DC-6
PILOT INTRODUCTION

PMDG

DOUGLAS

Developed for Microsoft Flight Simulator

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The Precision Manuals Development Group Web Site can be found at:

https://www.pmdg.com

NOTE: *Some graphics contained in this manual were taken directly from the simulator and altered in order to suit duplication on a printed page. All images contained in this manual were used with permission.*

The PMDG Douglas DC-6 Development Team

The PMDG development team is recognized throughout the simulation community for producing ground breaking airliner simulations. The PMDG DC-6 was developed by the following individuals:

- Jason Brown
- Armen Cholakian
- Chris Powell
- Robert Randazzo
- Henning van Rensburg
- Vin Scimone
- Pete Sterling

Thank You!

In any project of this scope, there is always a very dedicated development team. For a development team to succeed, there must be an unwavering commitment to the fine detail of the product and to the product quality. While the dedicated experts on the PMDG development team have raised realism in flight simulation to a science, we depend very heavily upon the dedication of our beta team to make our products the highest quality possible. Without these fine individuals, it simply would not be possible to bring you the quality level for which PMDG products are known.

We would like to thank the following individuals for their time, attention to detail, candor, sense of humor and sense of urgency during the development of this product:

- Mark Adeane
- Carl Avari-Cooper
- Aaron Buchanan "Lomaric"
- Allan Burek
- Michael Codd
- Dan Downs
- Charles Harris
- Mats Johansson
- Tom Landry
- George Morris
- Mike Roth
- Kyle Weber

Dedication

The aircraft that you now have installed on your computer is the result of a rather exhaustive effort of collecting images, audio, and video of the last DC-6 to roll off of the assembly line, and the last to fly commercially in a passenger configuration: V5-NCG, s/n 45564.

The interior, but more specifically the cockpit, faithfully recreates this aircraft down to the occasionally mislabeled placards, and gauge replacements that differ slightly from the rest. Both 45564 and its sister ship 45563 have lived rather storied lives, serving both important people and missions.

They first flew commercially for JAT out of Yugoslavia, and were later converted to VIP transports for their Air Force. They were later used by the Zambian Air Force in the VIP transport role, and later parked where they sat unused. NCA of Namibia later purchased the two aircraft on the condition that they remove both from the airport in Lusaka. Despite being visibly worn, both were mechanically sound, and were off in short order to Eros Airport in Windhoek, Namibia.

The first to be restored into charter service was 45563, V5-NCF, which flew a number of trips around local landmarks before being sold to Red Bull, joining the Flying Bulls, where it was re-registered as OE-LDM.

Following its sister ship, 45564, or V5-NCG, also took to the skies in a similar capacity, flying VIP charters all over Namibia and Southern Africa.

V5-NCG was sold by NCA in 2020. It's current status and location is unknown as of this writing.

Wherever V5-NCG ends up, it will certainly live on in the virtual skies through the work and dedication of the PMDG team.

Table of Contents

Things the Beta Team Wanted You to Know

Learn How to Manage Fuel

The tank set up of the DC-6 can be a little bit of a chore to work with at first. The inboard tanks hold more than the outboard tanks, and there are MAIN and ALTERNATE tanks to contend with. Do yourself a favor and see Page 56 of the Operations Handbook for a graphic on fuel management. The graphic and surrounding section will provide great detail on how to get the most fuel out of the tanks.

Using External Hardware

When using external sim hardware, we suggest that you remove all button and switch assignments, and only add the ones you want to assign to hardware buttons and switches from scratch.

The purpose of this is to avoid having key bindings that can affect the airplane systems.

The Autopilot has a Procedure

In order to use the **Sperry A-12 Autopilot Control**, you must first engage the GYROPILOT switch, and then set the **Autopilot Mechanical Disconnect** to ON. The GYROPILOT switch will not engage unless the Autopilot Mechanical Disconnect is set to OFF, and the TURN wheel is centered, however, so be sure that this is the case.

The Hydraulic System

The hydraulic system is normally de-energized by the AFE. It is important that the hydraulic system bypass lever needs to be checked as per the checklist in order to make sure that flaps and gear are operational during critical phases of flight.

Flying a GPS Loaded ILS Approach

When you have activated an approach on the GPS and you switch to VLOC using the GPS's CDI button, and you have switched to LOC mode on the Gyropilot, the Autopilot will not follow the ILS signal. The solution for this

is to do a quick double tap of the CDI key on the GPS — from VLOC to GPS, and back to VLOC — this "wakes up" the Autopilot/GPS signal and gets it to track the localizer. This needs to be done when ILS LOC needle starts to move.

Wait for Full Power to be Set

Prior to running the Takeoff (Dry or Wet) flows, hold the brakes and do not release them until "full power set" has been confirmed!

The AFE has Limitations

A flight simulator still requires you to be the pilot flying, at least for the most part. You are still in charge of where the aircraft goes, and a large part of actually flying it, even with some help from the autopilot.

Some Gauges and Placards are Correct in Being Incorrect

In order to capture the history and true form of the aircraft we surveyed, certain items may seem out of place, but are really true to form. The most obvious items are likely the different gauge faces for the engine gauges. The next items that you may come across are the lighting placards marked as 'white' but are actually red. The final items for the sharp eyed are two placards that have misspelled descriptions. These are all items carried over from the actual aircraft.

What the AFE Does and Does Not Do

Below is an overview of the actions and responsibilities of the AFE. The AFE will continue to control (maintain) the selected active state. In order to revert to manual control, click Abort on the AFE panel. You will then need to manage all systems and power settings on your own.

Note: When the AFE is active, and you make changes to power, carb air, mixture etc., the AFE will override your actions. The AFE never manages autopilot, engine starts, or the inflight CHT via cowl flaps (planned feature for a future release).

AFE States

Before Start

- Once: sets switches, doors, and other miscellaneous setup items

- Will not start engines, but sets you up to start them

After Start

- Once: sets switches, and miscellaneous items
- Maintains: carburetor temperature at 15 C
- You must manage your own power settings

Before Takeoff

- Once: sets boost pumps, fuel selectors, flaps, gust lock, pitot heat, mixture, cowl flaps, landing lights
- You must manage own power settings

Takeoff

- Between dry and wet takeoffs, the only difference in the following procedure is that the AFE will apply anti-detonation water for higher power takeoff.
- AFE is in charge of all power application and propeller pitch
- Once: sets cowl flaps, gear, flaps, after-takeoff checklist
- Maintains: 40" MAP, 2400 RPM, carburetor temperature at 15 C

Cruise

- There are many different possible cruise configurations in the POH, so we picked a good, all-round middle-range cruise configuration. If you prefer a different cruise setup, open the AFE panel, click Abort and set it to your preferred setting.
- AFE is in charge of all power application and propeller pitch.
- Does not change the blower between low and high gears.

Descent

- Once: sets descent checklist switches, supercharger on low blower
- Maintains: 26" MAP, 2000 RPM, carburetor temperature 15 C

In Range

- Once: sets fuel selectors, boost pumps, miscellaneous switches

- Maintains: 26" MAP, 2000 RPM, carburetor temperature 15 C

Before Landing

- Once: sets flaps, mixtures, gear, props 2400 RPM, cowl flaps, landing lights, ADI, carb heat off
- You must manage your own power settings

After Landing

- Once: propellers, cowl-flaps, switches, flaps, gust lock, mixtures
- You must manage your own power settings

Parking

- Once: sets parking brake, fuel selector switches, lights, radios
- Cuts engines in correct sequence

Introduction

Douglas DC-6 Pilot Operations Handbook

PMDG has provided a Pilot Operations Handbook (POH) in PDF format. It is installed with this product. This manual was derived from the manuals provided to flight crews operating the DC-6, and has been modified to suit the needs of the simulation. In some cases we have removed information that does not apply to the simulation, and in other cases we have left information that doesn't directly apply to the simulation in order to provide completeness of information with regards to operating procedures and environment.

Goal of this Manual

This PMDG DC-6 Pilot Introduction will help simulator pilots familiarize themselves with the PMDG DC-6, and will provide you with the information that you require in order to operate the simulation effectively from an interface and options standpoint. We strongly suggest that you study the POH thoroughly prior to flying this airplane.

Options, Configurations, Operations and General

In the following sections we describe the various options and configurations that we have included to further your enjoyment of the DC-6 simulation.

We also give a brief overview of the switches and levers on the flight deck. This will help you understand the switch, knob and lever usage and will help with familiarization of the aircraft. It is still important to refer to the POH for more detailed operational information.

We hope you will find this information useful and that it will enhance your enjoyment of the PMDG DC-6!

Product Activation

The PMDG DC-6 requires a license code to activate the product. When running the installer, you will be asked for your license key. This key can be found in your purchase confirmation email. It is a long string of 6 groups of letters and numbers that looks like this:

MP6B-XXXX-XXXX-XXXX-XXXX-XXXX

…where the Xs are letter or number characters. There is no letter "O" in our keys, it's always the number zero.

Installing Liveries

PMDG Operations Center

Liveries are downloaded and installed using the PMDG Operations Center application (hereafter referred to as OC2), which is installed automatically with the PMDG DC-6.

To open OC2, go to Start-> PMDG Operations Center v2.

