AEROPLANE HEAVEN

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P-51D Mustang

COCKPIT AND FLYING GUIDE

FOR SIMULATOR USE ONLY

P-51D Mustang

This P51D Mustang Cockpit and Flying guide has been produced to make getting acquainted with your new aeroplane, both simpler and more fun. To this end, this is not an “official” pilot’s manual and should not be considered such.

The P-51D , built by North American Aviation is a single-seat low wing aircraft powered by a (under licence) Packard built Rolls Royce Engine. Originally designed as part of a proposal to design a a completely new fighter from ground up the P51 saw a number of roles during the second world war and in fact well into the 50’s and the advent of the jet age.

The P-51 was not without its problems. In particular the earlier version suffered from a problem with vision especially to the rear and a lacklustre performance. This was remedied with a bubble canopy and the addition of the Merlin engine.

First seeing action with the RAF the American armed forces were to take up the majority of the use during latter stages of WW2. Merlin powered Mustangs were to start their first of many missions to escort long range bombers in mid-december 1943. The P51D’s were to prove superior to the premier german fighters of the time the Me-109 and the Fw-190 .

About 13 000 Merlin powered Mustangs were produced in the United states. They continued to serve past the WW2’s end and some were even used in a ground attack role during the Korean war. They last saw combat in the 1969 “Soccer War “. Now they can be found either in racing guise or as highly restored examples at airshows throughout the world.

As much as possible we have adhered to the stock naming conventions and stock animations and code.

We thank you for purchasing the P-51D and hope that you enjoy flying the aeroplane as much as we enjoyed making it.

USE THIS MENU TO NAVIGATE THE MANUAL

Packard V-1650 Merlin

Dimensions:

Wing span	37 ft 0 in (11.28 m)
Length	32 ft 3 in (9.83 m)
Height	13 ft 5 in (4.09 m)
Wing area	235 sq ft (21.8 m2)
Empty weight	7,635 lb (3,463 kg)
Loaded weight	12,100 lb (5,488 kg)

Performance :

Max speed	383 kn (709 km/h)
Cruise speed	315 kn (583 km/h)
Service ceiling	41,900 ft (12,771 m)
Max range	1,434 nmi (2,656 km)

Powerplant :

1 × Packard (Rolls Royce) V-1650-7 Merlin 12-cylinder liquid cooled engine, 1,490 hp (1,110 kW) at 3,000 rpm

Armament :
Guns: 6 × 0.50 caliber (12.7mm) AN/M2 Browning machine guns

Bombs: 1 × 100 lb (45 kg) or 250 lb (110 kg) bomb or 500 lb (230 kg) bomb

Where ever you see the youtube symbol it refers to a chapter in the accompanying video companion. Click the logo to be taken to the video.

Liveries

343rd squadron 55th fighter group

336th squadron 4th fighter group
Warbond promotion version.

354th squadron 355th fighter group

335th squadron 4th fighter group

362nd squadron 357th fighter group

3rd squadron 3rd fighter group

Liveries

361st squadron 356th fighter group

84th squadron 78th fighter group

MKIV A 3rd squadron

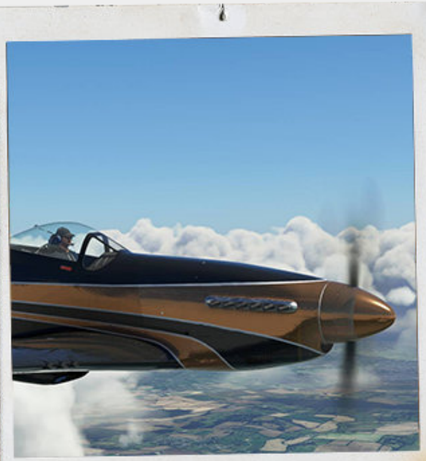
MKIV A 303 squadron KM112

363rd squadron 357th fighter group

487th squadron 352nd fighter group

Liveries

375th squadron 361st fighter group



P-51D 45-11371 - N1051S

P-51D 44-74950 - N511D

P-51D 44-84952 - N201D

COCKPIT

FAMILIARISATION GUIDE

Cockpit - main instruments

The six main instruments (often referred to the flying six) can be found in the area that is demarked by a yellow line.

1. Airspeed indicator
2. Altitude indicator
3. Gyro compass
4. Turn and slip indicator
5. AHI gauge
6. Vertical speed indicator
7. G-meter
8. Oil pressure & temperature , Fuel pressure
9. Carburettor heat
10. RPM gauge
11. Coolant gauge.
12. Manifold pressure.
13. Suction gauge
14. Clock.
15. RMI

Cockpit - right side

This area can be found immediately to the right as you are sitting in the cockpit.

1. Detrola radio. Click to remove gunsight for the stock GNS 430 instead. This is switched on by default in the modern versions of the Mustang.

