

Checking out in the Curtiss P40 Kittyhawk

The Curtiss P40 was a development of the previous radial engined Curtiss P36 and first flew in 1938. By the time production ended at Curtiss Wright's Buffalo plant in 1944 13,738 P40's had been built. The RAF used the name Tomahawk for the early P40B and C models and Kittyhawk from the D model onwards. The US Army Air Corps used the name Warhawk from the outset.

The US Army Air Corps intended that the P40 operate at low to medium altitudes. The P-40's Allison V-1710 and its lack of a two-stage supercharger made it inferior in high-altitude combat to *Luftwaffe* fighters and it was therefore rarely used in operations in Northwest Europe. However in North Africa, Southwest Pacific and China it played a significant role and it also served in the Middle East, Italy and Alaska. P-40s first saw combat with the RAF in the North African campaign, famously serving with 112 Squadron with their famous "shark mouth" logo, later copied by the Flying Tigers in China.

Despite the development and operating hindrance a number of allied aces such as Australian Clive "Killer" Caldwell and Canadian James Edwards were very successful in the P40 in the North African campaign. This theatre of operations was an incredibly hostile environment in terms of the *Luftwaffe* opposition such as the multiple aerial victory scoring Hans Joachim Marseille, "Erwi" Reinert, Werner Schroer and Otto Schultz. Schultz was shot down by "Stocky" Edwards in his P40. The Vintage Wings of Canada P-40 featured in this article is painted in his 260 Squadron markings.

Now registered C-FVWC the Vintage Wings P40 is an N model originally manufactured as serial number A29-414 at Curtiss Wright's plant in Buffalo New York. It served with 78 Squadron Royal Australian Air Force in New Guinea as tail number HU-Z. It was damaged in a landing accident at Tadj, New Guinea on April 25, 1944. It was recovered in late 1990 and completed a ground-up restoration at Pioneer Aero in Ardmore, New Zealand and made its post-restoration test flight on April 23, 2009.

I had seen the aeroplane during its restoration at Pioneer in New Zealand. The then company - and P40 - owner Garth Hogan had briefed me in the cockpit on the ways of the P40. As is my usual way I filmed Garth's briefing so that I had a DVD record to go into my library of flight tests.

In August 2009 I was due over at the Vintage Wings of Canada base at Gatineau Quebec. Tim Leslie, Chief Pilot at Vintage Wings e mailed me and said "*when you come over next week I'll check you out in the P40 - so get your head in the books*". I trawled my home library and got out my P40 flight tests, manuals, and the Garth Hogan and WWII "Ways of the Warhawk" DVDs and set off on my homework.

Whilst preparing I recalled stories and advice from other display pilots; *"the brakes fade"*, *"mind your hand operating the radiator shutter door"*, *"remember there is no gear downlock"*, *"best ailerons in the business"* *"it cooks on the ground if you are not careful with the coolant temps"*, *"be very careful on hard runways in a crosswind"* and all manner of other such friendly advice.

The Vintage Wings P40N is one of just a few limited dual control P40's so I had a chance to fly with Tim up front. Not only could I observe his handling and follow through learning the taps and the numbers but I also had a chance to fly it from the rear thanks to the limited dual controls. I also carried out an engine start and taxi from the front to get more cockpit familiar which was a great aid in converting to type.

I flew a solo Harvard trip earlier in the day before the P40 trip so with the drills in my head I was ready to jump in up front in the P40 with all the bells and whistles.

The Kittyhawk looks purposeful as you walk out to it and externally appears younger than it really is. All of this initial perception goes out of the window when you step in as the handpumps, levers and switches appear quite archaic.

It feels quite shallow sitting in the cockpit compared to the depths of the Hurricane. The instrument panel is a bit of a reach and the nose looks inordinately high, due in no small measure to the carburetor air intake at the top of the cowling. The engine cowling also appears narrow compared to the Spit, Hurri and Mustang which made me think of peering out around the sides of the nose during the landing flare. The Bead-and ring gunsight – just like the Hawker Nimrod 1930's biplane fighter that I normally fly – confirms the "older than it looks" impression.