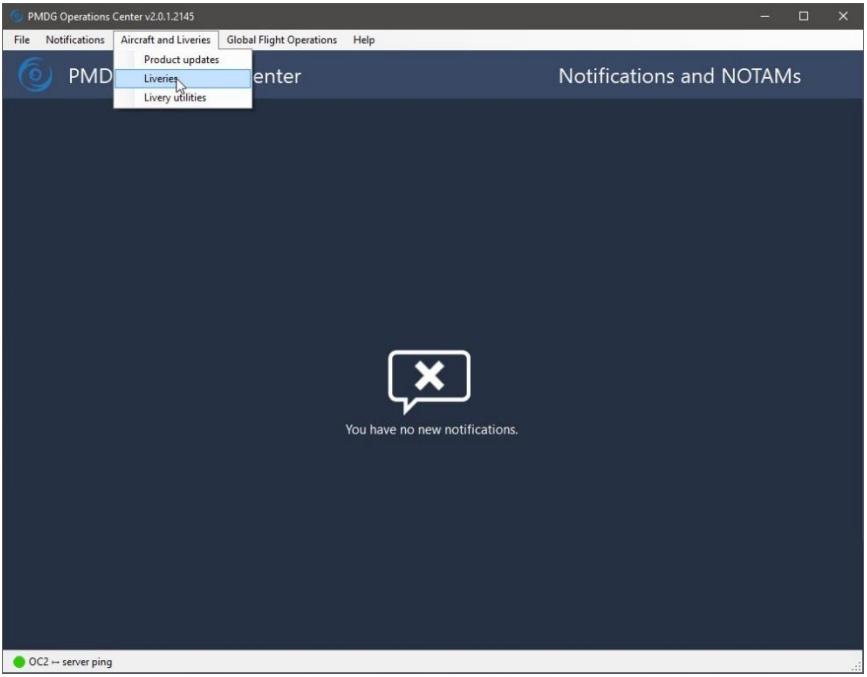
Alternatively, OC2 can be found here:

C:\Users\<Your Username>\AppData\Roaming\PMDG\PMDG Operations Center

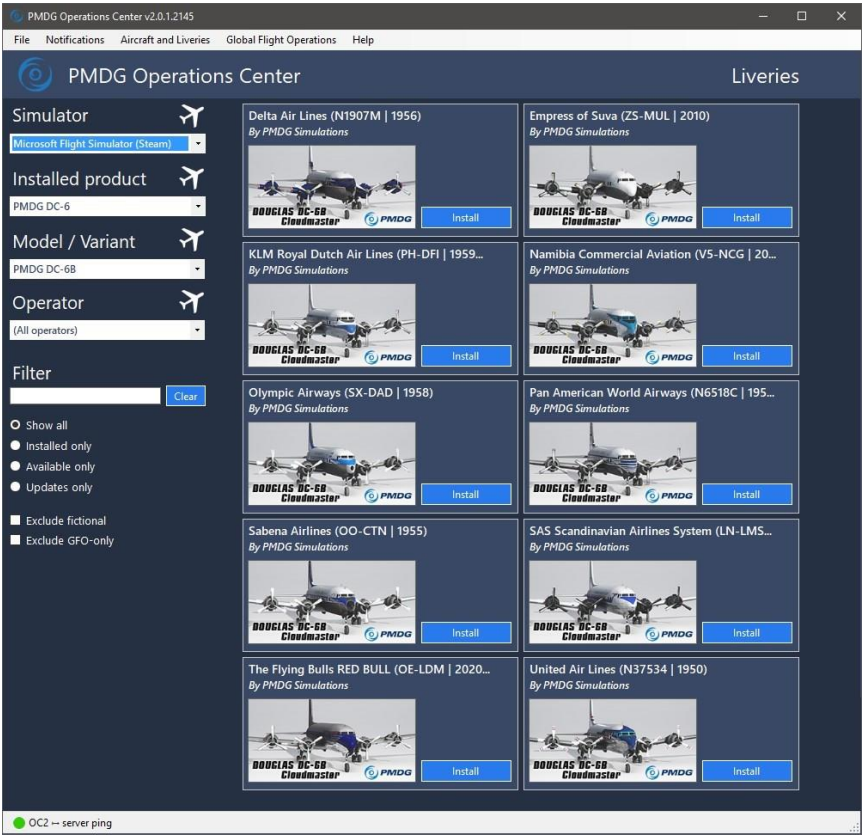
You are welcome to add a desktop shortcut for OC2 if you so wish.

Installing a Livery

Once you have OC2 open, navigate to the 'Aircraft and Liveries' menu, and from there, select 'Liveries' in the dropdown:



The 'Liveries' screen will open:

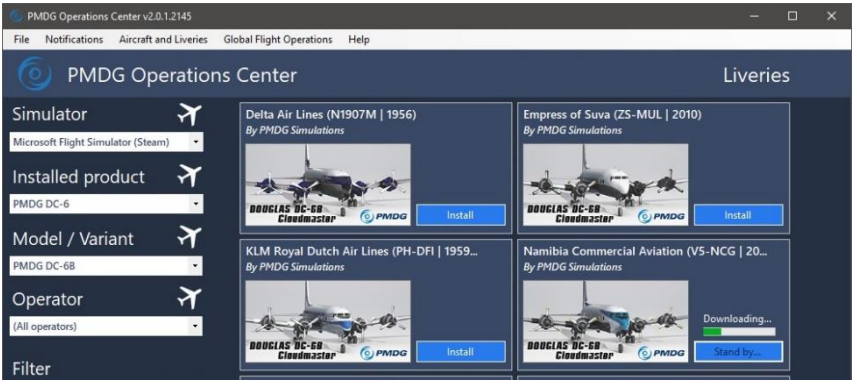


In the menu to the left, choose, from top to bottom:

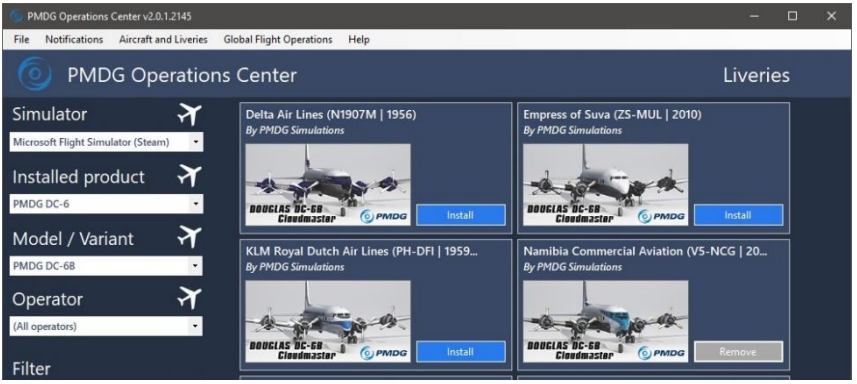
1. **Simulator** — which Simulator you want the new liveries installed to. In this case, select Microsoft Flight Simulator.
2. **Installed product** — Make sure the PMDG DC-6 is selected.
3. **Model/Variant** — Choose between the DC-6A and DC-6B
4. **Operator** — If you want to select a livery used by a specific operator, you can select the operator here and all liveries available from that operator will be displayed.

Once you have made your Simulator, Product and Model/Variant selections, and have decided which livery to install, click on the 'Install' button next to the livery you want installed.

The livery installation will begin, and you will see a green progress bar and a 'Downloading…' message above the Install button:



Once you livery has been installed, the 'Install' button will change to a 'Remove' button:



To remove an installed livery, press the 'Remove' button, and the livery will be removed.

Setting Up the DC-6 in MSFS

Types of Mouse Interaction

We have implemented two types of mouse interaction in the DC-6:

1. MSFS Type Mouse Interaction (Default):

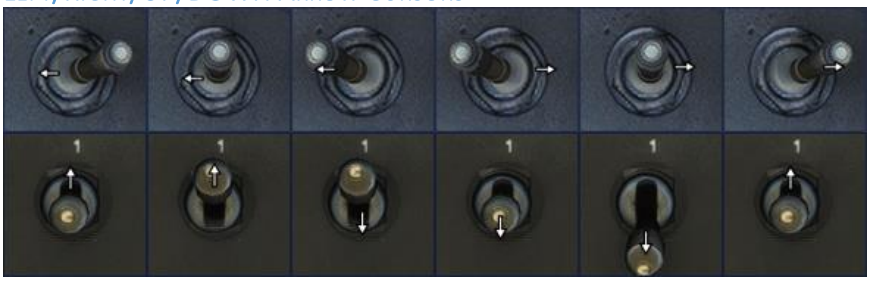
Most people will be familiar with this type of interaction in MSFS, in particular those who have not used PMDG products in FSX and/or P3D. When using this type of interaction, *Left Click* is used for all mouse interactions to manipulate knobs, switches, buttons or levers.

The following cursor types are used in the MSFS mouse interaction type:

LEFT AND RIGHT TURN ARROW CURSORS

When operating a knob or rotary switch in MSFS, you are presented with either a *Left Turn* arrow or *Right Turn* arrow, depending on which side of the knob your cursor is positioned at the time. In the case of, for example radio knobs, outer knobs will present *large turn arrows*, whilst inner knobs will present *small turn arrows*. *Left Turn* and *Right Turn* arrows indicate knob rotation click direction.

LEFT/RIGHT/UP/DOWN ARROW CURSORS



When operating a switch or lever in MSFS using the default type of mouse interaction, you are presented with a *Left/Right/Up/Down* arrow, depending

on which side of the switch or lever your cursor is positioned at the time. Switches or levers that mover vertically in relation to the cockpit will present *Up/Down* arrows, depending on which side of the switch or lever your cursor is positioned at the time. Switches or levers that move horizontally in relation to the cockpit will present *Left/Right* arrows, depending on which side of the switch or lever your cursor is positioned at the time. *Left, Right, Up* and *Down* arrows indicate switch and lever click direction.

Hand Cursor

All 2-position switches in MSFS use the *Hand* cursor. Here we use *Left Click* to interact with these types of switches, no matter where the cursor is positioned on/over the switch.

Grab Cursor

There are some knobs, levers and objects in the PMDG DC-6 that use the *Grab* cursor, which indicates a drag-able object. These knobs are:

1) All cockpit light rheostats
2) Propeller Pitch Lever (Cueball)
3) Garmin and Bendix VOR OBS knobs
4) Altimeter Setting (inHg/Millibar) knobs
5) ADF HDG (Heading) knobs
6) Carburetor Air levers

7) Aileron, Elevator and Rudder trim wheels
8) Inverter 1 and 2 flip switch
9) Cockpit and Cabin Temperature Control knobs
10) Cockpit side windows (open/close)

Note: *All the above items, except the inverter flip switch and cockpit windows, support mouse wheel up (forward) and down (backward) scrolling. This is helpful when making small/fine adjustments.*

2. PMDG Type Mouse Interaction:

This type of interaction allows existing PMDG customers who prefer the PMDG type of mouse interaction (*Left/Right* click) to use the mouse in the same way they have been used to in FSX/P3D, with only a minor setup change required.

