



Curtis P-40 Warhawk ARF

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Who hasn't watched John Wayne clearing the Chinese skies of the dreaded foe in the "Flying Tigers" movie? There he is, sitting in a cockpit the size of a CEO's corner office, endlessly turning inside Mitsubishi Type 96 (Claude) fighters, out climbing them in spiral turns while firing guns with an endless supply of ammunition.

Have you ever *looked* inside a P-40 cockpit? Forget climbing in if you are over 180 lb. The P-40N model, most similar to this model, had 14 *seconds* of ammunition, could barely climb over 2,200 fpm, fell out of climbing spirals after 500 ft. and couldn't turn inside a "96" if it was tied to its tail. Aren't Hollywood airplanes always the best!

In real life, the P-40 was our front line fighter when the war began. It, and the men who flew them, held the line, even gaining some ground, until more capable airplanes became available. The 13,000+ P-40's served with nine countries and flew in *every* combat theater. It is definitely an airplane worth modeling and flying. And, it looks great in the air or on the ground.



Engine trouble forced this P-40 down in the Aleutians, February 15, 1943. A private recovery expedition is planned for the summer of 2008. (Nah! But the model looks good enough for it to have been true!)

Building



Photo 1

The Thunder Tiger P-40 kit is very complete including decals for either Chinese or American versions. You will need lots of new, sharp #11 razor blades to cut out all those nicely painted plastic parts.

The Thunder Tiger P-40 ARF is a worthwhile version of this legendary airplane. Its all-foam construction and easy assembly will help you gain air superiority in any park or small flying field. Although flying will be described later, this fighter has a surprising ability to fly safely inside very tight areas.

The Thunder Tiger P-40 Warhawk meets all the aircraft requirements of the Academy of Model Aeronautics' (AMA) Park Pilot Program. The aircraft weighs less than 2 pounds (the Program's upper weight limit) and has a level top speed under 60 mph (the Program's upper speed limit). For complete Park Pilot aircraft details, [follow this link](#).

The AMA Park Pilot Program offers non-AMA members the opportunity to become AMA members at a much reduced cost. Park Pilot membership includes a great magazine "Park Pilot", \$500,000 personal liability insurance, \$2.5 million liability insurance for the flying field owner ([see insurance details](#)) and membership in the world's largest sport aviation association – the AMA. For complete information and details about Park Pilot membership, just [click here](#).



Fig. 1

The Thunder Tiger P-40 Warhawk was originally reviewed in Park Pilot magazine. Park Pilot is the magazine included with membership in the AMA's Park Pilot Program. Space limitations in the print magazine prevented publishing this fully detailed review. The complete review is published here, Sport Aviator style (meaning in excruciating detail); to provide newer pilots a better understanding of assembly techniques and flight abilities.

Two small errors crept into the Park Pilot article due to the extensive editing process required to shrink the full article down to just one-page. This kit has *only* a 3-bladed propeller. A 4-bladed propeller is not available. The elevator pushrod does exit on the correct side. But the interior fuselage former's push rod hole is drilled incorrectly. A new one must be drilled as detailed in this article.



Photo 2

Be sure that all the alignment marks, those thin burnt lines, match up. If not the thrust angle will be 180 degrees out of phase.



Photo 3

The fuselage halves must fit tightly together. Rotate the firewall in place as needed for a perfect fit. Mark a few places as shown so that everything is the same when it is time to epoxy.

But to fly it, we need to first build it. The first step is to assemble the plywood motor mount. Trial fit the pieces together to ensure everything fits. Check the photo and make sure that all the identifying lines "line up" as shown. Once everything fits, apply some thin CAA to the joints. After a short wait, build fillets around all the glue joints using medium CAA and Accelerator.

Trial fit the firewall assembly into place and then test to make sure that both fuselage halves fit together perfectly. Rotate the firewall to get a perfect fit. Tolerances are tight as they must be when positioning the power system. Once everything fits together, mark the inside of the fuselage and firewall as shown in photo 3 so that it can be replaced in the exact same spot once the adhesive has been applied.



Photo 4

Note the new hole drilled in the former to allow the elevator pushrod to reach the back. The factory hole (half covered by foam) was on the wrong side.

The elevator control rod hole is cut into the wrong side of the interior fuselage brace, shown in photo 4. Drill a new hole as shown, 5/8 in. from the square end of the former.



Photo 5

This is how the interior of P-40 fuselage should look before joining the fuselage halves.

Apply 12-minute epoxy to one fuselage side and to the firewall and former brace grooves. Leave the outside 1/16 in. area free of adhesive to prevent excess epoxy from being squeezed onto the surface. The included epoxy sets too fast (3 min.) to be useful. Save it for field repairs.



Photo 6

Hold the fuselage halves together with #64 rubber bands. Do not use smaller or thinner bands as that will dent the foam.

Position the halves together and hold them with #64 rubber bands. Be careful not to damage the soft foam.