The cockpit is comfortable and feels wide enough to read a copy of the Financial Times, certainly spacious compared to the Spitfire and Hurricane cockpit which are roomy at the hip and narrow at the shoulders. The P40 is just plain huge by comparison. However look left and right outside of this huge cockpit and compared to the Hurricane the Kittyhawk wing looks tiny

VWC has a narrow original N-1 panel so does not have an artificial horizon or DI. Other items that strike from reading the notes and sitting in the cockpit is the different gear and flap actuation compared to other World War II fighters. Buttons in the 109, levers in the Hurricane, Mustang and Spitfire all different types granted. However for the Kittyhawk undercarriage and flap operation is electro-hydraulic. For the undercarriage there is a three-position lever at your left hip and a trigger on the pilots stick. Select the operation, up or down and squeeze the trigger with your little finger until the gear is up or down. After this you MUST check by the handpump until it feels solid.

The Flaps are also electro-hydraulic operated. There is a three position lever beside the undercarriage lever. Forward for Down, back for Up and neutral in the middle. It works in the same way as the undercarriage, select and squeeze the trigger. Always return the lever to neutral – and LOOK to make sure you have got the right lever. Do not pay lip service to checks was never truer than when operating gear and flaps in the Kittyhawk.

Down by my left knee is the 24 volt inertia starter operated by a three-position switch. Enough oomph for one attempt.

The Propeller control is different to those of us that have used Dowty Rotols or Hamilton Standards. The Curtiss Electric prop has the usual rpm lever on the throttle quadrant but a manual and automatic switch on the instrument panel and a circuit breaker just below.

Press the toe brakes and pull on the parking brake down by my left shin. Working around in the usual left to right manner including checking the Flap Control Handle in NEUTRAL, Trims set with 2 degrees right rudder, Elevator in take off position and zero on the aileron trim. For the first of many times Landing Gear DOWN, checking it is gear and not flaps. Also checking the wing undercarriage indicators were sticking up out of the wing just as with the Mk.V Spitfire, but unlike the Spit you make sure the handpump pressure is solid.

To the propeller and switch in Automatic and the rpm lever fully forward. Hand over to the big handbrake type lever for the Coolant Gills, cycle and leave Open to help the Allison's ground cooling.

Look along the very neat row of Circuit Breakers under the main panel and check the prop circuit breaker again, Mixture-Idle-Cut Off, Prop-Full Increase and throttle Set. Fuel On – Fuselage tank and check it is in the detent. Two Fuel tank gauges are in the cockpit floor. Master switch ON. Fuel Boost Pump-ON and pressure checked.

Priming requires 4 primes when cold including 1 ½ charging the system. Mags on BOTH. and run up the inertia Starter, 15 secs "Clear Prop" and engage the starter. Engine fires and Mixture from ICO to Auto Rich. "Great – caught it again". Rpm a bit fast so bring back to 1100 RPM and check the Oil Pressure and run at 1100 until the oil pressure reaches 60-70lbs.

Now look and check the Flap handle and bring them UP and continue on through the checks with particular attention to the Oil and Coolant temperature. Tim had tipped me off that the Coolant temp comes up quickly, even quicker than the single radiator Mk.V Spit, whilst the Oil temp take some time to rise.

A different sound in the cockpit from the Allison with its brrrrp, brrrrp brrrrp brrrrp rythmn, definitely not a Merlin. Just on the oil temp and the coolant temp is still rising rapidly so time to taxi.

Weaving away as is standard practice for a World War II fighter I try to stay off of the brakes so that I have some left for when I need them. The tailwheel is effective but it feels very stiff. Must be careful as it will disengage at 30 degrees of travel.

At the hold and into the checks. Min Oil Temp should be 40C and Min coolant 80C before running up. Brakes on hard, stick hard back and run up. 2300rpm, mags checked and then into the prop checks, first Automatic for a 300 rpm drop and then switch to manual, decrease 300rpm, increase 150rpm close the switch shield so the prop goes back into Auto which should pick up the remaining 150rpm. Then back to Idle at 600-700 RPM.

TTMMPPFFGGHH. Trim-Throttle-Mixture; Auto Rich Fuel pump checked ON, Flaps, Gauges, Gyros, Harness and Hatches.