The following cursor types are used in the PMDG mouse interaction type:

HAND CURSOR

All knobs, switches and levers use the *Hand* cursor, except for those objects listed below under '*Grab Cursor.*' When using this type of interaction, *Left Click* is used to turn knobs *left* and pull 3-position switches *down*. *Right Click* is used to turn knobs *right* and push 3-position switches *up*. For 2-position switches, buttons and levers, the standard *Left Click* interaction still applies.

Note: apart from the *Left/Right* click interactions, *Up* (Forward) and *Down* (Backward) mouse scroll is also supported.

GRAB CURSOR

There are some knobs, levers and objects in the PMDG DC-6 that use the *Grab* cursor, which indicates a drag-able object. These knobs are:

1) All cockpit light rheostats
2) Propeller Pitch Lever (Cueball)
3) Garmin and Bendix VOR OBS knobs
4) Altimeter Setting (inHg/Millibar) knobs
5) ADF HDG (Heading) knobs
6) Carburetor Air levers
7) Aileron, Elevator and Rudder trim wheels
8) Inverter 1 and 2 flip switch
9) Cockpit and Cabin Temperature Control knobs
10) Cockpit side windows (open/close)

Note: *All the above items, except the inverter 1 and 2 flip switch and cockpit windows, support mouse wheel up (forward) and down (backward) scrolling. This is helpful when making small/fine adjustments.*

Choosing Mouse Interaction Type

To select which type of mouse interaction you would prefer, navigate to your packages directory:

Steam distribution:

<MSFS root directory>\Packages\Community\pmdg-aircraft-dc6\Documentation

MS Store distribution:

<MSFS root directory>\Community\pmdg-aircraft-dc6\Documentation

In this folder you will find a PDF:

PMDG_DC-6_Mouse_Options_HowTo.pdf

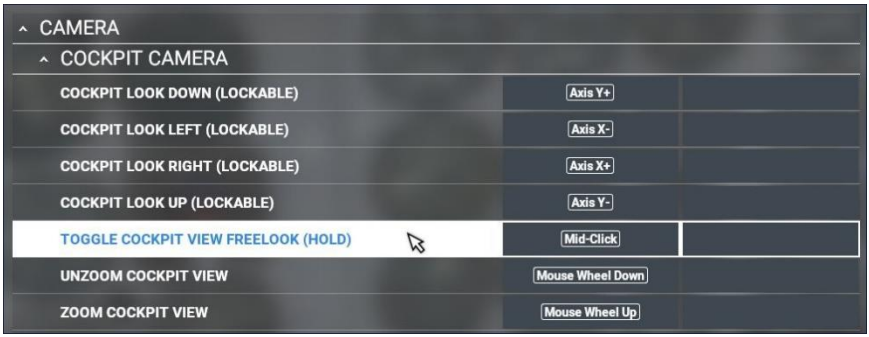
Please read this document carefully and follow the instructions therein should you wish to change your mouse interaction type.

If you change your mouse interaction type as described in the document mentioned above, the airplane will load with the same mouse interaction type every time.

Note: *When changing the mouse interaction type, you will need to re-start your flight in order for the new selection to become active. You do not need to return to the Main Menu – hit 'ESCAPE' and then 'HOME' to restart your flight, after which your new selection will be active.*

Setting Up the Cockpit Camera

To use PMDG Type mouse interaction, you need to re-assign TOGGLE COCKPIT VIEW FREELOOK (HOLD) in the COCKPIT CAMERA options section of your mouse in MSFS:



Tip: We have found that assigning it to Mid-Click works very well.

Important: *If you do not re-assign 'Toggle Cockpit View Freelook (Hold)' above, you will not be able to use the PMDG Type mouse interaction, as you will be limited to left click switch/knob interaction only.*

Sound Settings

During production of the PMDG DC-6 we recorded hundreds of sounds in order to provide the greatest degree of sound immersion possible. As part of the process, we have spent a significant amount of time balancing the sound levels, mixing them based upon volume and location in the cockpit.

The sound sliders in MSFS will control the DC6 sounds as follows:

1. **Aircraft Engines** — Engine sounds.
2. **Aircraft Miscellaneous** — AFE sounds.
3. **Cockpit** — All panel sounds.
4. **Environment** — All rattle, ground roll and wind sounds.

Realism Settings

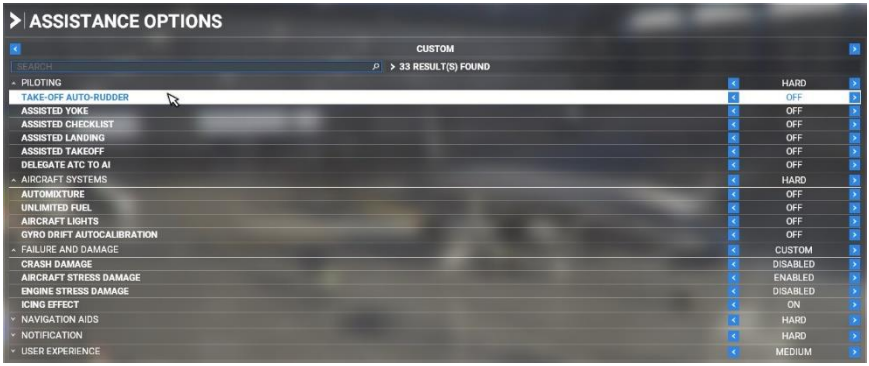
We have noticed some users who are using auto mixture and auto rudder, as well as the legacy flight model in some cases. While items such as auto mixture and auto rudder might make things easier for new users, we suggest the following settings in order to get the most out of your DC-6 from a realism perspective:

Flight Model

You must use the 'Modern' flight model, as the DC-6 flight model has been engineered specifically for Microsoft Flight Simulator using its new flight model. The 'Legacy' flight model option has not been tested and is unsupported.

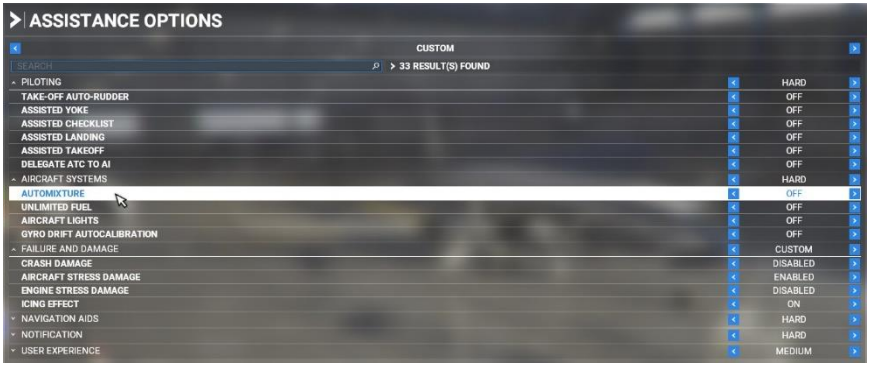
Auto Rudder

We recommend that you set Auto Rudder to OFF:



Auto Mixture

We recommend that you set Auto Mixture to OFF:



Having Auto Mixture set to ON will interfere with the airplane's operation, and it will also prevent the AFE from setting the mixtures correctly.

Tablet - Overview

We have included a tablet in the DC-6, which contains the DC-6A and DC-6B Aircraft Management Software.

This software allows you to manage several particularly important items, both from an airplane systems point of view, as well as a user experience point of view. It makes the management of the airplane easier for you. It provides you with various options to personalize the DC-6 to your liking. It also makes the operation of the airplane more or less difficult depending on the settings you choose according to your own preference.

It contains the following pages, which are covered in detail on the pages below:

1) Ramp Manager
2) Fuel and Load Manager
3) Artificial Flight Engineer (AFE)
4) Maintenance Manager
5) Engine Stress Visualizer
6) Options

The tablet is located on the cockpit side wall to the left of the Captain's seat. To pull up the tablet, grab it on the right edge and drag it into the extended position. To stow it, grab it on the right edge, and push it back to the stowed position.

Ramp Manager

The DC-6 Ramp manager allows you to call ground support equipment to help with servicing your airplane. Items that are currently selected have a green slider next to them, and those that have been de-selected will not. Any item with a green slider will immediately be removed when the aircraft begins to move.

External Items

Allows you to show/hide the tow bar and tractor, wheel chocks, pitot covers, engine oil pans, mechanic stands and the GPU (ground power unit).

Aircraft Access

Allows you to open/close the main and front cabin doors, and cargo holds and doors. While working with the entrances, you can also extend/retract the front cabin exit stairs, and show/hide the main cabin stairs.

Aircraft State

Allows you to immediately set the aircraft between Cold and Dark, Ready for Start, and Ready for Taxi. This is helpful if you do not have much time, but still want to sneak in a quick flight.

Cockpit Lighting

Sets cockpit lighting to one of the following: OFF, WHITE, RED or FLOOD. This is helpful for those who do not wish to have to set multiple switches to a particular position to get a decent level of overall flight deck illumination.

Manually Adjusting the Lighting

You will find lighting knobs scattered throughout the flight deck that allow you to adjust the lighting dynamically across the flight deck. In order to set a light to a desired level, *Left Click + Drag* is used to make large changes, and *Mouse Wheel Scroll Up/Down* is used for more refined settings.