2. Quick start switch. This will place the plane into a ready start state. HOLD and then release

3. Cold dark switch. This will place the plane into a cold dark state. HOLD and then release

4. Stock radio system (not functional)

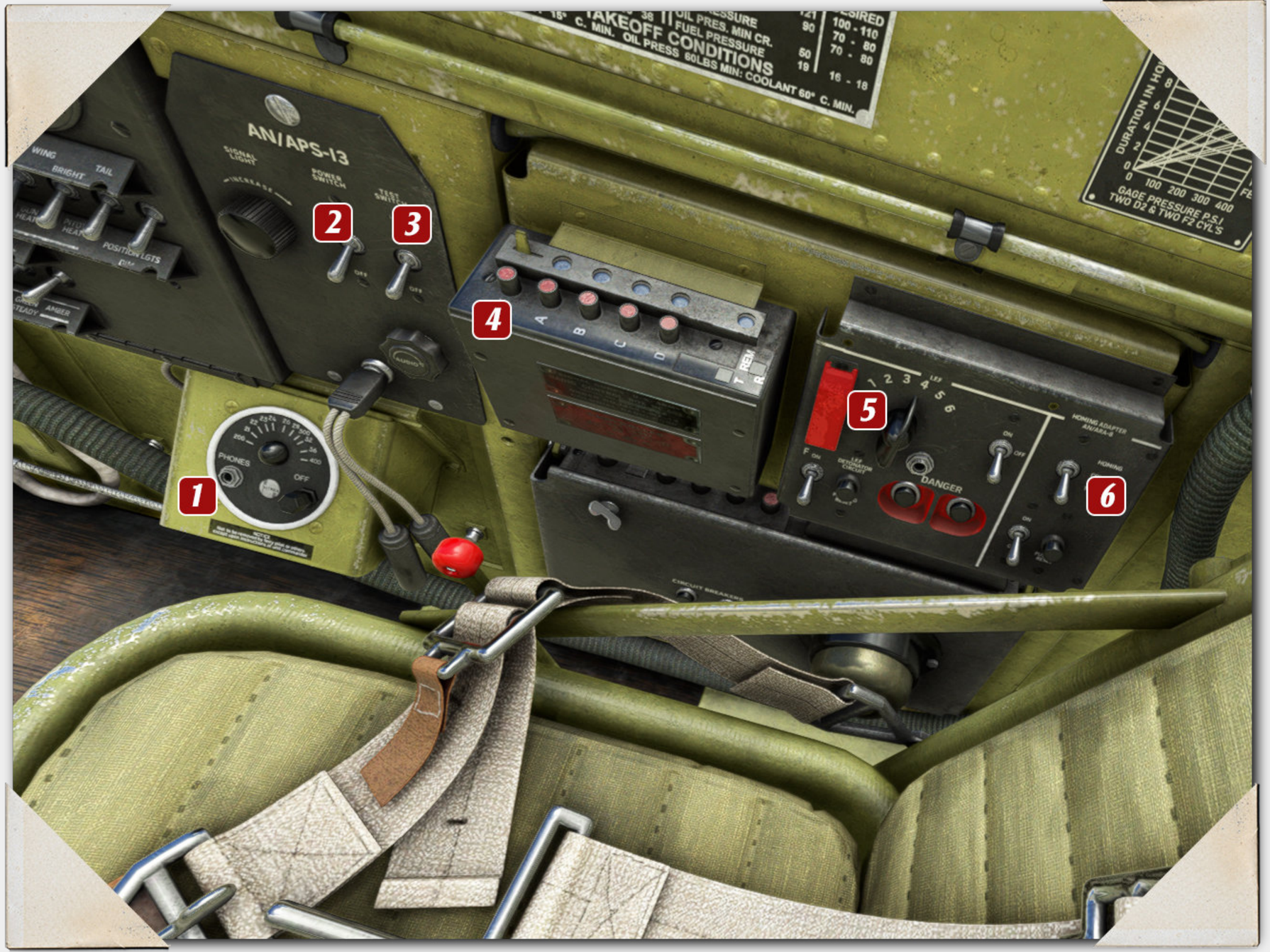
5. IFF system (not functional)

6. Homing adapter mode switch.

- 3 way switch

- Use this switch to switch from the accurate tail wheel lock functionality to no tail wheel to tailwheel lock. Please refer to taxying section for more information or the relevant section of the accompanying video on youtube.

Tailwheel -lock



Cockpit - right side

1. Electrical switch panel (see breakout panel for more information).

2. Oxygen normal - 100% oxygen

3. Oxygen blinker (check to make sure of oxygen flow.)

4. Oxygen amount

5. Canopy lever

6. Right side UV dimmer light (see lighting section for more information)

7. Ammeter

8. Generator switch

9. Battery switch

10. Gun heat switch

11. Pitot heat switch

12. Wing light switch (on/off only)

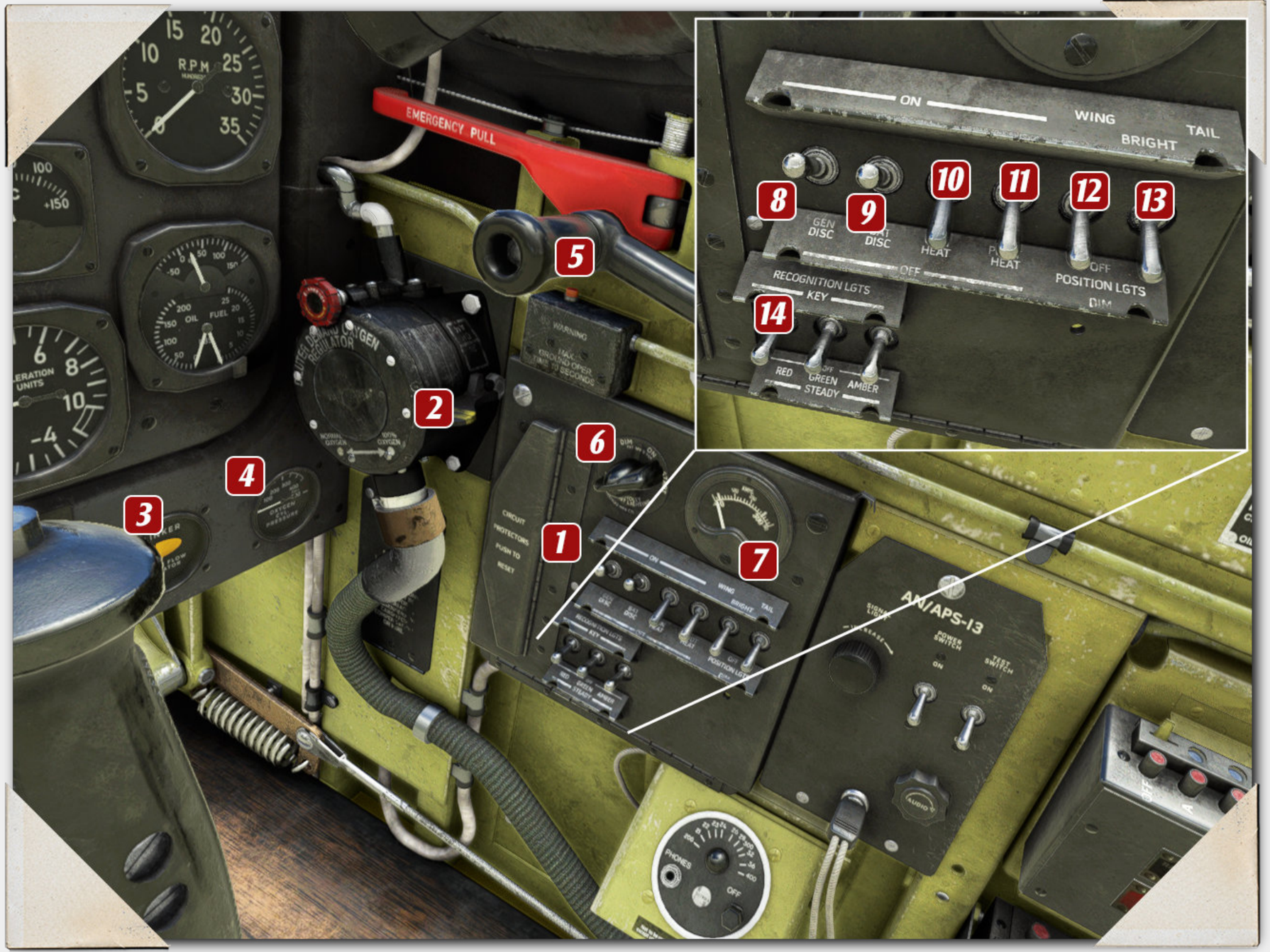
13. Tail light switch (on/off only)

