watt/pound power loading, the A-4 would be fast and have great vertical performance. What *did* surprise me was how *slowly* it can plug along. Just as with its full-scale brother, a light design pays heavy dividends at the low end of the speed envelope.

I didn’t know it at the time, but one of the guys at the field was tracking my Skyhawk with a radar gun. He later told me that he measured speeds of from 24 to 70mph. That’s an impressive range, considering that I never slowed to a stall or made any all-out Vmax passes. While I’m sure that its top speed is way more than 70, even that seemed quite fast with this 22-inch-span pocket rocket.

I used Alfa’s recommended control throws as high rates and set the low rates at 60% and added -40% aileron and -20% elevator exponential to both rate settings. On low rates, it was easy to make smooth fast and slow photo passes. I thought that the ailerons felt a little too soft, so I increased the low-rate throw slightly. The Scooter rolls really fast on high rates! I don’t think the high-rate ailerons are overly sensitive, but they are very effective. I would hesitate to use this much throw if my transmitter didn’t have exponential capabilities. The elevator simply gains a little more authority on high rates. I spent most of my flight time on high-rate elevator and low-rate ailerons.

The A-4 Skyhawk looks great making low, fast strafing passes over the runway, and it’s capable of aileron/elevator aerobatics as well. Big, smooth loops, Cuban-8s, inverted flight and even rolling circles are all in the mix. Just remember that there isn’t any propwash, so you have to keep this jet moving to keep fresh air on the control surfaces. I use high-rate throws for takeoff and landing. This ensures that I have plenty of control authority at the bottom end of the speed range.

This model retains energy well when landing, so plan for this. My biggest challenge has been setting up an approach that won’t make it overshoot the runway. Be prepared to float a bit in ground effect just before touchdown.

SPECS

MODEL: A-4 Skyhawk

MANUFACTURER: Alfa Models

TYPE: Scale electric ducted fan ARF

WINGSPAN: 22 in.

WING AREA: 155 sq. in.

LENGTH: 29 in.

FLYING WEIGHT: 16.5 oz.

WING LOADING: 15 oz./sq. ft.

RADIO: Hitec Eclipse 7 transmitter, Hitec Electron 6 receiver, 2 Hitec HS-55 servos.

MINIMUM FLYING AREA: Club field

PRICE: \$162

POWER SYSTEM: Little Screamer Jet Scream brushless outrunner motor, Alfa 60/15 Mk 2 ducted fan (included) with 5-blade impeller, Jeti Spin-22 ESC, PolyQuest 3S 1500mAh 20C LiPo battery

FULL-THROTTLE POWER: 21.7 amps, 220 watts, 13.3 watts/oz. 200 watts/lb.

DURATION: 6+ min.

COMPONENTS NEEDED TO COMPLETE: Motor for included ducted fan, 3S 1500mAh LiPo, radio system with two microsensors

SUMMARY

The Alfa A-4 is a scale EDF replica of the famous full-scale Skyhawk both in shape and design philosophy. The model displays an elegant simplicity that translates into a quick assembly. It is a fun, lightweight hot-rod with good manners across a very wide speed range.



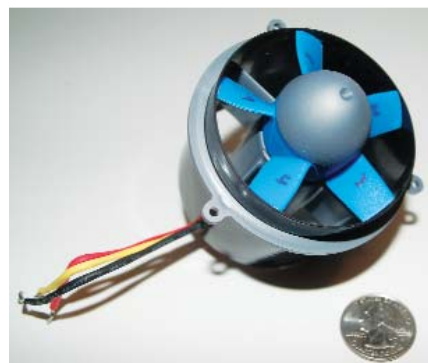
wish I had followed Alfa’s instructions to use a decal solvent and then apply a clearcoat to protect them. It is definitely better to apply the decals after you’ve assembled your model.



The Skyhawk comes with a battery hatch that’s held in place by a magnet. My model balanced perfectly with the PolyQuest 3S 1500mAh LiPo in the rearmost position.

Two molded-foam halves make up the intake duct, and the exhaust duct is a thin plastic sheet rolled into a tube. There isn’t much elbow room inside the fuselage, but the ducts fit exactly as they should. Hobby Lobby recommends that you cut a narrow slit in the intake duct next to the ESC. This helps to keep the ESC cool by moving the air inside the fuselage, and it’s mandatory if you use the 5-blade fan.

The instructions tell you to mount the receiver on the fuselage wall



With the optional 5-blade impeller, the Jet Scream motor provides a good mix of thrust and top-end speed. Note that I numbered the fan blades with a marker. This was a handy visual aid when I mounted and balanced the impeller. You must notch the rear of the motor tube in the Alfa EDF unit to clear the Jet Scream brushless motor's wires. You'll also have to slightly widen two of the motor-mounting holes on the front of the motor tube. The soft plastic is easy to grind, so work carefully with your Dremel tool.



