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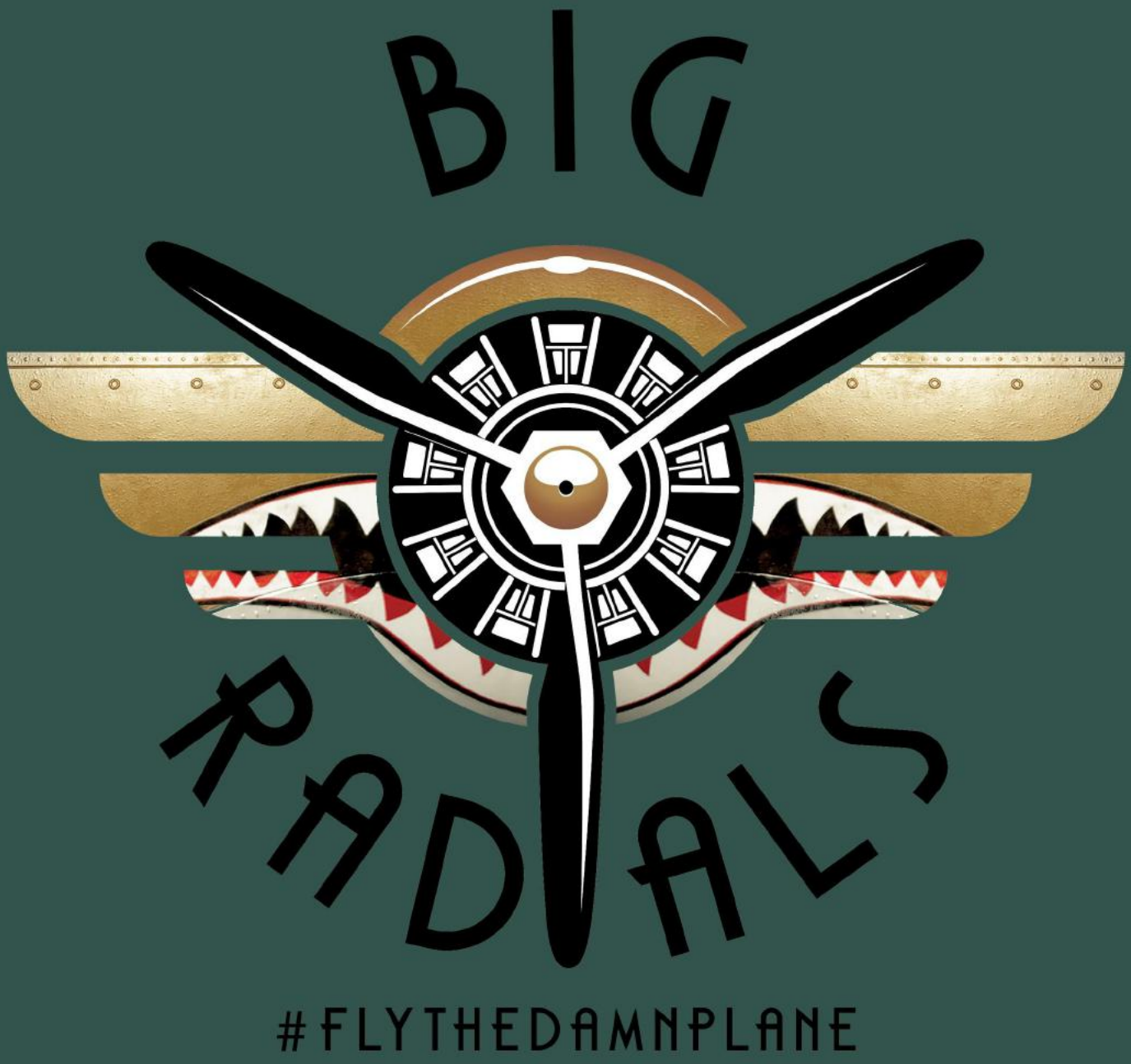

P40-B TOMAHAWK
Flight Manual

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Table of Contents

Extras, Limitations and Known Issues

[redacted]

RDTM Switches, Radio and Transponder

The RTDM switches are located under a cover where the right machine normally would be located. Here you can activate the real landing and gear lever functions as described in the chapter "… Like a BOSS". Additionally, you can hide the flight stick here or show take-off and landing tips.

The left machine gun cover hides a modern radio and a transponder. This was the only compromise we were willing to take to give you a more enjoyable product.

NOTAM

This software is an artistic representation of the subject matter.

Big Radials does not endorse, nor in turn, is endorsed by the manufacturer(s) of the depicted subject matter.

An Industry First?