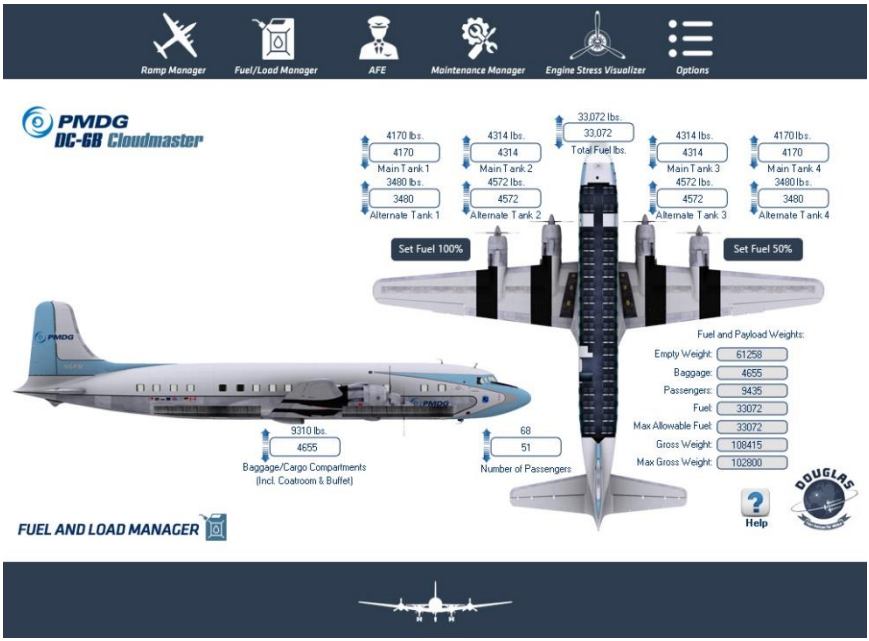
Note: Even though the lights are labeled red and white, the label may not be fully accurate. This is intentional, and a reflection of the set up found in our study aircraft.

Fuel and Load Manager

In order to fuel and load the aircraft, we have provided a comprehensive Fuel and Load Manager. This will allow you to load fuel by clicking on the quick 50% and 100% buttons, as a total fuel value. Alternatively, you can add fuel on a per tank level. It also provides an interface for specifying the total number of passengers and cargo.

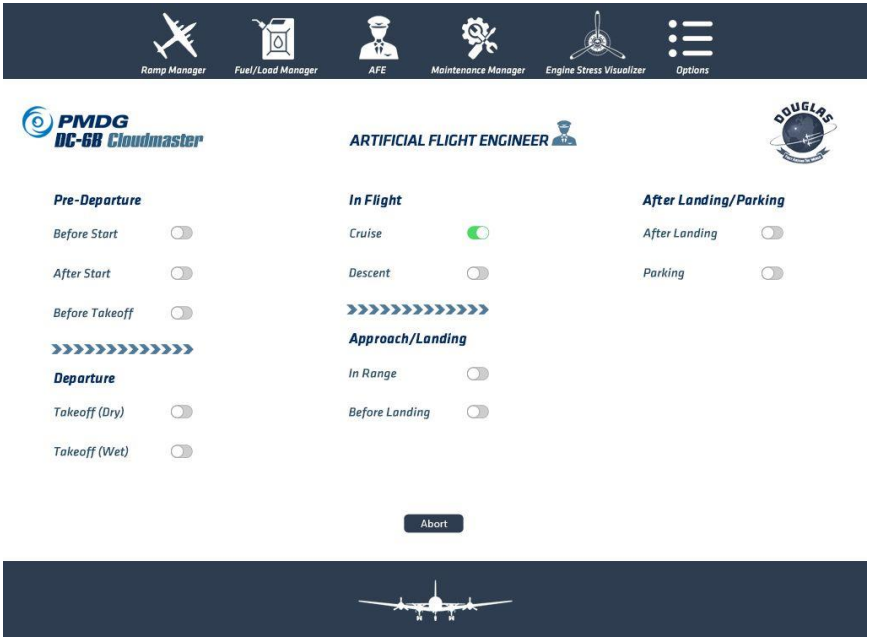
For detailed instructions on how to add fuel, passengers and cargo, be sure to read the instructions contained in the tablet's Fuel and Load Manager page. To access the instructions, click on the *Help* icon towards the lower right of the page.

Note: as you load weight onto the airplane, its presence becomes visible in both the upper (DC-6A only) and lower deck cargo holds.



Artificial Flight Engineer (AFE)

Since the DC-6 is normally flown with a three-person flight crew and the simulator is usually only flown by a single person, we have provided you with an Artificial Flight Engineer (AFE) to help you manage everything that is going on. The AFE can be accessed by clicking on the Flight Engineer icon in the tablet (this is the icon that looks like an airline pilot).



The list of buttons allows you to select a particular checklist to be run. This will cause the Captain and/or AFE to run through the corresponding checklist. If it is set correctly, the AFE will confirm it. If it is not set correctly, the AFE will accomplish the action for you in many cases, with the notable exception being your manipulation (taxiing/flying) of the aircraft. In other words, certain parts of the checklist are prompted by the aircraft reaching a particular speed on departure. For example, you will need to accelerate to a specific speed prior to the AFE retracting the flaps or setting climb power. In order to abort a checklist for whatever reason, you can click the Abort button, after which you will need to manage all operations on your own.

In addition to running checklists and configuring the aircraft, the AFE also has the ability to monitor and maintain engine parameters. This includes engine manifold pressure, propeller RPM, and carburetor heat. If anything disturbs the aircraft in flight, such as a weather update in the sim, the AFE will adjust the throttle, propeller control, or carburetor heat to accommodate that change. The AFE will also continuously adjust the throttle to maintain proper climb power as the aircraft ascends. If you would prefer to manage this on your own, simply click the Abort button.

Maintenance Manager

Some would describe the operation of older aircraft as an art form. Without the modern systems like FADEC to manage engines for you and report on engine conditions, many different engine management techniques have been developed. Regardless of what technique you subscribe to, eventually, poor engine management will cause damage in some way. The Maintenance Manager, accessed by clicking on the propeller icon in the tablet, allows you to check on the health and time of your engines and propellers, as well as engine oil, water/alcohol, auxiliary oil, and anti-ice fluid levels.

Should your engines incur any damage, you can repair them by using the *Repair Engine #* buttons. You can service your props by using the *Service Prop #* buttons. Engine oil *(important!)* can be topped up by using the *Top Up Engine #* buttons.

Total airframe hours are recorded at the bottom right of the page.

Engine Stress Visualizer

This tool can be found on the tablet and is used to help pilots who are new to radial engines learn how to effectively manage these highly complex, finely balanced engines. If you have experience working with radial engines in the real world, this tool will be largely replaced by your natural tendency to manage the engines carefully. If you are just learning how to manage radial engines, you will find the color visualization to be helpful in determining if you have the engine set up correctly for each phase of flight.

It is important to understand that the Engine Stress Visualizer is not simply a graphical repeat of the data provided to you by your engine gauges. The visualizer is giving you instantaneous, real time feedback as to how much stress each engine is experiencing in seven different areas that are key to long term engine health. As you learn how to operate radial engines, a quick glance at your Engine Stress Visualizer help you to learn whether the engine settings you have chosen are acceptable or if you might be demanding too much of your engines.

For example, under certain circumstances, you will see yellow stress indications that are completely normal during a phase of flight. Immediately after takeoff, conducting a heavy-weight climb, taking off from a particularly high altitude airport or in hot ambient atmospheric conditions would all impart greater than normal stress on the engines and thus yellow stress indications would seem normal during those phases.

If you are seeing yellow indications on your Engine Stress Visualizer, simply ask yourself if the stress you are seeing makes sense for the phase of flight. If the stress level does not make sense, then perhaps some small adjustments are necessary to bring the stress level back to the green, low stress level. The section below will help you to determine which settings you may need to adjust for each of the seven parameters.

Orange indications are a long term problem. The engine is experiencing unusual wear. If you can solve the problem with a change in engine settings, then you should do so immediately. If you cannot, then you should understand that the engine may begin to show signs of wear such as a loss of power, increased oil consumption, higher operating temperatures, etc.

Red indications mean that the engine is sustaining significant damage and immediate action is required to protect the engine from catastrophic failure.

With a bit of practice, you will learn how to manage your engines effectively in all phases of flight.

The Stress Visualizer will show you round graphic markers in the following colors:

Black: Engine not operating.

Green: Well within optimal stress range.

Yellow: At the high-or-low end of acceptable stress range.

Orange: Slightly outside of acceptable stress range.

Red: Dangerous level of stress.

Some parameters are specifically temperature based, and may also have:
Blue: Cold/Within Icing Range

The Engine Stress Monitor provides you with feedback in seven key operating areas:

Overboost

This metric is monitoring the internal pressures experienced by the engine cylinders as well as the amount of torque being experienced by the engine's main bearing. Pressures/torques above the design limits will wear the cylinders by causing cracking and unusual wear to the cylinders, pistons and rings.

Generally speaking, setting the engine manifold pressure and RPM in accordance with the takeoff, climb and cruise power charts will keep you within the green band. At very high power settings, such as during takeoff, very high weights during the climb, or extremely high altitudes, you may find that you are operating in the yellow band. If orange or red is shown, you will generally reduce engine stress by reducing manifold pressure (throttle) or increasing propeller speed per the climb tables.

Mixture Too Lean

This metric is monitoring the stochiometric mixture of fuel and air within the cylinders. If the mixtures are set to lean, but the throttles are too far forward, the mixture introduced to the cylinders becomes excessively lean and you risk excessively high temperatures and uncontrolled detonation of the fuel/air charge within the cylinder, which can damage the cylinders, pistons, valves, rings and connecting rods.

Green indicates normal stochiometric mixture. Yellow indicates that the mixture is becoming too lean and you should consider moving the mixture levers to AUTO RICH or reducing the throttle position. Orange and Red indicate abnormal or dangerous wear is taking place.

Excessive Engine RPM

This metric is monitoring the engine RPM. If RPM is too high for the throttle setting, the engine main bearing and connecting rods may wear excessively and it is thus important to ensure the engine RPM is maintained within appropriate limits for the throttle setting. If yellow is shown, you are

nearing the high end of acceptable RPM for the current manifold pressure setting and a reduction in RPM or an increase in throttle setting may be called for. Orange and Red indicate that excessive wear is taking place which could lead to eventual failure of the main bearing or connecting rods.