14. Recognition switches. Left click to cycle through the options.

- Down = steady

- Middle = off

- Up = keying (flash)



Cockpit -right side

When you are sitting in the cockpit when you look out either side (right side illustrated) clicking the ammunition hatches will open the doors to allow for reloading (simulated).

Clicking this area will close the hatches again.

These guns and ammunition are purely for historical purposes and are not live and do not fire.

Cockpit - lower front.

The main panel directly in front of the yoke (hidden in this photo) contains the bomb and rocket controls. Most are inoperable in this game.You can interact with them but have no effect in game.

The starter panel will be described in more detail further in this manual.

1. Supercharger control (refer to features section for more information).
2. High blower light. Push to test.
3. Fuel booster (pump)
4. Oil dilution switch
5. Starter safety and switch. This is a click and hold switch (refer to starting section for more information)
6. Primer safety and switch . This is a click and hold switch (refer to starting section for more information)
7. Magneto switch
8. Landing safety lights. Push to test.
9. Parking brake lever
10. Cockpit flood light dimmer (refer to lighting section for more information
11. All switches are interactive but have no effect on the game.

Cockpit - low front.

1. Fuel valve
2. Fuel selector
3. Emergency landing doors. This is a one shot lever and will disable the hydraulics to the doors.
4. Hydraulic pressure
5. Yoke hider. Click this to toggle the yoke. The great thing about the Mustang is generally you wont need to do this but for the purpose of this photo the yoke is hidden.

Please note :

To use the fuel selector you click the quadrant that you wish to select rather than interact with the knob.

Cockpit - left side

1. Throttle

2. Microphone button (in game is used to enable and disable WEP - refer to features section)

3. Prop pitch

4. Friction lock . Disabled to allow for mixture use in the stock pilot position.

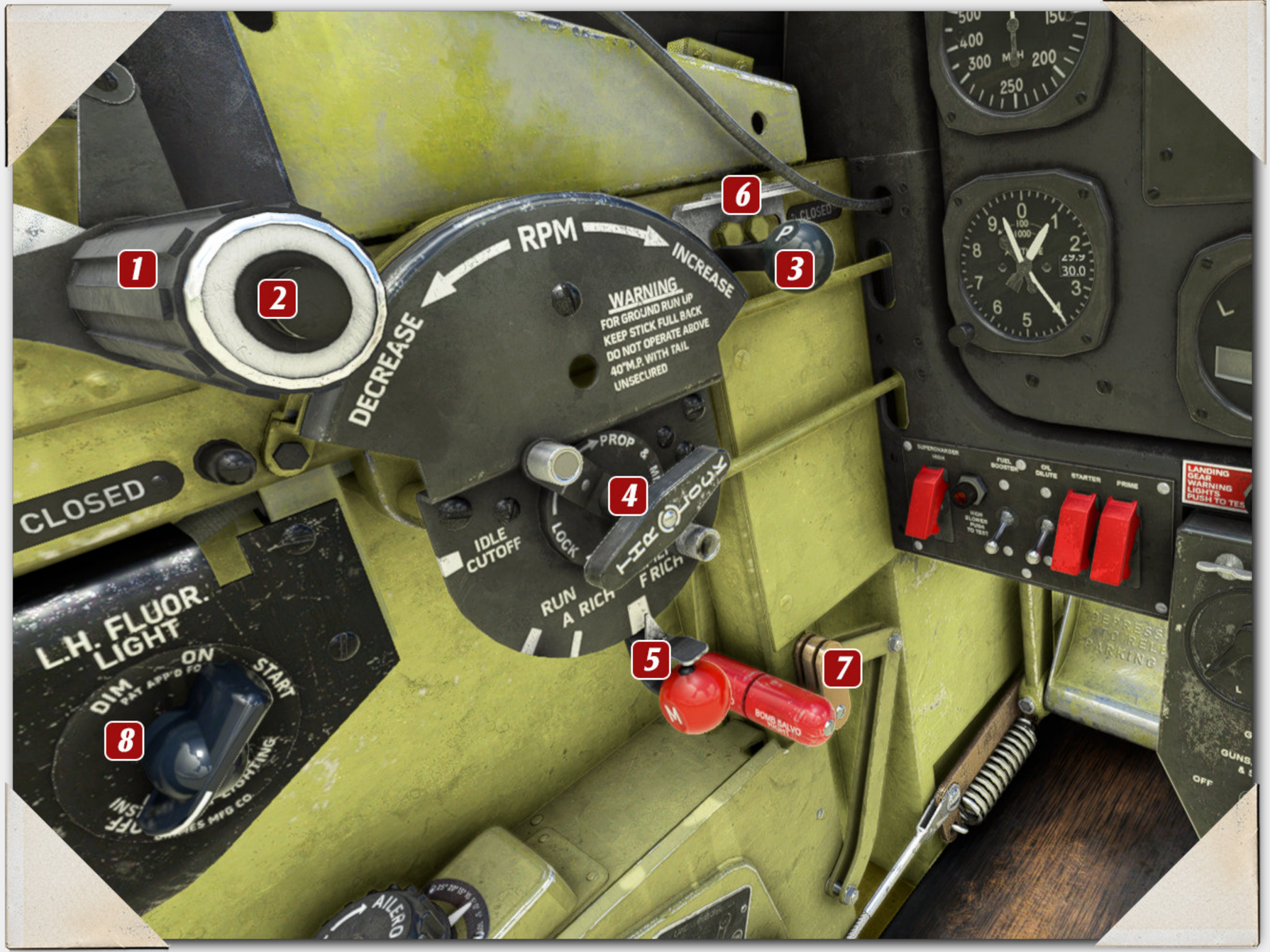
5. Mixture lever.