In what we think might be an Industry first: our P-40B Tomahawk comes with free STL files for a set of flight controls which are an exact replica of the controls in the aircraft. Using these files you can 3D print working replica flight controls compatible with Microsoft Flight Simulator and other popular flight sims.

The developer of the files, AuthentiKit, used source files provided by us, Big Radials, to ensure they are a perfect match to our version of the Tomahawk. Inside the download you'll find a PDF and an example STL to preview the final build.

Introduction

Thank you for purchasing the Big Radials P40-B Tomahawk. This manual will guide through everything you need to know to take your Tomahawk on all sorts of adventures!

Installation

Copy the contents of the ZIP file to your community folder. The default locations are

Windows Store:
C:\Users\[YOUR USERNAME]\AppData\Local\Packages\Microsoft.FlightSimulator_[RANDOM LETTERS]\LocalCache\Packages\Community

Steam:
C:\Users\[YOUR USERNAME]\AppData\Roaming\Microsoft Flight Simulator\Packages\Community
Or
C:\Users\[YOUR USERNAME]\AppData\Local\Packages\Microsoft.FlightDashboard_[RANDOM LETTERS]\LocalCache\Packages\Community

History of the Tomahawk

The P40 Warhawk is an American single-engined, single-seat, all-metal fighter and ground-attack aircraft that first flew in 1938. The P40 design was a modification of the previous P36 Hawk designated to be a high speed fighter. The reduced development time enabled a rapid entry into production and operational service. However, the Allison V-1710 engine was lacking a two-step supercharger, a major drawback at high altitude. The designer was so aggravated about this that he left the company when the more powerful engine, the Merlin V-1650, was given to the P51 Mustang instead. The Warhawk was used by most Allied powers during World War II and remained in frontline service until the end of the war.

The P40-B (or Tomahawk IIA) was the first variant of the original P40 (a single P40-A was a camera plane later redesignated). It had extra machine guns in the wings and a partially protected cockpit and fuel cell. While later on the United States Air Force (USAF) began to call all their P40s “Warhawk”, the Royal Air Force (RAF) and other forces stayed with the name “Tomahawk” for the P40, P40-B and P40-C. The “B” variant was delivered to the USAF (131 airplanes) and exported to the RAF (110 airplanes).

During the war the P40 saw service in nearly every theater, but initially not in Germany. It was inferior to the german fighters at high altitude. However, it played a critical role in three main theaters of the war: North-Africa, Southwest-Pacific and China. Here altitude was less an issue and it was used as an air superiority fighter, fighter bomber and bomber escort. The P40 gained a postwar reputation as a mediocre design, but based on war-time victory claims, over 200 Allied fighter pilots – from the UK, Australia, New Zealand, Canada, South Africa, the US and the Soviet Union – became aces flying the P-40.

A Word about RTDM Modes

Our Tomahawk comes with many features. One of them is the so-called RTDM Mode.

RTDM or #ReadTheDamnManual is a way we found to be able to cater for all kinds of simmers.

Want to get up and go have fun cloud surfing? Well, you can do that, just use your usual keybindings, commands and basic procedures.

Or maybe you just want to take your time, actually read this manual, get your hands dirty on the special and sometimes very "involved" procedures the P-40B is known to have?

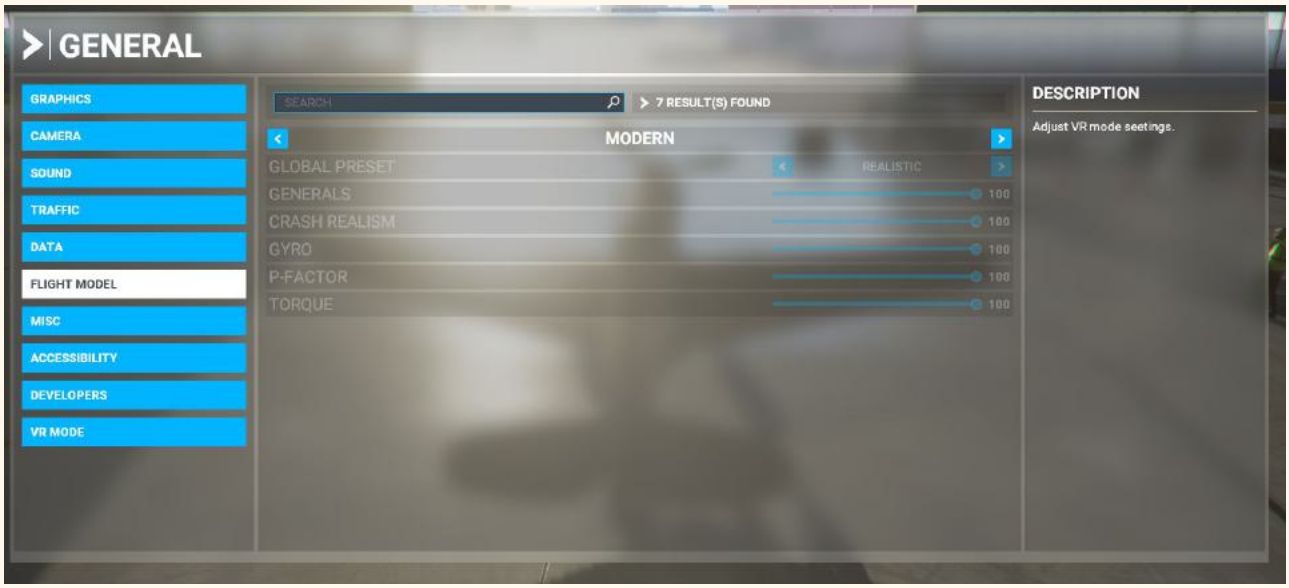
Please, meet the RTDM Mode switches! These switches, when turned ON, will unlock new depth of certain systems, in this case the flaps and landing gear logic. Please refer to the chapter „... Like a BOSS".