Cylinder Head Temperature

This metric is monitoring the temperature of each engine's warmest cylinder. Cylinder Head Temperature for each engine is taken through a single temperature probe mounted to the aft sparkplug of the cylinder determined by the manufacturer to be the warmest under normal operation on each of the four engines. The position of the temperature probe varies on each engine due to structural configuration, but by providing temperature at the warmest cylinder, it is possible for the crew to have a general idea of the temperature of all cylinders by treating the indicated temperature as the highest. The temperature of the engine cylinders is determined by a complicated series of factors that might include the temperature of combustion within the cylinder, engine RPM, cooling airflow through the engine cowling, fuel mixture, oil temperature and many more.

High CHT is generally considered to be an indication of engine stress and should be monitored closely in all phases of flight, but with confidence and with understanding as to what might cause an engine to run purposefully warm, such as an extended climb, a slow-speed climb or extended operation in very warm air temperatures.

Blue indicates that the cylinder temperature is excessively cold and can generally be rectified by reducing the cowl flap setting one, or possibly two notches under extremely cold atmospheric conditions.

Yellow indicates that the engine is running warmer than optimal, but this may be intentional or operationally advantageous in a heavy climb, a slow climb or if an engine has been shut down and the remaining engines are working harder as a result. The crew need only become concerned if orange or red is shown.

Orange indicates that CHTs are high enough to cause the cylinders to wear abnormally. Red indicates that the stress being placed on the engine is significant enough to cause concern for cylinder failure and subsequent engine shutdown if not corrected quickly. Correcting a CHT problem can

generally be accomplished by enrichening the mixture (Mixture levers to Auto Rich), reducing manifold pressure (throttles), increasing aircraft speed, increasing the cowl flap setting, reducing carburetor inlet temperatures, or adjusting engine RPM (propeller control) as appropriate for the phase of flight. The important note here is to recognize that it is not abnormal to see yellow during high power phases of flight and this should not be a cause for concern if the crew is aware of the reason for the engine to be under increased stress.

Carburetor Temperature

This metric is monitoring the temperature of airflow through the carburetor inlet on each engine. This key metric is important because excessively warm inlet temperature can cause the fuel/air charge to become excessively lean, which may lead to loss of engine power, excessive CHT, detonation and a range of associated problems culminating in a loss of power from the engine, or failure of the engine in flight.

Yellow in this metric may be experienced under normal, but hot atmospheric conditions and should direct crew attention to the need to provide additional attention in the form of reduced power demand, increased cooling for the cylinders or a change in mixture setting depending upon conditions.

Orange or Red indicates that the carburetor inlet temperature is out of limits and damage may be expected not in the carburetor itself, but downstream in the cylinders. Orange or Red in this metric will normally serve as a precursor to increasing CHTs, and excessively lean mixture.

This metric is also unusual in that it may show a blue icon, which indicates that the current carburetor inlet temperature is normal and not dangerous but is within the range *known to promote* the accumulation of ice within the carburetor inlet throat, thus reducing the airflow and negatively affecting engine performance. It is important to note that a blue icon does not indicate the presence of ice or the existence of a problem.

It merely indicates that such icing might accumulate under the present conditions and thus the performance of the engine should be monitored for indications of carburetor icing such as a loss of engine power. If the crew determines icing to be present, application of carburetor heat is called for until conditions and indications of carburetor icing have ceased.

Oil Temperature

This metric is monitoring the temperature of the engine oil within each engine. Engine oil is a key component in removing heat from the core of the engine and serves as a primary indicator of long term engine health. If the engine's oil temperature varies significantly from the others, it is normally an indication of some internal wear or problem that is causing the engine to generate more heat internally than would otherwise be considered normal. Oil temperature will change during flight as a lagging indicator of the demand placed upon the engine. During takeoff and climb, temperatures will climb. During cruise oil temperature should decrease to it's normal range and then remain steady. During descent, oil temperatures can be expected to decline slightly.

Yellow indication for oil temperature is nothing to be alarmed of, provided that you can explain why the oil temperature may be out of the normal operating range. If such stress is explainable due to engine power demands then simply monitoring for continued stability is sufficient.

Orange or Red indicate a problem that likely needs crew attention to resolve, whether it be through a reduction in power demand from the engine, or increased cooling through the use of enrichened mixture or cowl flaps to provide relief to the engine.

Orange or Red will normally be an indication of some excessive internal wear that is causing the engine to run hotter than is normal, thus exceeding the oil cooling system's ability to remove heat from the engine core.

Oil temperature may also be too cold, (indicated by a blue icon) which is exceedingly dangerous for the engine's main bearing. Cold oil is highly viscous, making it a poor lubricant until it has warmed above 40C. Pilots should be careful not to exceed 1000 RPM on any engine where the oil temperature has not exceeded 40C.

Oil Pressure

This metric is monitoring the pressure of the engine oil within each engine. Oil pressure will be affected by a number of conditions such as the temperature of the engine oil and the RPM of the engine.

Oil pressures slightly higher or lower than normal will be indicated by a yellow stress indication and should not cause alarm provided the crew understands why the oil pressure is slightly high or low. Cold oil that is still warming will cause a yellow (slightly high) stress metric while hot oil in an engine operating a very low RPM will cause a slightly low stress metric. Both are to be considered normal if these conditions are normal for the phase of flight.

Orange indicates that oil pressure is abnormally high or low with risk of damage to the engine and the crew should take corrective action to prevent abnormal wear.

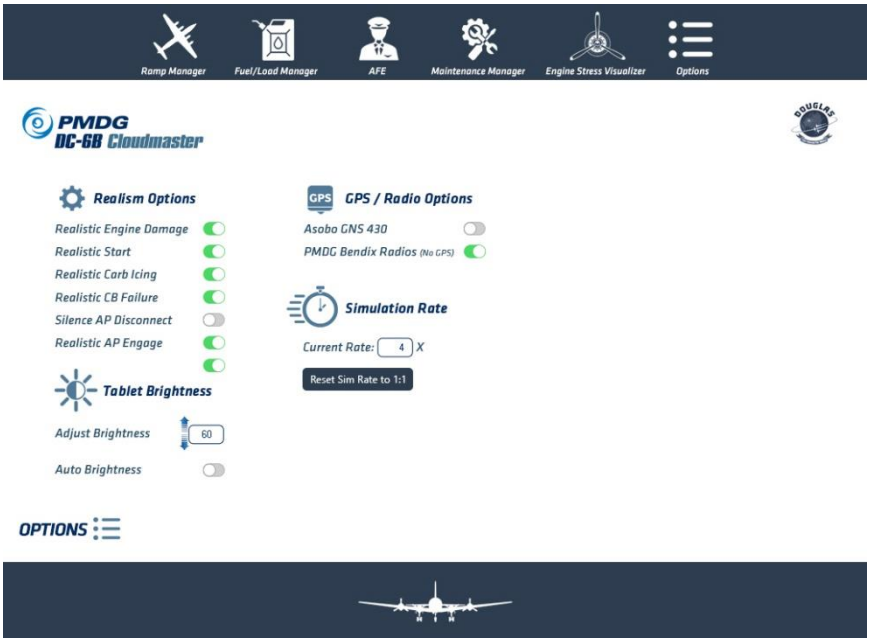
Red indicates that oil pressure is significantly out of acceptable bounds and severe damage to the engine is likely. It is important to understand what causes high or low oil pressure in order to take appropriate corrective action.

High oil pressure is an indication of poor lubrication to the engine as a result of either cold oil or a blockage in the oil system. Low oil pressure is an indication of poor lubrication due and is normally the result of high oil temperature or a loss of oil from the engine.

Options

Realism Options

We have provided several realism options to allow users to choose how realistically they want to operate the DC-6.



Realistic Engine Damage — Disable this option if you do not want to worry about proper engine management. Once you've become familiar with the DC-6, you can enable it and operate the airplane more realistically.

Realistic Start — Disable this option if you would like the engines to fire up right away, even on the coldest of days, where the engines usually require a little more coaxing.

Realistic Carb (carburetor) Icing — Disable this option in order to lessen the workload by not having to worry about high humidity and visible moisture freezing the carburetors up, choking the engine air stream in the process.

Realistic CB (circuit breaker) Failure — Disabling this options will prevent circuit breakers to fail in a realistic manner. You will still be able to trip them manually.

Silence AP Disconnect — We have provided an autopilot (AP) disconnect sound to mimic newer aircraft with audible warnings. This option, when set to 'on' (enabled) is more realistic, as the aircraft did not come with an audible warning, but it is provided as an option for those of you who might find it nice to have.

Realistic AP Engage — Disabling this option will allow you to engage (and disengage) the autopilot using only a single keystroke (Z). When enabled, you will need to switch the Gyro Pilot ON, and then engage the AP Mechanical Disconnect lever on the bottom left of the pedestal. Note that the 'Z' key will only engage/disengage the AP Mechanical Disconnect lever when this option is enabled.

Tablet Brightness

Here you can manually adjust the brightness of the tablet to suit your taste, or you can set it to Auto Brightness, in which case the tablet's light sensor will handle the brightness for you depending on the time of day.

Setting the brightness manually is especially helpful during night operations, where you can set it all the way down to 1%, which will make the light being emitted from the tablet's screen a lot less distracting.

GPS/Radio Options

By default the airplane uses the Asobo GNS 430 GPS as the primary source of navigation. In addition there is also the Bendix KX155 NAV/COM (Navigation and Communication) 2 radios, and the KT 76A ADF unit.

If you prefer to use the PMDG Bendix Radios instead, you will have Bendix KX155 NAV/COM (Navigation and Communication) 1 & 2 radios, as well as the KT 76A ADF unit. When using this option, the airplane is not fitted with a GPS, and you will have to navigate visually using landmarks and/or NAVAIDS such as VOR (very high frequency omni-directional range) stations and NDBs (non-directional beacons).