Transponder to ALT given the Ottawa airspace above and the last item is to grip the big handle by my right knee for the cowl flaps, squeeze the release and raise it to neutral/Combat climb. If doing this in flight watch out for the slipstream as you will need very strong pressure to move it against the air load on the gills in flight and if you are not careful you will be caught out by it. Better to do this on the ground.

For me it is then the Emergency self brief as always for the engine failure glide speed – in this case "*Stay alive at one-three-five*" (mph), as compared to the Spit V's "*stay alive at ninety five*". Taxi down for 09 at Gatineau and as I turn to line up I can already feel the brakes fade – although I have stayed off them as much as possible.

Then ready to go with my attention being particularly drawn to the Curtiss electric prop in with a glance again at the manual propeller rpm switch so that I know where it is if I have to deal with an overspeed on take off.

Power smoothly up to 45" MP feeling my right foot taking the pressure of the torque, feels hard, Prop at a maximum of 3000rpm, very slight surge but no problem and the usual big V-12 engine volume, just NOISY!

Off at 100 mph, brakes ON/OFF with the toes. Check the gear handle and select UP and squeeze the trigger with my little finger. Undercarriage retraction seems to – and does - take an age, not the four seconds of the Vintage Wings Hurricane IV, and I can really feel the P40 wheels turn beam-on each side to the slipstream as they rotate before retracting. I can hear the hydraulic system squeal, indicator on the panel shows up, wing indicators are flush, so off the trigger, handpump a couple of times until the pressure goes solid and then undercarriage lever goes back to Neutral.

DMP – **D**ecrease Power/**M**anifold/**P**ropellor so back to 35" 2500rpm climb at 150mph at about 2,500rpm and Fuel Boost Pump goes OFF

After takeoff, I climbed to a safe altitude, leveled off with the power back to 25 inches MP and 2,000 rpm with target temps of 75°Oil and 100-105° Coolant and began to get the feel of the ways of the Kittyhawk.

I was advised by Dave Hadfield, the P40 Manager and principal P40 pilot at Vintage Wings, to keep the oil temperature below 80C, and the rpm in cruise to 21-2200. Dave knows from long trips in the P40, such as from Gatineau to Oshkosh 2009, where C-FVWC won the Best Fighter award.

I settled into cruise, glanced at the coolant temperature and as expected it was in the upper green indications on the gauge, just short of 110 degrees C. Oil temp nicely in the green. Ever so slowly the temperatures on the Allison engine crept down while the speed crept up.

25" 2000rpm and the Allison up front is amazingly quiet – or is it just me after flying the Hurricane and Nimrod? It really does seem so, almost civilized for a big V-12. At this power setting the fuel consumption is in the order of 40 gals (US/hour)

With all in place, I tried a few turns and was surprised by the rapid ailerons. By comparison, the Hurricane will pull much tighter in a turn but its roll rate is positively pedestrian compared to the Kittyhawk. The Hurricane vision over the nose is good as it drops away somewhat whereas the P40 has a high nose from the carburetor air intake.

Then into stalling which was initially clean. I had expected a sudden wing drop to the left having never heard from any colleagues at Duxford that one ever dropped a wing to the right. It certainly was sudden to the left, so much so that I felt like I was still sitting upright with the stick as the aircraft departed at about 85mph with a sudden 90 degree drop quite unlike its contemporary the Spitfire V which has a benign stall, 30 degrees when I last flew it. Standard stall recovery and it recovers well. Then as practice for the return to Gatineau I flew an imaginary circuit lowering the gear and flaps and then took this to the configured stall. Again a sudden wing drop to the left and sudden nose drop at about 78mph but I was ready for it this time with a quick recovery. Best not try this near the ground, and hence the fast approach speeds more of which later.

Now into some gentle wingovers. The elevators do not feel as heavy as I'd expected them to be, quite Hurricanesque and no heavier than a Mustang. I had heard about the roll rate during a chat with Ray Hanna who used a P40 to lead the *Breitling Fighters* or as we used to call them the "frightening blighters". HASELL check and particularly the t's & p's and nose down to get to 230mph then nose up, check – wow! In the Hurricane I will be up at 45 degrees to roll, the P40 can roll flatter but I still prefer 30 degrees nose up to be on the safe side. Although I'd heard about the roll rate I could not believe it, it was more

like an Extra 200 than a WWII fighter. To quote Charlie Brown the ailerons are "*the best in the business*".