6. WEP slide. When enabled the throttle will enter this gate. In the real plane this was wired to prevent accidental initialisation of the WEP system.

7. Bomb release. Disabled for game.

8. Left hand UV lighting. (See lighting section for more information)

WEP functionality



Cockpit - left side

1. Coolant radiator control. When the safety is on or the switch is in the middle position the door is opened via temperature. In the closed position door is closed and in the open position door is fully open.

2. Oil radiator control. When the safety is on or the switch is in the middle position the door is opened via temperature. In the closed position door is closed and in the open position door is fully open.

3. Landing light.

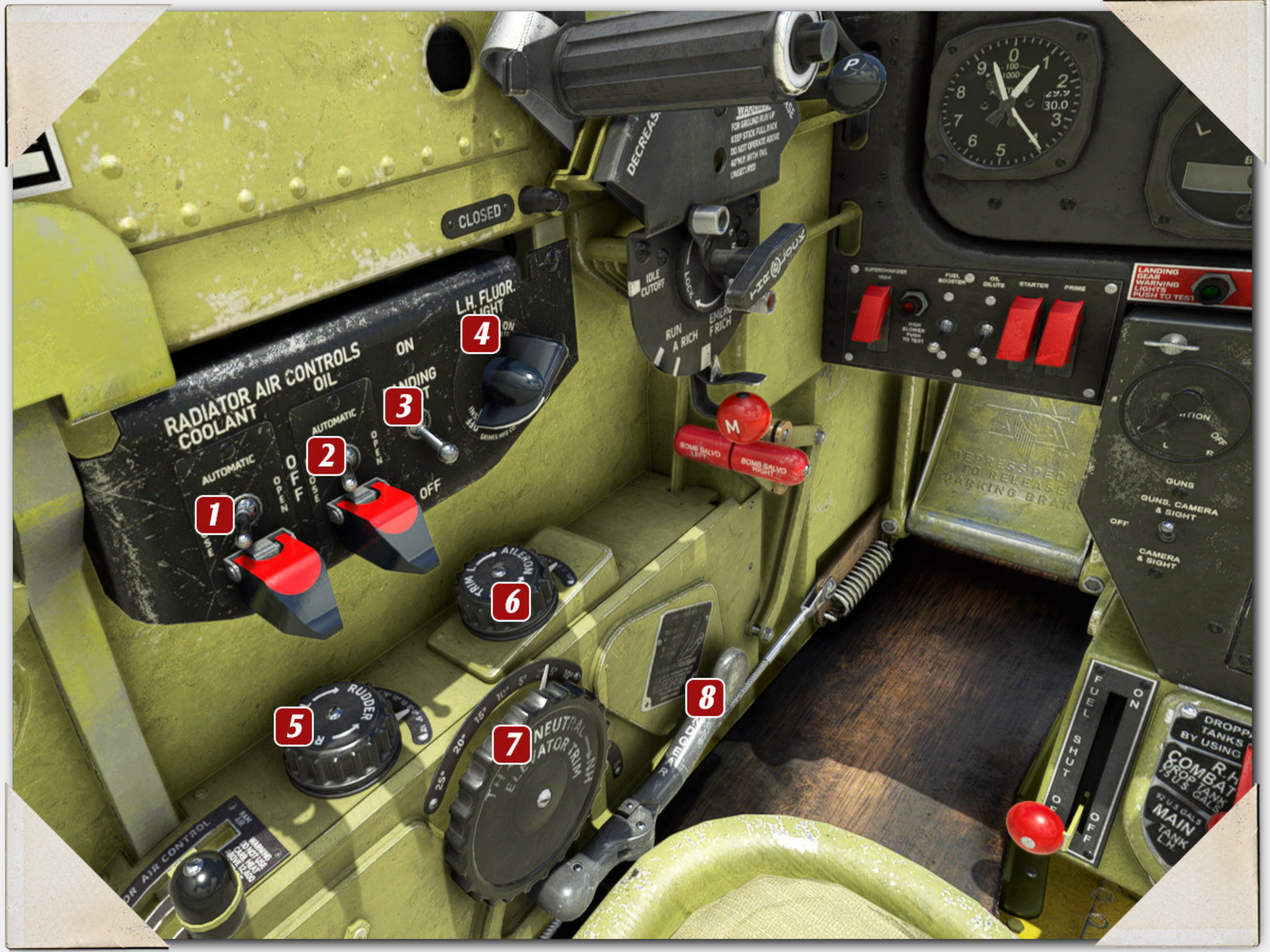
4. Left hand UV light dimmer (see lighting section for more information)