Simulation Rate

The Current Rate window displays the current simulation rate in the simulator. Seeing that the simulation rate is not currently displayed on-screen in the simulator, this is helpful information for pilots when they use R+ or R- to increase or decrease the simulation rate.

The 'Reset Sim Rate to 1:1' button assists pilots to quickly and easily reset the simulation rate to a rate of 1 (the 1:1 real time) rate.

Flight Deck Operations

Captain Side Panel

DFC Analogue Clock & Stopwatch

We have included a period correct analogue clock and stopwatch to help pilots when flying instrument procedures, especially when they are operating the DC-6 with the PMDG Bendix Radios configuration (without a GPS).

The clock is located just above the DME gauge on the Captain's side instrument panel.

The following is an overview of the different times, modes and functions available in the clock.

Time

Both Local and Zulu time is available. To toggle between Local (default) and Zulu time, rotate the left knob clockwise. With each turn the time will toggle between Local and Zulu time.

Mode

Clock and Stopwatch modes are available. To toggle between Clock and Stopwatch mode, rotate the left knob anti-clockwise.

Start/Stop/Reset

When the clock is in Stopwatch mode, press the right knob to Start and Stop the stopwatch.

To reset the stopwatch press the right knob in and HOLD it pressed in for 2 seconds or more. The stopwatch will then reset back to zero.

DME

To the far left of the captain's side instrument panel, and just below the DFC Clock, you will find the DME (distance measuring equipment) gauge.

N1 (NAV 1) and N2 (NAV 2) sources are operational. DME HOLD is INOP.

Transponder Selector

The transponder selector allows you to change transponder sources. If one should fail, the other may be selected by changing the source from 1 to 2.

Gyro Slaving

The directional gyro (DG) is slaved to sensitive equipment that keeps it properly aligned. If this equipment malfunctioned, it is possible to free the gyro so that it behaves like those in smaller aircraft of even today. From there, the heading can be adjusted by using the INC/DEC three position switch to the left of the slaving cutoff switch. Click the Slaving Cutoff switch to switch between normal and gyro mode. The gyro heading can be increased/decreased by pushing the switch upward to increase or downward to decrease direction on the compass.

Wiper Knob

The wiper knob turns the wipers on and adjusts their speeds between OFF, SLOW and FAST. Clockwise rotation increases wiper speed, and anti-clockwise decreases wiper speed/switches wipers off. ***Note:*** *Hydraulic pressure is required for the wipers to operate.*

Transponder

The transponder mode knob right is used to set the transponder to SBY, ON, ALT, or TST. When in ALT mode, a MODE C report will be sent to vPilot (VATSIM).

Audio Control Panel

Clicking any of the COM, NAV, DME, MKR, or ADF switches will select them as sources to mix into your headset.

Tip: having cockpit tooltips turned on will help to easily identify the states each of these switches are in.

Captain Side Panel - Upper

De-Ice and Heater Switches

Most de-ice and heater switches are located on the overhead panel just above and to the left of the captain. The main ones you will be concerned with are the airfoil heater, prop deicer, and carburetor deicers.

Cockpit Temperature

The cockpit temperature dial allows you to set the desired temperature on the flight deck. It is normally left in the full left position, marked as NORMAL.

Cockpit Flood Light

The cockpit flood light is a simple way to light up the flight deck with white light. It provides variable lighting and uses left click + drag or mouse scroll up/down to increase/decrease brightness.

Windshield Heat and Radome Anti-icing

The windshield heat and radome anti-icing switch allows the selection of different amounts of heat to be applied to the windshield and radome. This prevents frost and fog buildup, but also keeps the areas from becoming too brittle from cold temperatures.

First Officer Side Panel – Upper

Pressurization Controller

This system is used to set the cabin pressure and control the rate of change. For more information on the operation of the pressurization system, see the DC-6 OPERATION MANUAL, p.129.

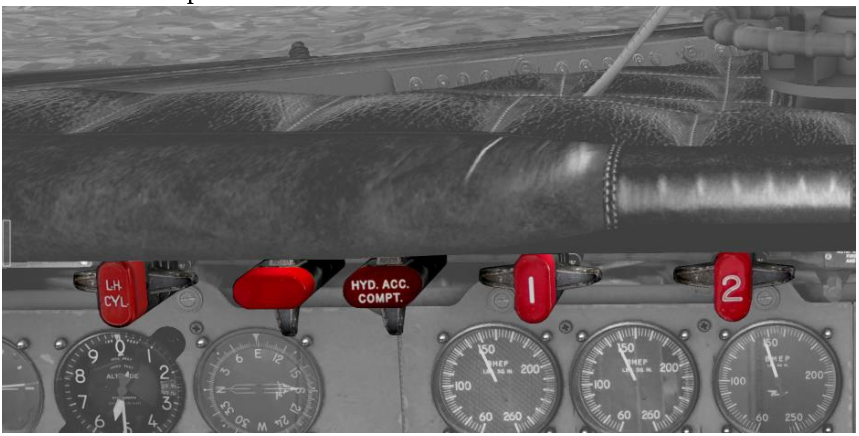
Cabin Temperature Control

In conjunction with the cabin heater, this control maintains the cabin temperature at the desired setting. Use left click + drag or mouse wheel scroll up/down to increase/decrease cabin temperature.

Glareshield

Fire Handles

The CO_2 Discharge and Engine Selector Valve handles are located on the underside of the glareshield. For operational info, refer to FIRE CONTROL on p.256 of the DC-6 OPERATION MANUAL.



Lower Overhead

Landing Lights

Landing lights are operated by setting the LAMPS switch to the ON position. The position of the lights are controlled by setting the POS CONTROL switch to the EXTEND position, and once the lights are extended, back to the OFF position. Conversely, when retracting the lights, set the LAMPS switch to the OFF position. Then, once the lights are out, set the POS CONTROL switch to the RETRACT position, and once the lights are retracted, set it back to the OFF position.

Cowl Flaps

Cowl flaps assist in maintaining the proper temperature of the engines. They can be opened by rotating them clockwise and closed by rotating them anti-clockwise.

Supercharger Controls

Supercharger controls can be changed from high to low by right or left clicking. Refer to the DC-6 OPERATION MANUAL for more information about supercharger operation.

NAV/COM Radios

The NAV/COM Radio on the right side of the GPS in the picture below manages NAV 2 and COM 2 radio frequencies. When you have the PMDG Bendix Radios option selected in the tablet Options page, the ADF will be positioned where the GPS is currently, and a Bendix KX155 NAV1/COM1 will be found in it's place. In this configuration, both NAV2/COM2 and NAV1/COM1 will be Bendix radios, and no GPS will be present.

GPS

The GPS in the center of the panel is the Asobo GNS 430, and contains the COM 1 and NAV 1 radios. Left clicks operate all of the GPS functions, regardless of what type of mouse interaction option you have selected in the tablet Options page.

ADF Radio

The ADF radio is used to tune NDB frequencies. It also contains a flight timer and an elapsed timer. Timers can be reset by holding down the SET/RST button for 2 seconds or more.

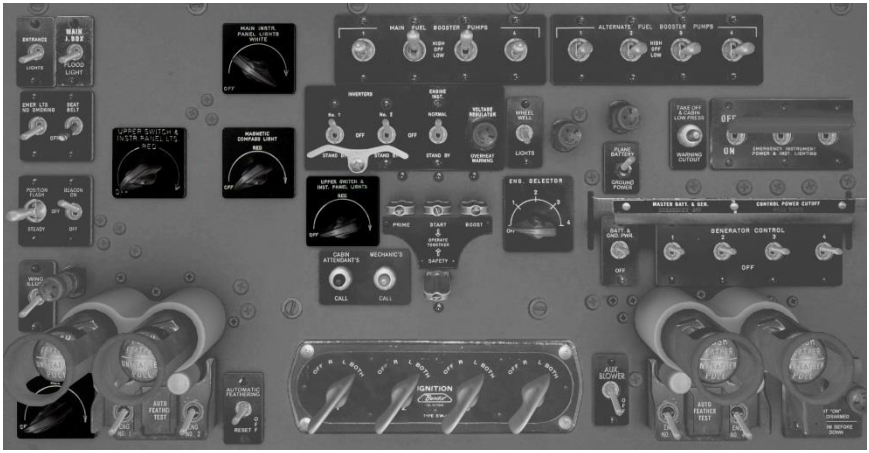
Main Overhead

Exterior Lights

The exterior lights, with the exception of the landing lights, are all located on the overhead.

Panel Lighting

The panel lighting dials allow you to light up various segments of the flight deck at night. The red lights are ideal for any time where night vision should be preserved. White lights are more effective, but compromise night vision.



Fuel Booster Pumps

The fuel booster pumps provide additional fuel pressure where a particular situation has increased demand, such as engine start, tank switching, and tank crossfeed.

Electrical System Controls

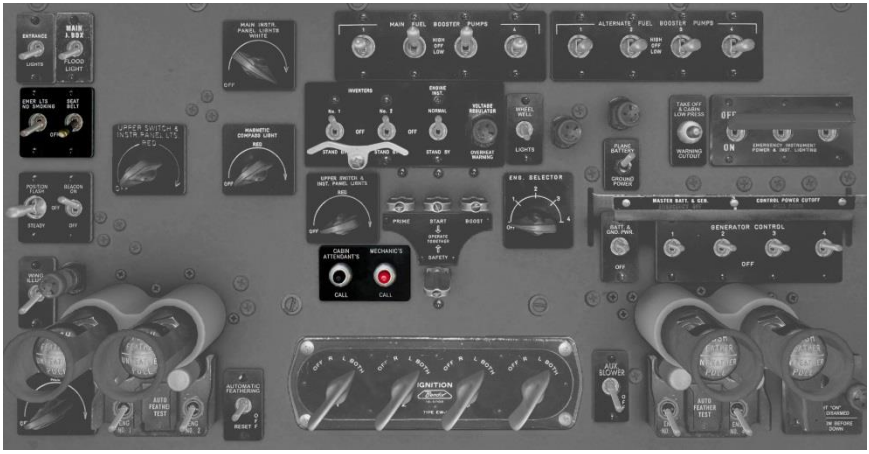
The electrical system controls provide the aircraft with power, and converts AC to DC when and where required. The inverter and engine instrument switches at the top left are three position switches. For operational details and schematics, see the DC-6 OPERATION MANUAL.