Recommended Specs & Settings

The Tomahawk has been modeled with fluidity of frame rates in mind, which means you should not notice a significant drop in performance when using it.

Please use the same graphics settings you are used to.

The flight model has been specifically designed to feel best when following settings are used.



The Tomahawk will fly on any difficulty levels you set - but if you are experiencing greater mishaps than normal on take offs and landings, please try feel free to turn down some of these settings. Or work on improving your rudder skills. 😉

Quick Start Guide

If you are just too eager to fly, and you don't care about real world procedures, please follow these tips and tricks to get you up in no time.

Center of Gravity

The empty Center of Gravity (CG) value in MSFS can be changed by the user and is reset upon loading any plane. We have fixed the CG for our P40-B, but it is good practice to check before the flight. Please make sure the CG is at 26.9% MAC (± 1%), otherwise you may have an uncontrollable plane.

STARTUP

Simply use the default keybind Ctrl+E to start your engine and electrical systems. If engine stops, check your throttle is about ¼" open.

TAXI

Due to its very high nose up attitude on the ground, taxiing the Tomahawk can be quite challenging. Keep it slow and always taxi following an "S" shape, in order to see what is in front of you. Have the canopy open to look cool.

TAKE OFF

Be gentle, very gentle! Set around 3 units of trim up. Apply power very gradually to achieve take off power (41" MAP is considered the sweet spot) . The tail should come up and level on its own. Perform your best rudder dance moves! The plane should lift off at around 105 - 115 MPH. Passing 500 ft, retract gear, reduce power to 35" MAP and 2600 RPM. Close the canopy!