Photo 7

Carefully cut out the sides of the ailerons. A hobby razor saw is best for this if one is available.

While the fuselage is curing, finish the wing. Using a very sharp blade or a razor saw, cut out the ailerons. Do not bend the ailerons downwards more than the allowed upwards movement to prevent splitting the hinge. Apply transparent tape to the underside of the hinge joint as directed.



Photo 8

Aileron torque rods are enclosed in blue plastic to match the wing underside. Although the tail wheel was installed (a P-40's did not retract), this airplane sported the faux retract gear for looks and to prevent constantly nosing over on grass landings.

Install the torque tubes in the wing, photo 8, and choose whether to use the included wheels or the faux retracts. If you are flying from a grass runway, I strongly suggest using the faux gear. Wheels must be used when operating from a paved surface. Here are two tips that will help:



Photo 9

Inject a small amount of plastic-safe oil into the torque tube to prevent any binding should epoxy leak inside the tube.



Photo 10

Use sandpaper to roughen the unpainted surface of the aileron torque tube hold down and epoxy in place with clamps.

Install the aileron servo, the front plywood mounting plates and trial fit the wing. The kit includes a clear plastic “bumpy” thing not mentioned in the directions. That is the wing bolt brace and fits inside, once you cut it out, of the wing’s bolt hole for bracing.



Photo 11



Photo 12

Cut a 1/32 in. space out of the rear of the stabilizer to clear the connector. Holding the plastic flaps far apart while slipping the connector over the elevators takes some practice. Once both sides are in place, epoxy the connector to the elevator halves one at a time.

Install the elevator connector before mounting the elevator to the fuselage. This can be tricky. I found a good way was to cut an extra 1/32 in. clearance between the elevators and the stabilizer. Then hold the flaps of each connector far apart while slipping the elevator in between the two flaps (photo 12). Do this without adhesive. Once in place, lift each flap, apply some 5-min. epoxy underneath then clamp in place. Do only one elevator at a time.

Screw on the clip end of the elevator control rod; slide it through the fuselage former and out the rear. Clip the control rod end to the elevator connector and epoxy the stabilizer in place. Make sure it is parallel to the wing. The vertical fin fits perfectly. The factory mounting grooves were exactly aligned.



Photo 13



Photo 14

Using a very sharp new blade, score, do not try to cut through, along the molded cut lines on all the plastic pieces. Then fold back away from the score to remove the unwanted plastic.

All that is left are the finishing parts. Cut out the plastic parts using the “score and snap” technique. Using a new #11 razor blade, score along the molded cut lines. Then carefully bend the plastic away from the score until it snaps. Wag it a little and the part will release. Trying to use a scissors or cutting all the way with the razor knife will guarantee messing up the part.

The decal sheet has complete canopy framing detail and it all fit well. Install the canopy using a few dabs of 5-min. epoxy. Don't forget the pilot! Do not tape the canopy in place as even the lowest adhesive masking tape will lift some of the paint. Its only 5 minutes, so just hold the canopy there; possibly while watching the “Flying Tigers” DVD. Continue watching the movie while epoxying the exhaust manifolds to the cowling, one at a time.



Photo 15

The power system is a mixture of factory motor and mount with your choice of battery and ESC. The Thunder Power 11.4 Volt, 910 mAh, battery could be continuously discharged at 16C while providing 10+ minutes of flying action.

The 2928/09 outrunner motor and mount are included with the airplane. This P-40 used a Castle Creations Thunderbird 18 (18 amp) Electronic Speed Controller (ESC) with the Battery Eliminator Circuit (BEC). Since the wing must be removed to access the battery, it is a good idea to install a switch to turn off the radio system. The switch does not disconnect the motor circuit but will prevent accidental motor starts should the throttle stick be “bumped” during battery change outs. This P-40 used the Maxx #1570 Universal Controller Switch.

Finish installing all the details and extras but don't rush. Flying time will come soon enough. Rushing will dent the foam and mar the paint. Take your time and always protect the foam. Especially take your time assembling the three-bladed propeller. Yes, you read that right – assemble the propeller. Sounds daunting but actually proved easy and absolutely painless. The

airplane looks more scale-like and flies very well with this system. The thin, very light spinner is held in place with a screw into the motor shaft.

If any of the assembly process is missing or vague in the above description, that is because the photo directions cover most every step in great detail. You won't need me to help you much here except for the few changes already mentioned.

The airplane balanced perfectly the first time. The radio system used was the Spectrum DX 6 2.4 MHz transmitter and AR6000 receiver. The 2.4 MHz system removes interference possibilities while allowing transmitter programming for dual rates and exponential. Two E-flite S75 sub-micro servos each produced 17.2 oz/in torque, weighed just 0.26 oz., and moved the control surfaces with authority. The P-40 weighed 15.5 oz. ready to take off.

And Flying (Flight photos by Bob Karasiewicz)



Photo 16

At 129 watts per pound, the P-40 climbs quickly, flies fast (but less than 60 mph), while handling like a nimble fighter.