Engine Starter Controls and Magnetos

The engine starter controls and magnetos allow you to start and sustain an engine, in combination with the mixture levers on the pedestal. The starter requires a single click and will remain in position while the engine starts. The engine selector and magneto switches need to be turned clockwise to increase the selection, or anti-clockwise to decrease the selection.

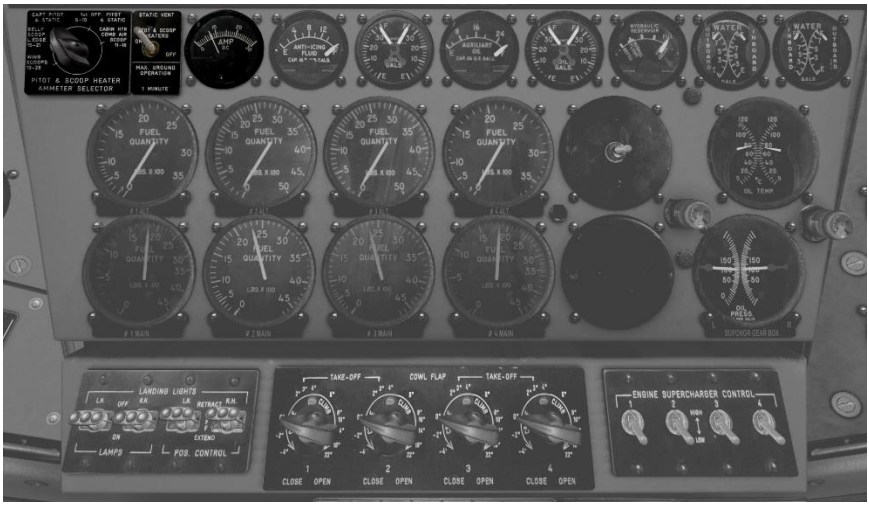
Passenger Signs and Call Buttons

The passenger signs switches allow you to illuminate the signs in the cabin corresponding with the requirement to refrain from smoking, or to wear a seat belt. The call buttons call the listed stations.



Pitot-Static Heat

The pitot-static heat provides heat to the pitot-static system to avoid the ports becoming iced over. This system should not be used for extended periods while on the ground.



Upper Overhead

Water Injection Pumps

Water injection pumps provide the engine with a water-alcohol solution to decrease engine temperatures at high manifold pressures to avoid detonation during for example a WET take-off.

Oil Dilution

Oil dilution should be used at any time a cold start is expected on the next leg. Refer to DC-6 POH Section VII for more info on extreme weather operation.

3RD Crew Member Map Light

This light will illuminate the area above the flight engineer. Use left click + drag or mouse scroll up/down to adjust.

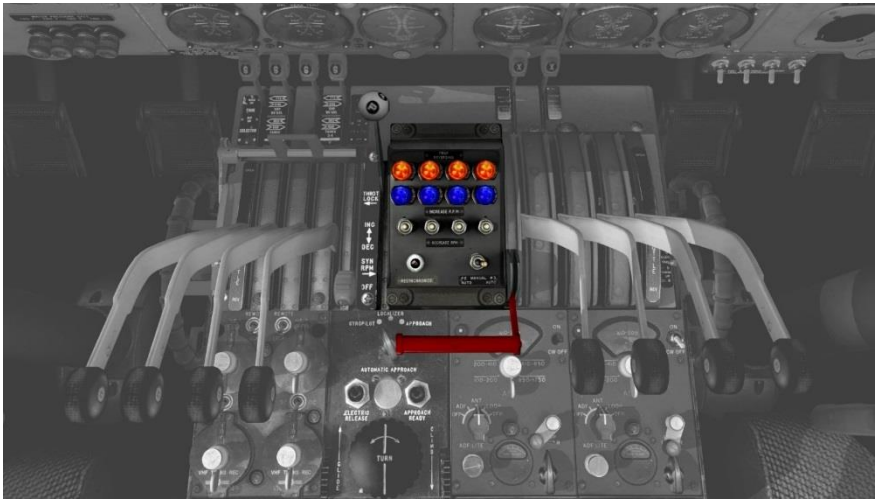
Pedestal – Upper

Throttle Levers

The throttle levers adjust the amount of fuel provided to the engine. The red bar at the top left of the image is the gust lock throttle interlock, which prevents the application of full thrust while the gust lock is engaged. It can be slid left and right using mouse clicks. This allows the crew to run up the left and right engines while the gust lock is still engaged. For more on the interlock and engine ground runs, see the DC-6 OPERATION MANUAL. The red lever between the captain and first officer throttle levers is a throttle lock, which operates with a single click to change it between ON and OFF.

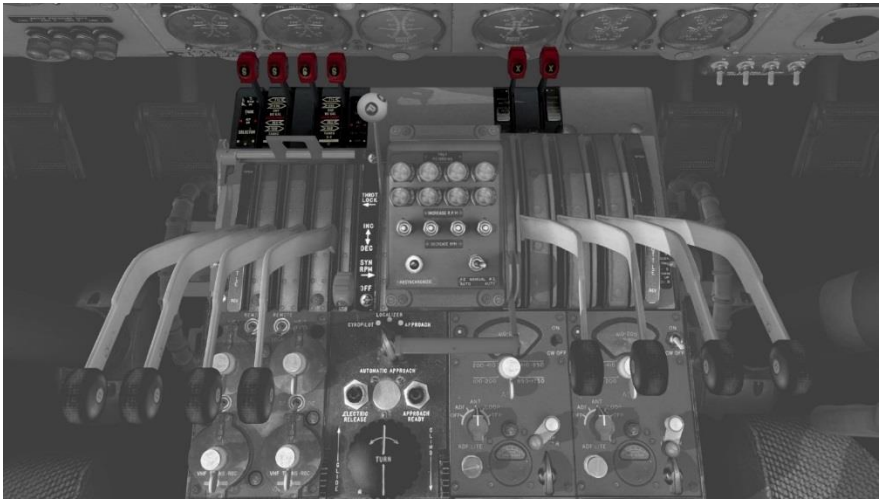
RPM Controls

Unlike many aircraft you may be used to, the RPM of all of the engines is controlled with a single prop control, which is on the left side of the highlighted area in the image, marked with 'P'. The RPM can also be resynchronized with a single click of the RESYNCHRONIZE button. Note that the PROP REVERSE bar is in the REVERSE position to show the RESYNCHRONIZE and slave switch. Single click it to toggle between NORMAL and REVERSE positions, though we suggest setting up a hardware button. It is tied to the default "water rudder up/down" command in the sim.



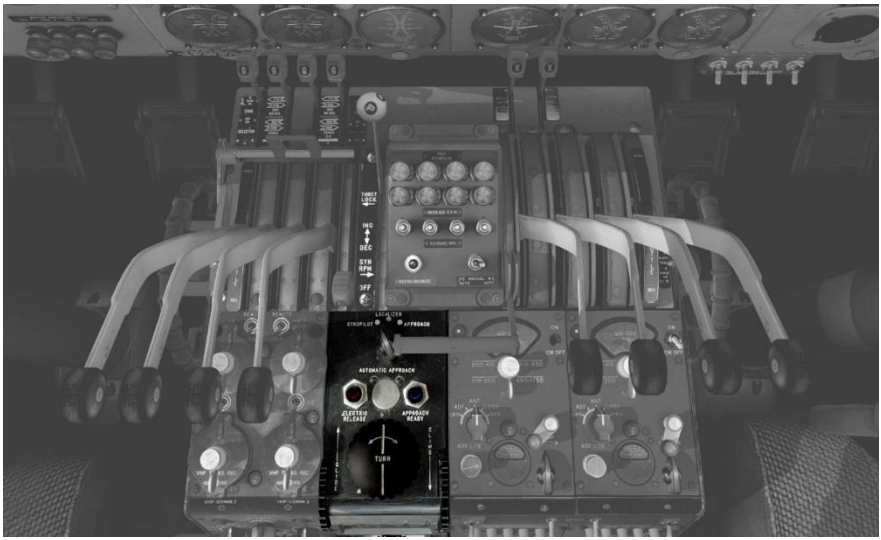
Fuel Tank and Crossfeed Selectors

Four levers at the top left of the pedestal allow for the selection between the four MAIN tanks and four ALTERNATE tanks. Two levers at the top right allow for the selection of different CROSSFEED settings: OFF, ENG 1-2 and ENG 3-4, and ALL ENG TO CROSSFEED. See Page 56 of the DC-6 OPERATION MANUAL for a graphic on fuel management.