Looping would need 35" and 2500rpm and 250 mph but the oil temp was too high to be able to do this. I had however seen the speed response when the nose went down such as during the stall recovery and diving for rolling speed. I should add here that for every power or speed change there is a need to carry out an immediate trim change.

Back into cruise and time to return to base, fuel, instruments, radio, altimeter, and throttle around 25-26". I was planning to fly a long gentle curve to 09 at Gatineau giving myself plenty of time to get the Kitty slowed down and gear down. I felt if I flew my standard Hurricane run and break this first time in the P40 I would run out of time getting everything squared away.

Below 175mph gear limit speed so gear DOWN; unlock the silver knob on the undercarriage lever and select down. Little finger on the trigger and down come the wheels again feeling them beam-on to the slipstream. At least you know they are going down! Hydraulic pump squealing, 3 green lights, Indicators in the top of the wing are sticking Up thus the gear is down and then handpump – solid – and lever back to neutral. It did take an age!

22"/2500rpm Downwind slowing from 160 to 140mph.

BUMFICHH -Brakes OFF, Undercarriage DOWN – handpump solid when down, lever to Neutral, Indicators sticking up in the wings showing the gear is down, Mixture Auto Rich, Prop 2700rpm, Fuel- boost pump checked ON and Instruments (they don't do QFE in Canada!) Carb Heat, Harness and Hatchesownwith Flaps to follow at 140mph – the limit speed.

Start the curve at 140mph with 14" MP slowing to 120mph and taking half flap. It is advised not to lower flaps below 500ft unless you are landing.

It is worth bearing in mind that the Go Around performance is not the best with Full Flap but the air loads on a Go Around will partially retract them if they are selected up. This should be an early decision and not too close to the ground so if needed, throttle to 35" MP, flaps up to half, select neutral, Gear up and at 500ft flaps up.

On with the landing. Look and select Flaps, little finger on the trigger and with a standard fighter approach curve to the left giving as good a view as possible around the nose. As is standard practice at Vintage Wings on Finals GUMPPF – Gas/Undercarriage/Mixture/Prop/Fuel/Flaps as last check. Visibility is poor over the carb air intake so kept it curving all the way into the 09 approach at Gatineau.

300ft 120mph coming down to 110, 100mph late finals and over the number for what is a much faster approach than the 90–85–80mph for the Spit V. Fly it on for a taildown wheeler, no bounce, on and straight although it should be

such as there was little wind to contend with. In a stronger wind I'd heard it from wartime and current pilots that it is awkward in ly in a crosswind, as the Pilots Notes make very plain - "Avoid cross-wind landings whenever practicable." No advice on what to do about it – just don't do it! The tailwheel down feels stiff as we go along the centerline.

Taxying off the runway and must get the cooling radiator gills open as the coolant temp is climbing, then LOOK and check Flaps NOT gear UP. Boost pump off and taxi back to the Vintage Wings ramp.

Brrrp, brrrp, brrrp, brrrp all the way back and then into the shutdown checks. Throttle at 1000 RPM, Mag check, Throttle at idle and then Mixture to Idle Cut Off and Mags off. All switches OFF.

The P40 has many legends relating to its achievements over the years from the exploits of squadrons such as the Flying Tigers or 112 Squadron RAF in the Western Desert. There are many more units that made great use of the P40 that are not as well known as they should be. For making the most of a fighter, restricted in its engine development in service, and operating in the most hostile of conditions, they deserve to be more recognized today.

Howard Cook 2010

Model:	P-40N-1
Power Plant:	Allison V-1710-81A
Horsepower:	1,350
Wing Span:	37' 4"
Length:	33' 4"
Max Speed:	378 mph
Gross Weight:	8,850 lbs
Fuel Capacity:	90 gallons

Armament:	6 x .50 calibre Browning machine guns Provision for an external bomb load of three 500-lb. bombs. 90 gallon drop tank
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