CRUISE

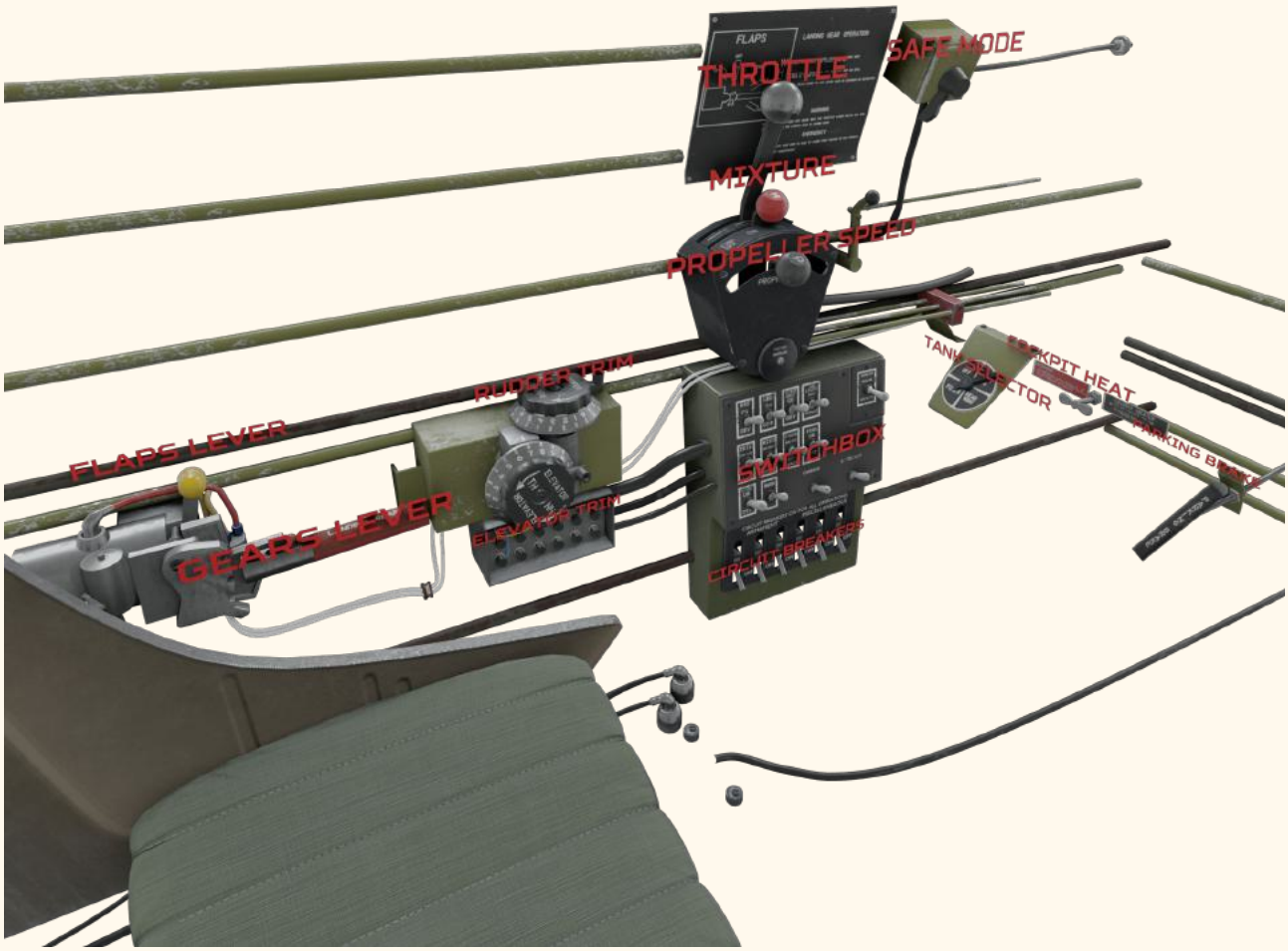
Best fuel efficiency is achieved with power set to 30" MAP and propeller to 2500 RPM. If you are in a hurry, you can use max continuous power of 38" MAP and 2800 RPM. Beware that with these settings, you'll hit Bingo fuel very quickly, she's a thirsty girl! Economy cruise is achieved at 1950 RPM and 20" MAP (yields around 210MPH)