5. Rudder trim (required for take off).

6. Aileron trim.

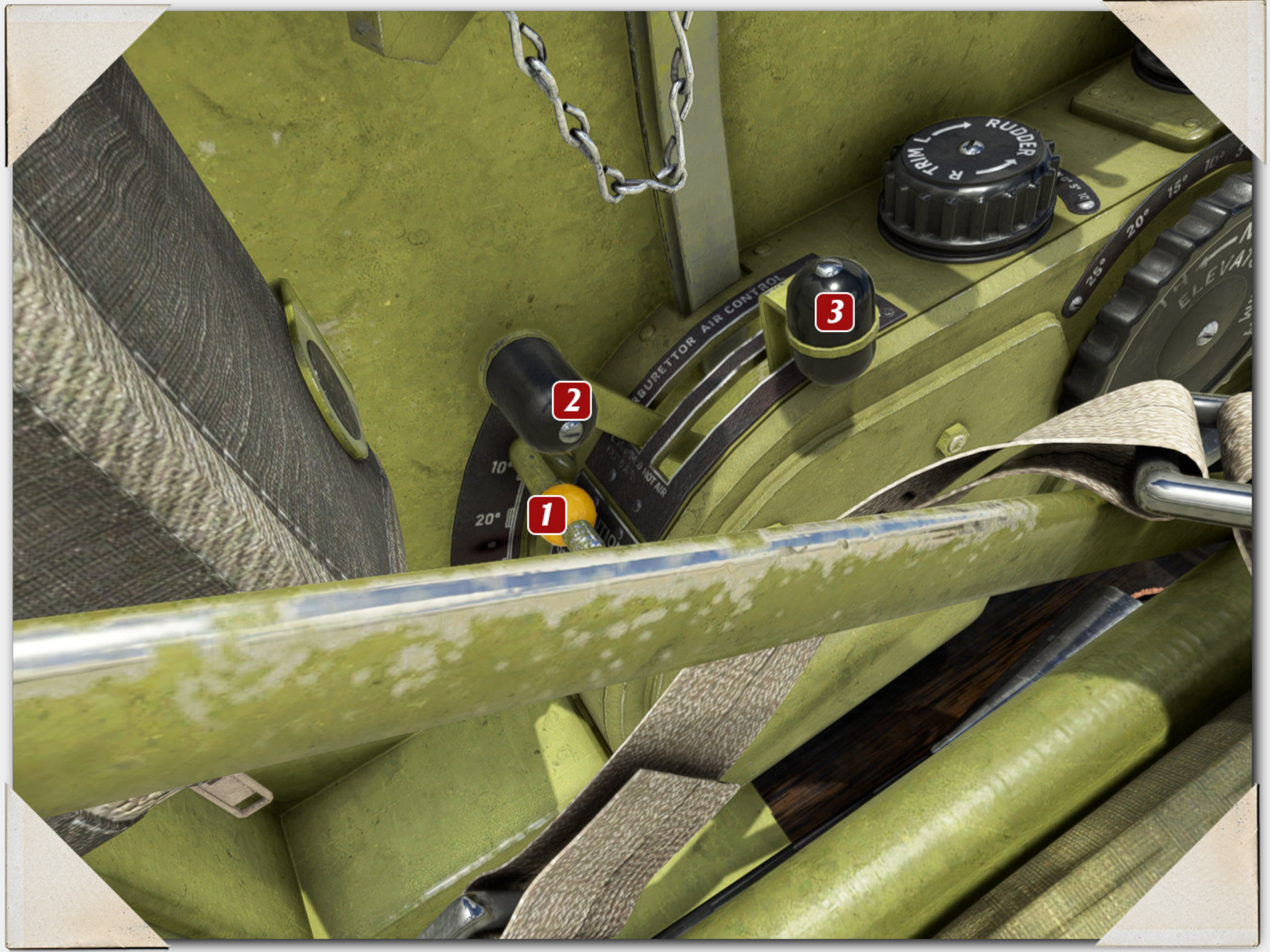
7. Elevator trim (required for take off).

8. Gear handle.



Cockpit - left side

1. Flap lever
2. Carburettor air control - Ram control
3. Carburettor air control - hot air cold air control (carburettor heat lever control in game)



Cockpit - lighting - main

The cockpit consists of 2 flood light utility lights and switchable UV lighting.

The knob to control the panel lights (utility lights) is found on the panel directly in front of the yoke.

In the photo to the left the lights are at full bright value

Cockpit - UV lighting - left

The knob to control the U.V lighting on the left hand side of the main panel is found on the radiator control panel to the left of the pilot.

In the photo to the right the dimmer is around the 30 % point. Beware it is possible to overdrive the UV lighting.

L.H.S UV lighting knob

Cockpit - UV lighting - right

The knob to control the U.V lighting on the Right hand side of the main panel is found on the electrical control panel to the right of the pilot.

In the photo to the right the dimmer is around the 30 % point. Beware it is possible to overdrive the UV lighting

Either side can be set to a separate level

This will allow the “flying six” to be brighter or dimmer than the right side or vice versa.

Cockpit - Lighting options

Ok with all of that out of the way lets get her started and moving shall we !


STARTING
STEP-BY-STEP GUIDE
MZRO 1940'S

Starting a P-51D Mustang

STEP 1.

Ensure that the fuel tanks are correctly selected and the fuel shut off is in the on position.

Do not use the drop tanks to start the P-51 Mustang.

You can use Instruments 05 in the smartcam targets of the game for a closer look.

STEP 2.

Since our attention is on the centre panel area we also will take the time to set the magnetos to both. And ensure the parking brake is set to on. The Merlin engine generates a lot of torque with the parking brake on you wont accidentally creep forward.

STEP 3.

To the right of the cockpit you will find the electrical controls panel. Set the battery to on as well as the generator to on. We suggest you switch the other lights on AFTER the engine is started.

You can use Instruments 03 in the smartcam targets of the game for a closer look.

Starting a P-51D Mustang

STEP 4.

Set the fuel pump to on. This can be turned off once combustion is achieved.

You can use Instruments 02 in the smartcam targets of the game for a closer look.

STEP 5.

Move the mixture handle to run (in this case the pilot felt a little more was required) . Please note that depending on your assistance options within the game you may or may not be able to move this lever. While here ensure the prop lever is in high rpm. (Away from pilot).

You can use Instruments 01 or 02 in the smartcam targets of the game for a closer look.

STEP 6.

Change the radiator controls to auto. If you have not moved them then they are in this position at start with the safety switches up.

You can use Instruments 01 in the smartcam targets of the game for a closer look.

Starting a P-51D Mustang

STEP 7.

Hold the primer on for around 3 seconds and then immediately hold the starter till combustion occurs.