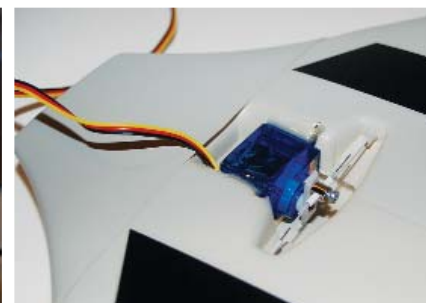
near the fan unit. With its vertical crystal and servo plugs, the Hitec Electron 6 doesn't fit in that area. A smaller receiver or one with horizontal plugs would fit fine. Without throwing off the CG, I installed the receiver in the empty space under the battery tray, just in front of the wing's leading edge.

I didn't want a long, ugly antenna to hang out at the back, so I used the antenna bobbin Hitec includes with each receiver. The bobbin allows you to wind up to 18 inches of antenna into a neat coil. I'm happy to report that I now have only a few inches of antenna hanging out in the jet blast, and I haven't had any problems with glitching.

The horizontal stabilizer comes in two halves that you glue into place on a balsa spar. A Hitec HS-55 servo controls both elevator halves



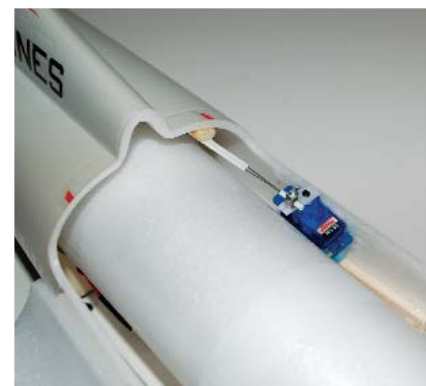
Left: I poked a round toothpick horizontally through the vertical stabilizer to provide an external brace for the two elevator pushrod sleeves. Epoxy secures the toothpick to the sleeves. Right: a Hitec HS-55 fits the molded pocket in the wing snugly. I put 1/16-inch-thick balsa sheet under the servo to shim it up and then epoxied it into place. Be sure to anchor the pushrod sleeves to the wing, or the neutral point may wander in flight—a very bad thing!



via flexible pushrods. I epoxied the servo to the fuselage's inner surface and added the included balsa fuselage stiffener below it. As suggested in the instructions, I braced the pushrods to prevent in-flight flexing. This is much easier to do before you install the ducting.

The ailerons also use flexible pushrods, and both are driven by one servo. As I did with the elevator, I was sure to glue the outer pushrod sleeves in place. This is absolutely vital on the ailerons. A couple of light dabs of epoxy where the sleeves exit the wing did the trick. I also epoxied a Hitec HS-55 into the molded wing pocket. There isn't any easy access to this servo once the wing has been glued to the fuselage, so double-check the settings and the servo's freedom of motion. I added a couple of drops of CA to the pushrod connector for insurance.

I decided to add one optional feature before I headed to the field. The A-4 is intended to be hand-launched or to slide along on smooth grass, but there's an addendum to the instructions that illustrates a stealthy landing-gear option for hard fields. Hobby Lobby offers an optional landing-gear kit if you don't have the necessary parts on hand. I added just 1/2 ounce and two hours of



An HS-55 to control the elevator is epoxied to the fuselage side. Note the balsa used to stiffen the pushrod sleeves and the fuselage below the servo.

assembly to my model to be able to use my club's paved runway. Best of all, the wheels barely affect the Skyhawk's scale outline.

The completed A-4 Skyhawk is attractive and makes a great blank canvas that's worthy of any scale detailing and weathering effort you're prepared to make. I decided to keep things simple and just painted and installed the vacu-formed pilot.

CONCLUSION

The Alfa A-4 Skyhawk is a solid flying little machine that bridges a gap in the EDF market. It offers the best features of sport EDFs with affordable off-the-shelf components, the building ease of a foam ARF and stress-free, low-speed flying qualities. At the same time, it has enough power and maneuverability to satisfy adrenaline junkies, and it looks good enough to display proudly between missions. I'd say that Ed Heinemann's full-scale design has again been solidly validated with this mini A-4 "Scooter." 🚀

Links
Hitec RCD USA Inc., www.hitecrd.com, (858) 748-6948

Hobby Lobby Intl. Inc., www.hobby-lobby.com, (615) 373-1444

For more information, please see our source guide on page 169.



This TA-4J Skyhawk served the U.S. Navy for 27 years. Now owned by the Collings Foundation, it's at Ellington Field, Texas. The Skyhawk flies in airshows nationwide and is available for unique pilot training.

Want more? Check out www.flyrc.com to find out more about Hobby Lobby's Alfa A-4 Skyhawk and to discover how you can log time in a full-size A-4 at the Collings Foundation—www.collingsfoundation.org.