LANDING

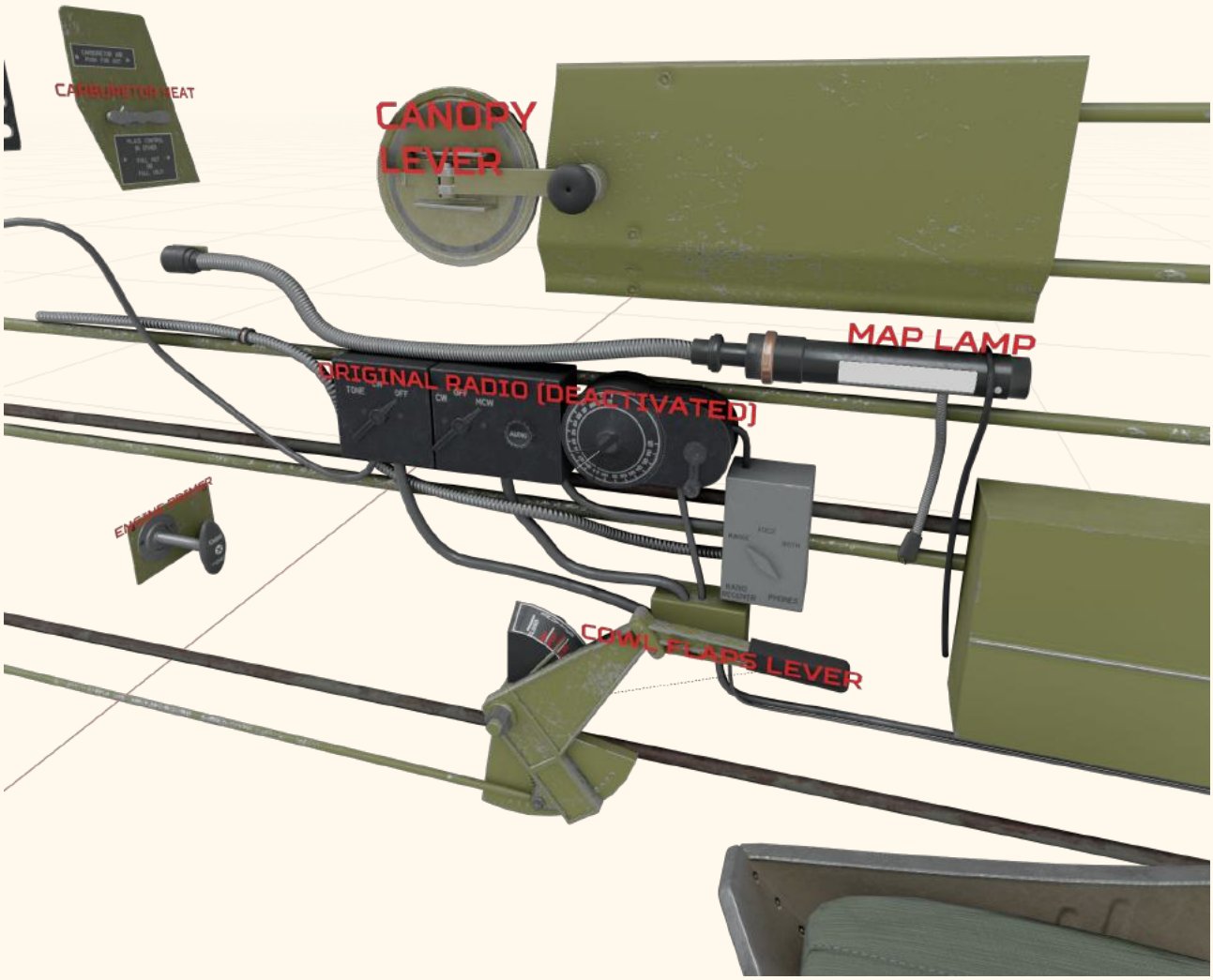
Slow down to about 110 MPH and aim for a touchdown speed of about 95 - 100 MPH. If using flaps, we recommend shooting for a very steep approach. Shallow angle approaches will greatly reduce the forward visibility. Upon touchdown, get ready for round two of the rudder dance!

Panel Layout

Port Layout



Starboard Layout



What the hell is it?
What the hell does it do?

Compass: Indicates your magnetic heading. The P40-B has two, one in the more usual position at the top left of the panel and a second one below the altimeter.

Attitude Indicator: Indicate your current pitch and bank angle.

Speedometer: Shows your Indicated Air Speed (IAS), in Miles per Hour. Not to be confused with knots!

Coordinator Gauge: Helps you coordinate your turn to avoid side slipping.

Vertical Speed Indicator: Indicates your vertical speed in thousands of feet per minute.

Fuel gauge: Shows the remaining capacity of a fuel tank in percent. There are 3 fuel gauges on the Tomahawk. One on the main panel, and the floor mounted ones for both wing tanks.

Altimeter: Measures sea level altitude in hundreds (big hand) and thousands (small hand) of feet. The knob changes the pressure the altimeter is calibrated to, measured in inch Hg.

Clock: You know what a clock is, don't you?

Engine Manifold Pressure: This indicates the manifold pressure (MAP in short) in inch Hg.

Propeller Speed: This shows the revolutions of the propeller in hundreds per minute.

Ignition Switch: The "Magnetos" (self-contained generators) power the spark plugs. Depending on switch position either none, left, right or both banks of plugs are powered.

Flaps and Gear Position Indicator: This gauge shows flaps (top) and gear (bottom) position in real time. As the P40-B has a retractable tail wheel, you can also see its position here.

Suction: This indicates the pressure difference in inch Hg between the vacuum tube and the ambient air pressure. This allows you to check if your suction instruments (heading, attitude, turn and slip) are working correctly.

Loadmeter: Shows the load put on the generator by the electrical system in Ampere.

Radiator Temperature: Shows the engine coolant temperature in degrees Celsius (°C).

Carburetor Temperature: Shows the temperature inside the carburetor body in °C.

Oil Temperature and Oil and Fuel Pressure: The top shows oil temperature in °C. The bottom is a combined instrument, left shows oil pressure, right shows fuel pressure. Both are measured in pounds per square inch (PSI).

Hydraulic Pressure: The pressure of the hydraulic system used for flaps and gear in PSI.

Prestone Warning Light: This indicates a high pressure or a high temperature in the coolant system. If this one goes on, you are in trouble! Get her cooled quick! This light can be deactivated by the Prestone switch in the lower left main panel.

Gun Sight: Originally, this switch was the safety switch for the machine guns. Now, it enables the gunsight reticle on the right side of the cockpit. Depending on seat position, the gunsight can also be used as an aid for trimming the aircraft… when not being used to trim the wings off your enemy's aircraft! Dugga Dugga Dugga!