You can use Instruments 02 in the smartcam targets of the game for a closer look.

STEP 8.

Turn off the fuel booster pump and switch the safeties to down.

You can use Instruments 02 in the smartcam targets of the game for a closer look.

STEP 9.

Congratulations you have started the Mustang. Now the fun starts!

If you are interested in a pilot's review on how a real mustang starts (due to the nature of the game we have had to make some compromises) then the following link has some great information.

http://www.warbirdalley.com/articles/p51pr.htm

TAXI & TAKEOFF

STEP-BY-STEP GUIDE

Taxiing

Once combustion has occured you will see as the hydraulic pressure comes up the flaps will lift to the position as indicated on the flap lever. In this case all the way up.

If you have not used the emergency gear door lever then the gear doors will also move to the closed position.

STEP 1.

Now is the time to turn on the oxygen supply and Check the gauge. Which in this photo is fully used up.

Check that the oxygen flow is working with the oxygen indicator.

NOTE : if you have switched on the simple radio option then the blinker is replaced with a comms radio.

STEP 2.

Make sure that the oil temperature reaches at least 60 degrees and that the other needles are within correct indications.

Taxiing

STEP 3.

Before you release the park brake ensure your throttle is in idle position and the WEP is disabled (so you dont accidentally run it on take-off)

If you have your game set to turn off park brake with a tap of the brakes then do this other wise use the keys or the red lever to release the parking brake . Apply brakes

STEP 4a.

The P-51D has an interesting tailwheel lock. With the homing switch in the bottom position you are using the accurate version. Pull 40 % back on your stick engages the tail-wheel lock. Push 20 % forward on your stick disengages the tail-wheel lock.

We understand this is difficult so we have made this switch a tail wheel lock.

STEP 4b.

In the middle position this switch turns off the tail wheel lock code. YOU WILL NOT HAVE A TAIL WHEEL LOCK. This gives you full control on the ground with all the corrections available to you.

Left click cycles through the options.

Tailwheel -lock

Taxiing

STEP 4c.

With the switch in the up position the tailwheel is locked and you have minimal correction abilities.

We highly recommend that you spend a little time to practice the accurate method of tailwheel locking a few times.

Tailwheel -lock

STEP 5.

Depending on which style of tailwheel lock you choose, due to the long nose of a P-51 you need to taxi in an S-turn method till you reach your designated take off point.

One tip is if you are using the accurate method you can lock and unlock with the joystick moving forward and back between turns.

STEP 6.

Once you have reached the point at which you want to take off what we like to do is to put the tail-wheel lock on and the parking brake to on as well. We now need to set the trim controls and then await clearance to launch into the skies.

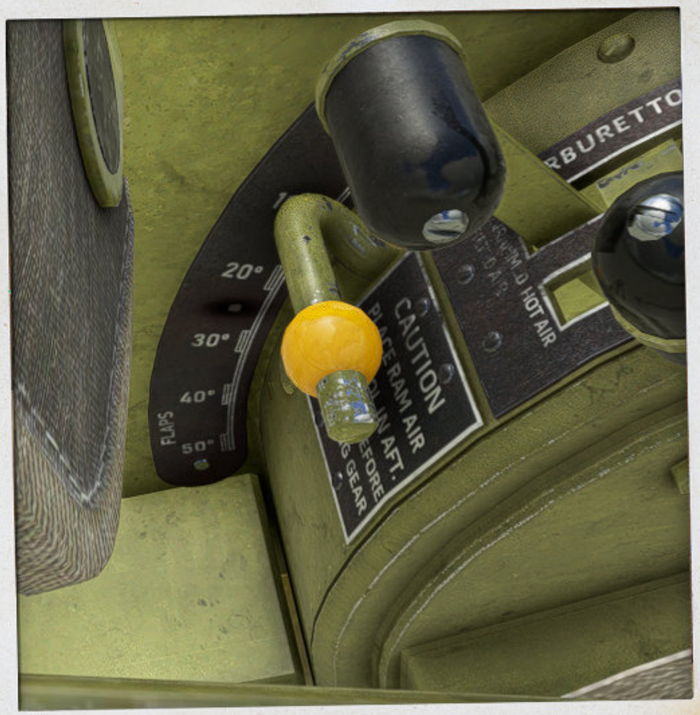
Taxiing

STEP 7.

To counter the torque effect from the engine you need to set rudder trim before you take off. In this case rotate the rudder trim to about 6 degrees right. Remember to reset this once you are airbourne.

STEP 8.

Elevator trim to about 2 degrees nose heavy (NH on the trim wheel) . Should you be carrying drop tanks or bombs then 3 -4 degrees is recommended as in this shot above.



STEP 9.

To help with getting into the air with heavy loadouts such as the drop tanks, you will require flaps. Use 10 or 20 degrees flap for takeoff.

Tailwheel -lock

Takeoff

STEP 10.

Keep the stick back to keep the tail down. This will lock the wheel should you choose the accurate option otherwise the choice is yours. EASE the throttle forward to around 40 inches of manifold pressure.

Increase the throttle to push the pressure up and the speed.

STEP 11.

As the rear tail comes up you need very little and precise movements on the rudder at this point. We recommend that you check your sensitivity settings in game . The P-51D will bite you should you put too much rudder in at this point.

Once speed reaches around 100 mph push forward slightly on the stick and then rotate.

STEP 12.

Once the plane is in the air the P-51D becomes a totally different and graceful machine. Unlike the spitfire Do not apply brakes to stop the wheels from rotating. Take this time to ensure that the manifold pressure is set to around 46 inch mp and RPM back to around 2700 rpm . The plane will climb at the speed of 160 - 170 mph fine.

STEP 13.

Pay attention to the gear indicators. When the gear is in the transition phase the right light will glow and then go out once the gear is in the up position.

Congratulations you are in the air. Time to start your mission or sortie.

Information on the supercharger and WEP functionality can be found in the features section

Note :

The P-51D is a tricky plane to master when on the ground. If you ram the throttle all the way to the stops and apply gob loads (technical term) of rudder to correct ground handling you will put the plane into the nearest hedge very quickly . You need to be careful with your throttle hand and just as careful with your rudder controls.