Sperry A-12 Autopilot Control

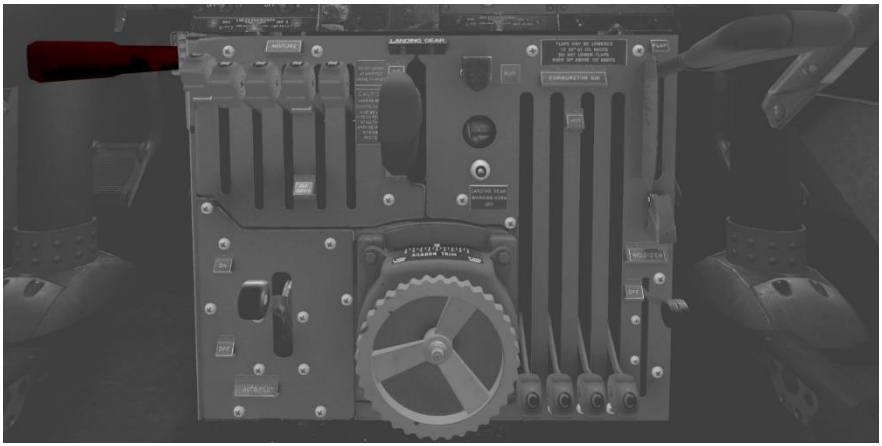
The Sperry A-12 Autopilot Control provides basic autopilot controls for the aircraft. They are nowhere near as advanced as the functions of today but are indispensable when operating the DC-6. The pilot switch, mounted on the aft face of the controller, provides a means of controlling power to the functions of the autopilot. A three-position switch at the top allows the selection of GYROPILOT, used for normal automatic flight; LOCALIZER, used to permit automatic yaw correction on the localizer beam (or a VOR); and APPROACH, which is used to make the final letdown. The turn control knob, located on the top of the pedestal controller, produces coordinated turns of the airplane at any airspeed. The turn control knob must be in the centered position – marked by a detent and by a white fore-and-aft line – before engaging the automatic pilot. The round metal plate above the turn control knob can be clicked to center the knob.



Pedestal – Lower

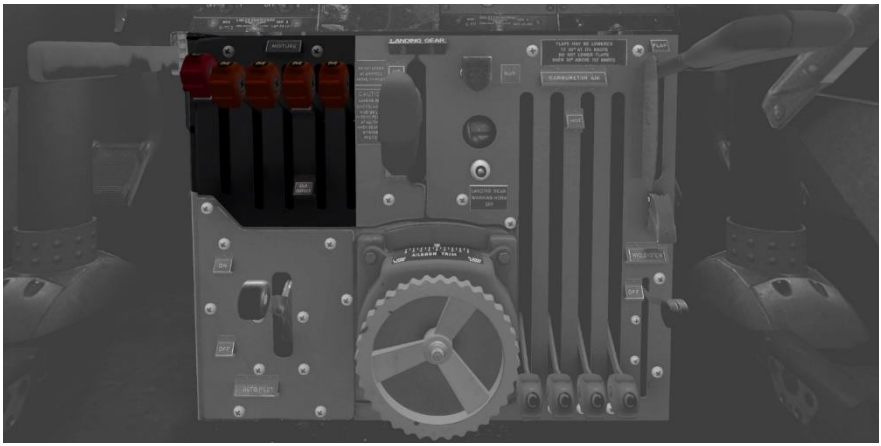
Gust Lock

The gust lock will lock all control surfaces and will also prevent the application of full thrust on at least two of the four engines, depending on where the throttle interlock is positioned. The interlock allows for engine run ups with the gust lock being engaged. For more information on the throttle interlock and engine runs on the ground, see the DC-6 OPERATION MANUAL. Single click the large part of the gust lock to ENGAGE or DISENGAGE it.



Mixture Levers and Mixture Lock

The mixture levers adjust the fuel to air mixture delivered to the engine. The mixture levers on this aircraft only have three positions: AUTO RICH, AUTO LEAN, and OFF. Right click the four mixture levers to bring them from IDLE CUTOFF through the AUTO LEAN and AUTO RICH positions, and left click for the opposite motion. A simple click on the mixture lock will move it between LOCKED and UNLOCKED positions.



Landing Gear Lever

When the landing gear lever has been raised, move it to the NEUTRAL position to depressurize the hydraulics to the gear. When you are ready to lower the gear, move the lever to the UP position prior to moving it to the DOWN position. If you are using the AFE, you will also hear the crew calling "Up and Down" when commanding the landing gear item of the checklist.

Carburetor Heat

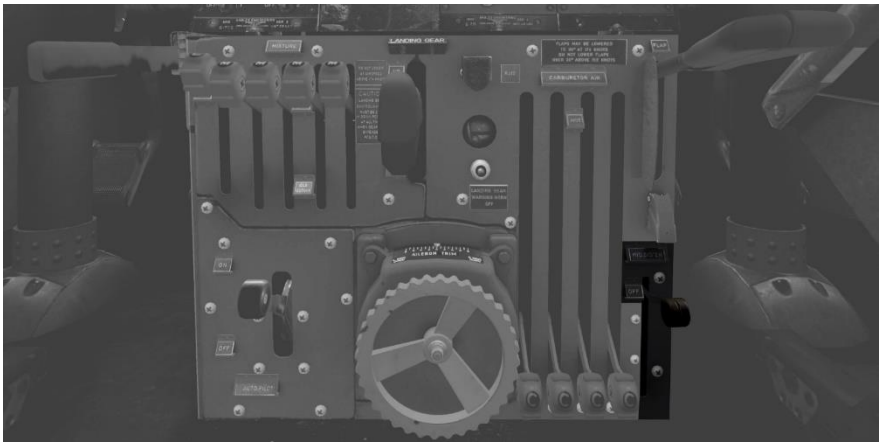
Carburetor heat is used to prevent ice accumulation in the carburetors. Carb heat will only be required when the airplane enters visible moisture and when the carburetor temperature is in the yellow band. The carb heat levers are moved up and down using left click + drag or mouse scroll up/down.

Flaps

Flaps are used both to add lift and, at higher settings, drag. See the DC-6 OPERATION MANUAL p. 47 for more information on wing flap control and recommended settings.

Hydraulic System Bypass

The hydraulic system bypass is used to bypass the flaps and gear to reduce wear on both the pressure regulator and the engine-driven pumps when pressure to the various units are not desired during flight. Click the lever to toggle the system on (down) or off (up).

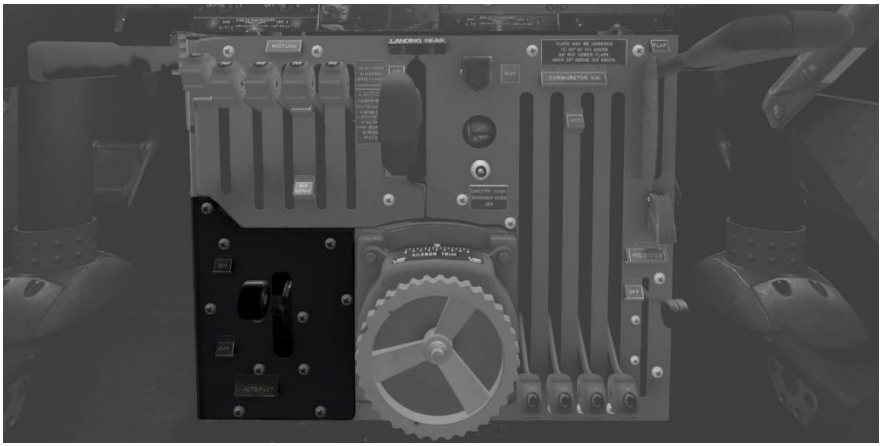


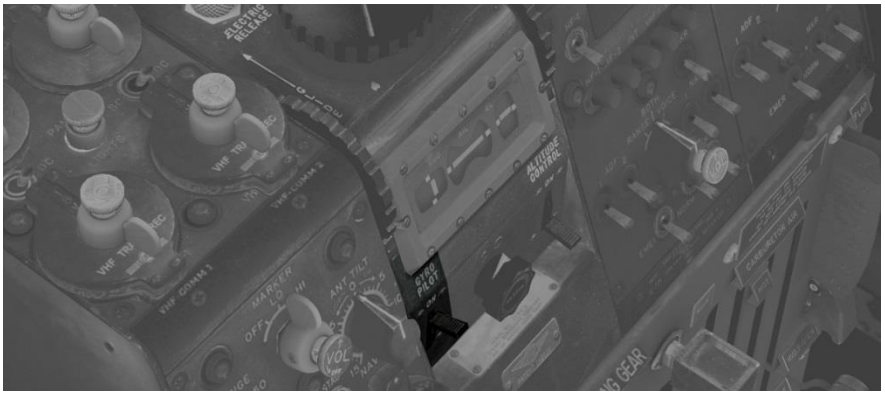
Aileron Trim

Aileron trim allows you to relieve any lateral pressure on the yoke. If you are having to hold the yoke to the left, you can add left aileron trim to cancel this aerodynamic force out. Use left click + drag or mouse scroll up/down to adjust aileron trim.

Autopilot Mechanical Disconnect

The Autopilot Mechanical Disconnect lever has two positions: ON (up) and OFF (down). Click the lever to toggle it between the two positions. In the DC-6 the autopilot on/off switch is called the Gyropilot Switch, and it is located on the rear of the **Sperry A-12 Autopilot Control**. This switch must be turned on prior to the Autopilot Mechanical Disconnect lever being placed in the ON position, else the gyropilot will not function.





Custom Key Commands

The following are the simulator commands that the DC-6 monitors to control its various functions. If you assign key commands or hardware buttons to the default sim functions listed below, you will be able to control the function associated with it:

- Autopilot ON/OFF
    - Default Sim Command: Z
    - DC-6 Function:
      Realistic AP Engage OFF: Toggle Gyropilot ON/OFF and AP Mechanical Disconnect lever ON/OFF
      Realistic AP Engage ON: Toggle AP Mechanical Disconnect lever ON/OFF Only
- Autopilot Localizer Hold:
    - Default Sim Command: CTRL+O
    - DC-6 Function: Autopilot mode rotary to Localizer
- Autopilot Approach Mode:
    - Default Sim Command: CTRL+A
    - DC-6 Function: Autopilot mode rotary to Approach
- Autopilot Heading Mode:
    - Default Sim Command: CTRL+H
    - DC-6 Function: Autopilot mode rotary to Gyropilot
- Propeller Increase/Decrease RPM:
    - Default Sim Command: CTRL+F3 / CTRL+F2
    - DC-6 Function: Increase/Decrease Prop RPM Lever Position

- Water Rudder:
    - Default Sim Command: CTRL+W
    - DC-6 Function: Enable propeller reverse

Assigning a hardware button to all of these functions through the default simulator controls menu is also possible, and highly recommended.