Before the fun part, here are the boring numbers. 6,500 rpm on the three-blade propeller. Current draw was 11.7 amps at 10.5 volts. A 12A ESC would have worked and saved a few grams. But heck, at 125 Watts of power at the same 10.5 V, the P-40 just doesn't need any help. 129 watts/pound is near rocket performance for a 34-in. span, 226 sq. in. wing area Park Pilot aircraft. Who said numbers are boring?



Photo 17

Hand launching is a must with the faux retracts. The P-40 launches straight with a very slight dive tendency that the pilot has no trouble correcting. At 129 watts/lb, climb out is impressive.

Climb out was rapid and steady. No trim adjustments were required. None, really! There was just enough right motor thrust to offset the 3-blades' increased torque. Thunder Tiger got that one right. In fact, the airplane has to slow almost to a stop in a vertical stall before torque takes over and the airplane can do fairly respectable left wingovers with proper power management. Without a rudder, there are *no* right stall turns.



Photo 18

The P-40 will fly three rolls in about 4.5 seconds. Start with the nose raised about 10 degrees since there is not a rudder to hold the nose on line during the knife edge parts of the roll.

Despite the small aileron movement, roll rate is steady and quick (1.5 seconds each). Rolls are almost axial and maintaining direction is easy.



Photo 19

Level inverted flight is steady and requires very little down elevator input. Inverted climbs don't even require a lot of power.

Inverted flight is stunningly solid, requiring very little elevator to stay level. Once upright, excess elevator input does not cause tip stalling until the airspeed drops to almost zero. Then it can get exciting, but the P-40 recovers with very little help.



Photo 20

Loops can be as large as 75 ft. in diameter. Wind correction is accomplished by holding one wing low into the wind. (Here the wing on the right side.)

Multiple loops are possible but the windward wing has to be dropped to prevent wind drift. Outside loops can be flown but dive a little first, have plenty of altitude and stay on those ailerons to keep the airplane level over the top. Rudderless "snap" rolls are fun, try them. No, they are not real snap rolls but are fun to watch and fly.

The P-40 is a fighter, not a trainer, but slowed down, the airplane remains easy to fly. It will cruise on 40% throttle levels, climb on slightly over half and dive, power off, at about the same airspeed as its top speed. The three-blade prop helps keep the airspeed steady in any attitude.



Photo 21

Here is John Wayne is on his way out to deal with those nasty, no-good, #%\$@&. This airplane makes low passes easy, and impressive.*

Slow speed flight is predictable, steady and not pitch sensitive. Power-off stalls break on a level keel. But forcing the airplane into a deep stall (holding full up after the break) results in a quick, right wingover.



Photo 22

Good slow speed handling, 2 oz. less weight than specified and generous wing area make for a fighter that lands like an advanced trainer.

Landings are slow, about 10 mph and the P-40 maintains positive elevator control all the way in on the approach. Approach speeds are slow, in the 15 mph range. Low speed turns can be almost as tight as the pilot can demand if a little throttle is applied during the bank.



Photo 23

Here is the P-40 flying overhead on its landing break. No more needs to be said.

Steep takeoff climbs, constant airspeed in all attitudes, low speed approaches, slow landings, tight low-speed turns, forgiving handling and gentle stalls make this an airplane that can safely handle small flying fields. Plus, with these looks, the Thunder Tiger P-40 Warhawk will look as good on the ground as in the air. Get one (\$140); put in 2 hours work and you can proudly fly this airplane just about anywhere.

For more information on the Thunder Tiger P-40, go to:
<http://www.acehobby.com/ace/TTR4339.htm>



Specifications

Manufacturer: Ace Hobby

Wingspan: 34 in.

Wing Area: 226 sq. in.

Wing Loading: 9.88 oz./sq. ft.

Weight: 15.5 oz..Airfoil: Semi-Symmetrical

Length: 29.0 in.

Radio: JR DX-6 2.4 GHz

Servos: 2 x E-flite S75

Engine: 2928/09 outrunner

Cost: \$140.00

Special Airframe Features: All foam construction, 3-Bladed Propeller, Quick Assembly.

Electric Specifications

Prop: 3-blade composite
Max Watts: 125
Max Voltage: 10.5V
Motor Run Time: 10 minutes
Max RPM: 6,500
Power Loading: 129W/lb
Motor Current: 11.7 A

Products used in this review:

Ace Hobby Distributors
26021 Commerce Centre Drive
Lake Forest, CA 92630
949-900-3300

www.acehobby.com

Spectrum Radio & E-flite
Horizon Hobby, Inc.
4105 Fieldstone Road
Champaign, IL 61822
Main Phone: (217) 352-1913

www.horizonhobby.com

Castle Creations
235 South Kansas Ave.
Olathe, KS 66061
913-390-6939

www.castlecreations.com

Maxx Products
815 Oakwood Rd.
Lake Zurich, IL 60047
847-438-2233

www.maxxprod.com