How to Operate Flaps and Gear - Like a BOSS

GOOD NEWS! You can choose to operate the landing gear and the flaps like any other boring plane you have in your hangar, using your usual keybinds for it. In this configuration your flaps have fixed configuration notches at 0°, 10°, 20° , 30° and 45° respectively.

However, you could choose to do it like the boys used to and follow the real procedure! This requires a few more steps to operate safely, so be warned that it could get messy. More so since it usually happens in the critical phases of flight. In this configuration flaps and gear can be set to any position you like.

Flaps and gear are acting on one(!) hydraulic pump activated by the top button on the flight stick. Always place flaps or gear lever back in neutral after using it. DO NOT forget this step!

Flaps

1. Place the flaps lever in the UP (backward) or DOWN (forward) position. This tells the hydraulic system the way the flaps will go when the pump is activated.
2. Press and hold the hydraulic pump button on top of the flight stick. The pump is now active and the flaps will start to travel in the direction selected in step 1.
3. Observe the flaps indicator gauge, and release the pump switch once you've reached the desired position.
4. Place the flaps lever BACK TO NEUTRAL!

Gear

1. Exactly the same procedure as the FLAPS, but different lever.
2. Make sure you deploy or retract the gear FULLY before releasing the pump switch.
3. Place the gear lever BACK TO NEUTRAL!

REMARK: The gear on the P40-B DOES NOT have a locking mechanism. It is held in place by hydraulic pressure ONLY! Hence, check your gear before taxi, takeoff and landing! The flaps travel through their range in less than 2 seconds. Gear operation takes around 20 seconds! Make sure to stop in time for the flaps and leave ample time for the gear.

Cockpit Check & Startup

Before starting up, make sure to have received a weather report, especially temperature. Also check you have sufficient fuel on board, she can eat up all your fuel in just two hours.

Cockpit Check

1. Flap lever - NEUTRAL
2. Gear lever - NEUTRAL
3. Trim tabs - Elevator UP 3 units
4. Throttle - ¼inch OPEN
5. Mixture - IDLE CUT-OFF
6. Propeller control - FULL FORWARD
7. Fuel Selector - FUSELAGE
8. Parking Brake - SET
9. Carburetor heat control - COLD
10. Cowl flaps - GROUND COOLING

Startup

1. Battery Switch - ON
2. Generator - ON
3. Recognition Lights - ON
4. Navigation Lights - ON
5. Electric fuel booster pump - ON
6. Ignition switch - BOTH
7. Engine Primer - 1 STROKE WARM, 3 STROKES COLD
8. Starter - HOLD ENERGIZE (approx 5 seconds)
9. Starter - ENGAGE
10. On engine start advance mixture control - AUTO RICH

After Startup

1. Establish 800 - 1000 RPM
2. On oil pressure 60-70 PSI - Advance 1100 RPM
3. On icing carburetor heat control - HOT
4. Oil pressure 55 PSI - 70 PSI (85 PSI max) - CHECK
5. Oil temperature 60° - 80° (85° max) - CHECK
6. Fuel pressure 15 PSI -18 PSI - CHECK
7. Coolant temperature 85° - 105° (125° max) - CHECK
8. Electric fuel booster pump - OFF

REMARK: Avoid prolonged ground running of the engine! In hot weather start the engine just before taxi and use cowl flaps immediately after landing.

Taxi & Pre-Takeoff

The Tomahawk sits high on its wheels and the view is blocked by the large Allison V12 engine in front of the cockpit. So, you can either use the cheat option a.k.a external view or swerve down the taxiway in S patterns as is usual for a taildragger. Be careful with the throttle, as you have around 1200 horsepower connected to that lever! Taxiing too fast may result in you doing donuts on the taxiway. Excessive use of the brakes is not recommended as you might nose over.

Taxi

1. Canopy - OPEN
2. Use only enough power to start rolling
3. Look out both sides, front and back
4. Taxi - SLOWLY
5. S - CONTINUOUSLY
6. Brakes - INTERMITTENTLY
7. Stick - BACK
8. Keep both hands on controls
9. RPM > 1000