This addon has been developed to stock animation and stock code. It is expected that you will understand how to calibrate your joystick and any external control sets. We highly suggest that you make sure your controls are correctly calibrated before attempting to take off in the P-51.

LANDING

STEP-BY-STEP GUIDE

Landing

STEP 1.

So now that you have completed your flight and mission you now need to get the plane into landing configuration.

First put the fuel selector onto the tank that has the most fuel in the tank.

The Yoke is hidden in this photo. To do this click the canvas stick boot.

STEP 2.

Lower the gear and the flaps to full. Pay attention to your speed here. The P51 is a robust aircraft and can actually handle quite a bit of speed before flap damage occurs. In this case we are moving at around 160 - 170 mph. Be careful with full flaps , speed bleeds off very quickly.

The trick is to keep the speed relative quick in that 160 mph range.

STEP 3.

Ensure that the gear is fully down and in the locked position . The gear indicator will light on the left side.

Landing

STEP 4.

As you near the landing zone you might find it helpful to put a little nose down to see a little better. Or use the landing camera view taken from the side of the aircraft.

STEP 5.

The p51 lands very fast or should we say a lot faster than a number of other planes. You can very easily get into trouble if you let your airspeed below 135 mph. If you have the room touch the front wheels down and around 120 mph Flare.

If you are using the accurate tailwheel lock feature you are also locking the tailwheel at this point so you have very little ground handling adjustments.

STEP 6.

Once down unlock the tailwheel either by pushing forward on the stick (if using the accurate tailwheel lock feature) or the switch on the right side of the cockpit, and apply rudder in the direction you wish to exit the airfield.

Should you need to stop quickly apply back pressure on the stick to settle the rear of the plane and apply the brakes.

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FEATURES & OPTIONS

FAMILIARISATION GUIDE

Features : Supercharger

Automatic mode 20 000 ft+

When the automatic mode (default) is set the supercharger will automatically turn on above 20 000ft. The real plane had a “dead”zone where the supercharger continued for a short while either side of this number. In game this is not the case.

Upon reaching 20 000 feet in automatic mode the blower light will turn on. As will a slight audible change in the engine.

Low mode.

In the low mode neither the high blower light will turn on nor will there be an audible change in the engine sound

High mode. Always on

With the supercharger in high the light will light. The supercharger will still spool at 20 000 ft. Should the functionality of the supercharger abilty in game change, this page and the Mustang will of course also change.

Features : WEP

1. WEP enable button
2. WEP gate.

WEP functionality

The microphone key enables and disables the WEP feature. On this addon.

This is not accurate by real world standards but within the framework of the game it is as good as we can get at present. Should the opportunity arise to better simulate this feature in the future this may change.

It also allows you stop the " over throttle" functionality unlike the real world function. The WEP functionality is a stock game function. Should you wish to control it via an external input.

Features : Option - Radio

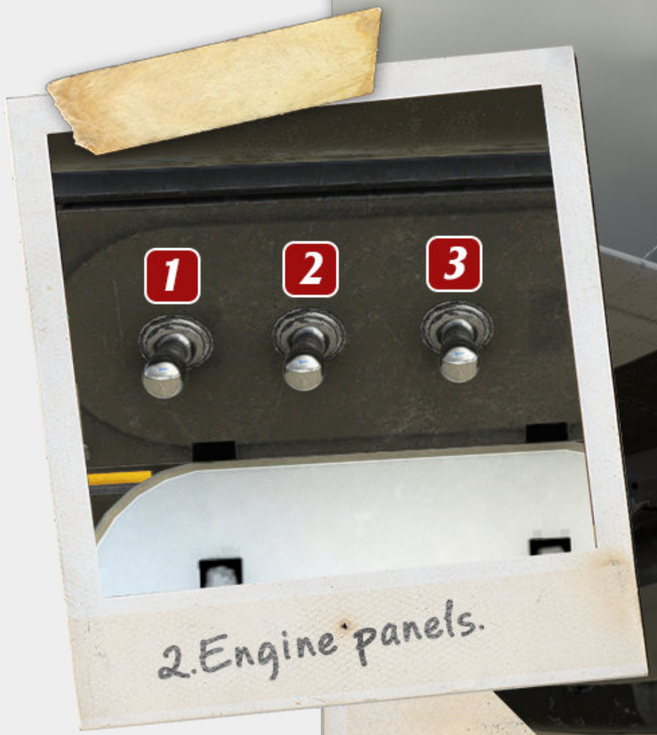
The options panel on the gunsight holds 3 switches instead of spare lightbulbs. We felt it was more useful to a gamer to have options.

1. This switch , switches out the oxygen blinker for a simple comms unit. If you are after a more fully featured comms solution then you can do this by clicking the Detrola unit. (More information further into this guide.).

Features : Option - Panels

2. This switch toggles the engine panels off the front of the aeroplane. Coupled with the weight management based visibilities some interesting screenshots can be had.

This does not work in the air... Obviously.

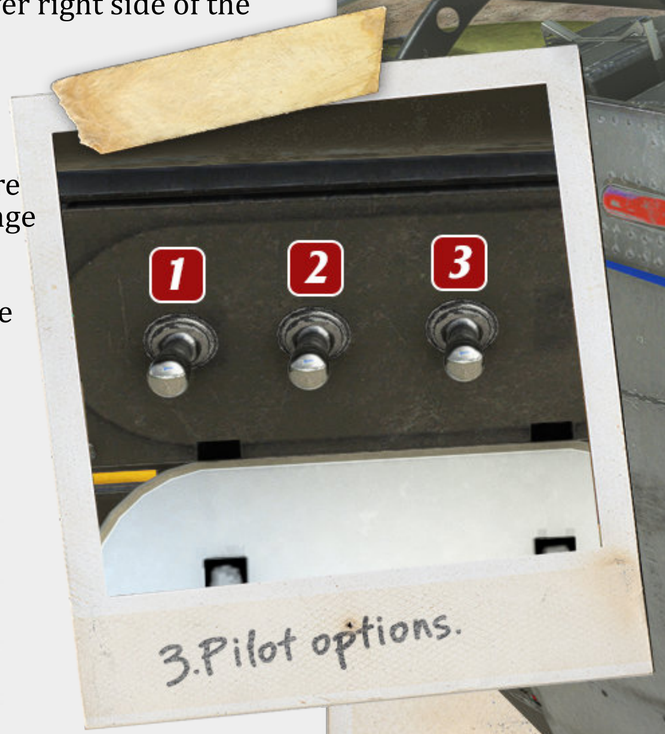


Features : Option - Pilots

3. This switch (on by default on the civilian versions) lets you switch between the WW2 era pilot (Jarvis) or the Asobo stock pilot. Please note. If you have set your pilot to a certain version in your settings then this is the pilot you should see. We have tried to overwrite it with the male casual.

If you are in the modern version and wish to have the gunsight and the WW2 Era pilot then click the Detrola radio on the lower right side of the cockpit.

Due to the way that the pilots are hidden, the change out to the other pilot may take a little time. Please be patient.



1. Click here to cycle reticle types.
2. Option switch holder

Clicking the Detrola radio on the lower side of the cockpit (Item 1 on page 9) will remove the gunsight and replace it with a stock GNS430. This is a stock GNS 430 with stock code and stock functionality. It is there for the use of the modern civilian version, and anyone who wishes to have a little more functionality.

Features : Loadout options

Loadout control

Setting the weight of the pilot in the weight screen of the game will remove the pilot. This works with both the WW2 era as well as the Asobo stock pilot.

We highly recommend that you put a pilot into the aircraft if you intend to fly the aircraft.

Features : Loadout options

Loadout control

Removing the fuel from the external tanks completely removes the fuel tanks. You should probably remove both at the same time as the flight model is and can be drastically changed with odd loadout weights.

Please note on the civilian P-51 the visual representation of drop tanks are not present (nor the bombs) however the fuel can be set. We recommend you dont set the fuel as that would be cheating.

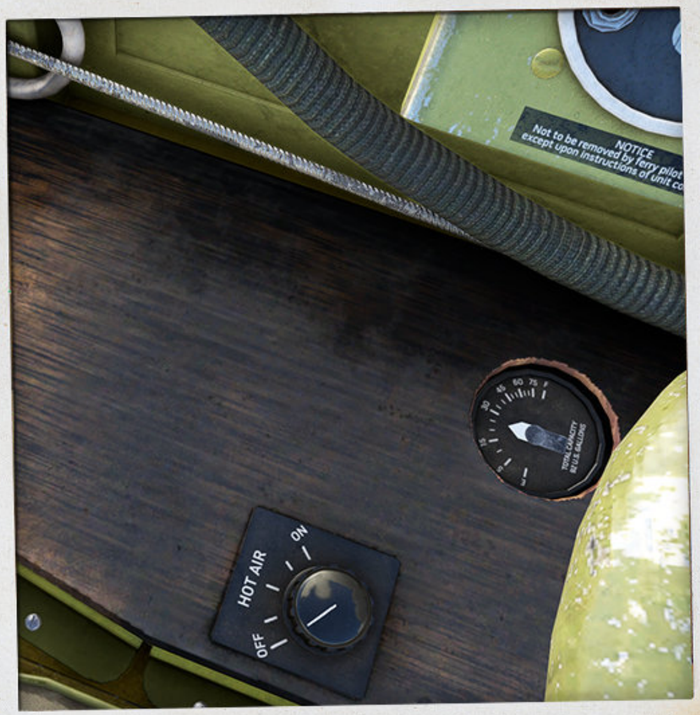
Features : Loadout options

Loadout control

To get the bombs to visually show you must remove the tanks first. Then add the 500 lB bombs to the payload. The pilot also must be 200 lbs. To show as well.

These bombs are not droppable and are for show use only. They also do not feature on the civilian versions. To that end neither do the guns or the armament.

Features :Fuel gauge locations



Instruments05

Instruments06.

Instruments07

The P51 has 3 main tanks and the ability to equip drop tanks of various capacities. The gauges to monitor the 3 main tanks can be found on the wooden floor above the wing spar on either side of the seat. And directly behind the left shoulder of the pilot.

We are using Instruments 05 - 07 in the smartcam targets roll down to allow for easy access. The Hot air knob and defroster knob are inoperable. As is the urine tube found on the left side of the seat. That would have been odd.

Addendum - Limitations - tips - contact

Repaint tips.

The P-51 was modified in theatre of operations a lot. Should you wish to modify your paint the following options are available to you.

1. There were a number of differing tyre treads used in the lifetime of the P-51. Each livery has a different tyre tread pattern. So copy the one you like to use to your texture folder and you are good to go.

2. The main shared texture folder contains a completely blank bare metal texture.

3. The writing on the fuselage is handled by decals. Remove the ones that you dont wish to see or scruff up.

4. The radiator vents in the nose are handled by the texture and therefore can be “closed” via transparency for theatre of operations where this was mandated.

5. The mirror styles are handled by the texture. Those of you who remember the old CFS2 days will know of the alpha trick. If you fail to put in a mirror texture into your texture folder you will have the internal mirror version.

6. The serials on the side of the aircraft are handled by a decal. This can be made fully transparent to delete the decal. Each decal is different per livery so you can use the correct serial /ID for each plane.

Limitations - Information.

1. We have removed the tooltips from the blower test and the landing gear test as the tooltips obscured the actual lights from showing underneath.

2. Using the dev mode airplane selector removes the engine fire effect from the start up effect. This might change in future game updates.

3. The supercharger is working as well as can be within the stock framework of the game. Should extra functionality be added to the game we will endeavour to better replicate the real thing. This functionality may also change over time.

4. The cold dark start will not remove the pilots due to the weight based loadout removal function.

5. The sounds have been made to strict Asobo recommendations found in the SDK document.

6. Due to adherence to stock code the gear unsafe light will not light when the gear horn is on.

Contact

Support : help@aeroplaneheaven.com

Website : www.aeroplaneheaven.com

Facebook : www.facebook.com/Aeroplaneheaven