Pre Takeoff

1. Canopy - OPEN
2. Controls - FREE
3. Flaps - UP (max ½ DOWN for dirt or short runway)
4. Trim tabs - Elevator UP 3 units
5. Trim tabs - Rudder RIGHT 2 units
6. Propeller control - FULL FORWARD
7. Mixture control - AUTO RICH
8. Electric booster pump - ON
9. Battery and generator switches - ON
10. Oil pressure 55 PSI - 70 PSI (85 PSI max) - CHECK
11. Oil temperature 60° - 80° (85° max) - CHECK
12. Fuel pressure 16 PSI -18 PSI - CHECK
13. Coolant temperature 85° - 105° (125° max) - CHECK
14. Carburetor heat control - COLD
15. Cowl flaps - COMBAT/CLIMB
16. Magneto Check at 2300 RPM and 28” MAP - MAX DROP 80 RPM

Takeoff & After Takeoff

Takeoff

1. Stick - BACK (initial run)
2. Throttle - 45” MAP (smoothly)
3. LOOK at end of the runway/horizon
4. WAIT for the tail to come up
5. COMPENSATE with right rudder and right aileron
6. KEEP STRAIGHT with rudder only
7. CHECK Speed 105 - 115 MPH
8. SMOOTH BACK PRESSURE on the stick
9. MAX: 52” MAP (for 1 minute) 3000 RPM
10. RECOMMENDED: 45” MAP (for 3 minutes) 3000 RPM

REMARK: Use brakes in emergency ONLY!

After Takeoff

1. Gear - BRAKE
2. Gear -RAISE
3. Gear lever - NEUTRAL
4. 500 feet - CHECK
5. Flaps - UP
6. Trim tab elevator - ADJUST
7. Trim tab rudder - ADJUST
8. Throttle - 35” MAP
9. Propeller control - 2500 RPM
10. Electric fuel booster pump - OFF

REMARK: To reduce engine power first reduce engine manifold pressure and then reduce propeller rpm. To increase engine power first increase RPM, then advance the throttle.

Climb & Cruise

The Tomahawk climbs and cruises well at high speeds, but she is quite thirsty if flown that way. In addition the P40-B has a tendency to overheat. Hence, throttle and propeller RPM should be reduced as soon as possible.

Climb

1.	IAS - 150-160 MPH			
2.	S - CONSTANTLY			
3.	On high temps - LEVEL OFF			
4.	MAX:	45” MAP	2600 RPM	Max. 5 minutes!
5.	RECOMMENDED:	35” MAP	2500 RPM	

Cruise

1.	Cowl flaps - HIGH SPEED			
2.	Trim tabs elevator - ADJUST			
3.	Engine and fuel gauges - CHECK every 5 minutes			
4.	MAX:	37” MAP	2400 RPM	
5.	RECOMMENDED:	30” MAP	2300 RPM	
6.	ECONOMY:	25” MAP	2200 RPM	Mixture: AUTO LEAN
7.	LOW ECONOMY:	22” MAP	2000 RPM	Mixture: AUTO LEAN

REMARK: For long distance cruises (economy) mixture control can be moved to AUTO LEAN. For all other cruise settings AUTO RICH is mandatory. Be advised, using below 30” MAP does suck the engine seals into the engine instead of pushing them out. This can lead to a very costly repair.

Approach & Final

The flaps on the Tomahawk are huge barn doors and you might find yourself falling out of the sky if you deploy them fully at 45°, especially on shallow landings. Hence, you should aim for a higher and steeper approach then you would normally. That way you can see the runway better and have enough speed in reserve. Also, if feasible, do NOT fly a pattern, but one continuous, descending turn from downwind to final. Pilots call this “falling off the perch”. Downwind entry speed should be about 120 MPH.

Approach

1. Altitude - ABOVE 1000 feet
2. Mixture - AUTO RICH
3. Propeller control - FULL FINE RPM
4. Fuel selector - FULLEST TANK
5. Electric fuel booster pump - ON
6. Cowl flaps - ADJUST BELOW 105°C
7. Speed < 170 MPH - CHECK
8. Gear - DOWN
9. Gear lever - NEUTRAL
10. Trim tabs elevator - ADJUST
11. Canopy OPEN

Final

1. Altitude 500 feet - Distance ¼ NM
2. Speed < 140 MPH - CHECK
3. Flaps - DOWN
4. Speed 110-115 MPH
5. Gear - CHECK DOWN
6. Trim tabs elevator - TRIM SLIGHTLY TAIL HEAVY
7. Cowl flaps - GROUND HANDLING

Landing, Go-Around & Shutdown

Landing can be quite tricky in the Tomahawk. Your forward view is very limited and it might be unusual for you to land with a tail-heavy trimmed plane. In addition, once on the ground, the airplane tends to be unstable above taxi speed. So you have to work your rudder pedals and keep the tail in the air flow as long as possible. You cannot catch a swerve in the P-40 once it has started!

Landing

1. Engine RPM - 3000
2. Over threshold - CUT THROTTLE
3. Landing speed 95 - 100 MPH - CHECK
4. LAND on wheels (3-point also possible)
5. On excessive bounce or balloon - GO-AROUND
6. Use rudder - KEEP STRAIGHT
7. Use brakes - BELOW 40 MPH
8. WAIT until the tail comes down, DO NOT force or drop
9. Roll out speed below 20 MPH - CHECK
10. Turn off runway

REMARK: The tail will come down naturally when the speed is right. Do not force it down! Doing so might break the airflow on the stabilizer and make you lose control. Watch your rudder and brake controls once on the ground or you will be doing donuts (again?).

Crosswind Landing

When landing in strong crosswinds of more than 15 kts come in slightly hot and do not use more than 30° of flaps. Dip a wing into the wind to correct the crosswind.

Go-Around

1. Advance throttle 40” MAP and propeller control 3000 RPM
2. Flap lever - NEUTRAL
3. Gear - UP
4. Climb to 500 feet
5. Reduce throttle 35” MAP and propeller control 2500 RPM
6. Flaps - UP

Shutdown

1. Parking Brakes - SET
2. Mixture - IDLE CUT-OFF
3. Once propeller stops, Ignition Switch - OFF
4. All switches - OFF

Bush Trip “Northwest Staging Route”

Our fellow test pilot Robert “Pontiac51” Graf-Klosterer has put together a historic bushtrip for you all to enjoy. This trip will put you in the pilot seat of a P40-B destined for Russia during World War II. You will fly the plane via the Northwest Staging Route from Great Falls, MT to Fairbanks, AK..

The journey leads you along the Rocky Mountains through Canada. Most of the route follows what is now known as the Alaska Highway. This road was initially built to help in constructing and supplying all the airfields along the route.

Although the route is over 1800 miles long, it can be completed in just over 7 hours. The longest flight is the first one from Great Falls to Calgary (Alberta, Canada) and should take you a good hour. Just take care of your fuel and you should have no problems reaching your destination. For a true #FlyTheDamnPlane feeling we recommend 1000 - 3000 feet AGL.

REMARK: This bush trip was designed to allow you to properly park your plane after a leg. Hence, do not forget to turn off the engine, avionics and battery at the end of a flight.

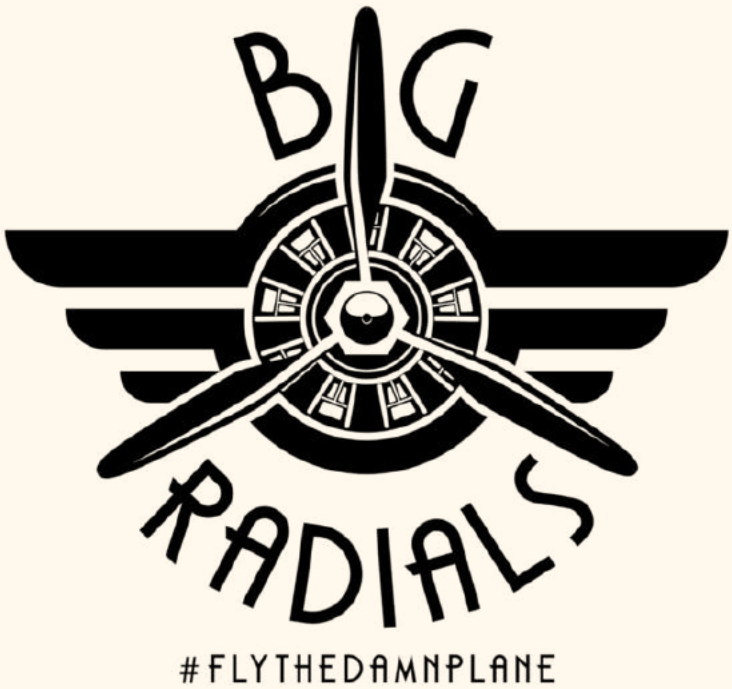
To receive more information on the Northwest Staging Route, please refer to Wikipedia.

Northwest Staging Route - Wikipedia - https://en.wikipedia.org/wiki/Northwest_Staging_Route

DOWNLOAD:

Nortwest Staging Route by Pontiac51 - flightsim.to - https://flightsim.to/file/18886/northwestern-staging-route-bush-trip

Come Talk To Us



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Flightmodel

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Robert “Pontiac51” Graf-Klosterer
www.pontiac51.com

Big Radials Logo & Bushtrip Loading Screen & Crash Test Dummy #2

David “Cmdr Bracher” Bracher
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Mahlon “Exaxis” Winstead

Livery Consultant

Jan “Jankees” Kees

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David Hadfield
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