



PMDG 737



Introduction and Use

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INTRODUCTION

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THE TESTING TEAM

We take great pride on the cohesion and dedication of our testing team members, and we place significant demands on their time, their expertise and occasionally their patience.

We would like to thank the following individuals for their contributions to the PMDG 737 project as Technical Advisors:

Emanuel Hagen
Omar Josef
Tom Landry
Ryan Syferd

We would also like to thank our dedicated team of wide beta testers who have worked tirelessly to help us improve the quality of this product. Any lapses are ours:

Allan Burek
Carl Avari-Cooper
Charles Harris
Cristian Caicedo
Dan Downs
Douglas Morlan
Evangelos Dokos
Evangelos Kagklis
George Morris
Johan Ketting
Jorge H. Moya

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Michael Codd
Mike Roth
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Steve Perry
Stirling Day
Sven Kubusch



PMDG TECHNICAL SUPPORT

PMDG employs a ticket-based support system that allows us to provide you with direct, personal attention from a tech support analyst. If you have trouble with this product, we encourage you to visit our technical support portal:

<http://support.pmdg.com>

Our policy on answering support tickets is that you should receive a reply from us within 24-48 hours, depending on the type of request you submit.

Our average reply time to tickets is generally less than 6 hours and our support team is dedicated to getting you up and running as quickly as possible.

Please Note: The support ticket system will require you to create a login that is unique to the ticket system and is not tied to your PMDG Store login.



IMPORTANT – READ THIS PAGE

- Product activation instructions can be found on page 15 of this document.
- Liveries are downloaded and installed via the PMDG Operations Center v2 application, which is installed automatically with the PMDG 737. You can find it in your Start Menu under PMDG Operations Center.

Note that an Operations Center update may be triggered the first time you run the application – this is normal and is required.

Detailed livery installation instructions can be found on page 18 of this document.

- Complete documentation for the aircraft including the tutorial flight that explains how to operate and fly it can be found in the **\pmdg-aircraft-737\Documentation** folder in your MSFS \Packages directory.
- Payload and Fuel loading as well as aircraft options selections are handled through the FMC directly by pressing MENU > FS ACTIONS, and then PMDG SETUP. There are no external load or fuel managers for this product. Do not modify payload or fuel with any other method than the FMC pages described above.



PRODUCT ACTIVATION

The PMDG 737 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:

MP3X-XXXX-XXXX-XXXX-XXXX

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



HOW TO USE THE MANUALS

When you install the **PMDG 737**, several documents are provided. We recommend that you study and use the following two operational documents:

- PMDG 737 Introduction (You are reading it now!)
- PMDG 737 Tutorial Flight

This can seem like an intimidating amount of information, but the point that we want to make most clearly is that *if you can fly the default MSFS airplanes, you can fly the PMDG 737!*

We have created a truly scalable experience for simmers who love the 737. If you want to just push up the throttles and fly, you can do this. If you want to dive as deeply into the details as a career airline pilot, you can do this also. The simulation will support you no matter what your goal is for any simming session!

Here is a quick rundown on how to get the most out of your manuals:

Introduction:

We have put this document together to collect as much information as possible in one place about how to use the PMDG 737.

This introduction will give you some tips on how to set up MSFS for optimal performance with the PMDG 737 and it will explain the different Mouse Interaction types available in the PMDG 737.

The introduction document will also show you how to use the in-sim capabilities to change your cockpit layout, cockpit displays, the visual appearance of the external model, as well as the use of mechanical reliability, failures, ground services and pushback capabilities.

This document includes a list of “fun to know” quirks that experienced 737 pilots will recognize within the simulation. We thought you’d like to know just how detailed we have made your new PMDG 737.



INTRODUCTION

Tutorial Flight:

To help new users get acclimated to the capabilities of the PMDG 737, we have created a tutorial to get you up and running quickly.

The tutorial should be viewed as a “Quick-Start Guide” that will take you from loading the sim to launching off on your first flight in the PMDG 737.

The purpose of this flight is to keep things simple and straight forward, thus giving you the opportunity to enjoy all that the simulation has to offer without getting lost in the details! It is a great way to familiarize yourself with the airplane, and it will give you good sense of what flight crews experience when flying this magnificent piece of machinery.

The tutorial will start you in a powered-up and ready-to-go 737-700 at **KPDX – Portland**, just west of the famed Cascades. You will follow along step by step and eventually find yourself parked at **KSFO – San Francisco** nestled between the San Francisco Bay and the Pacific Ocean with your passengers deplaning!



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 737.

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

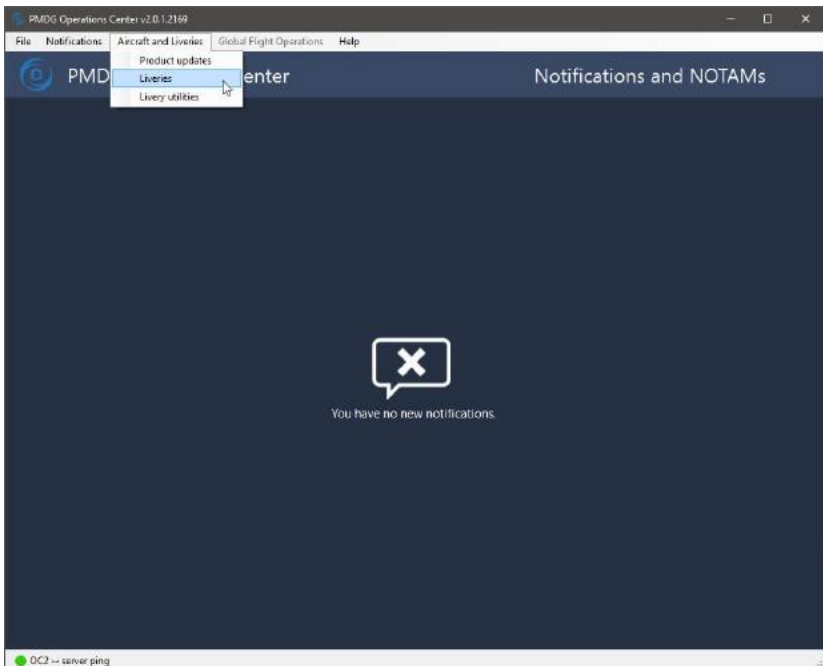
Alternatively, OC2 can be found here:

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

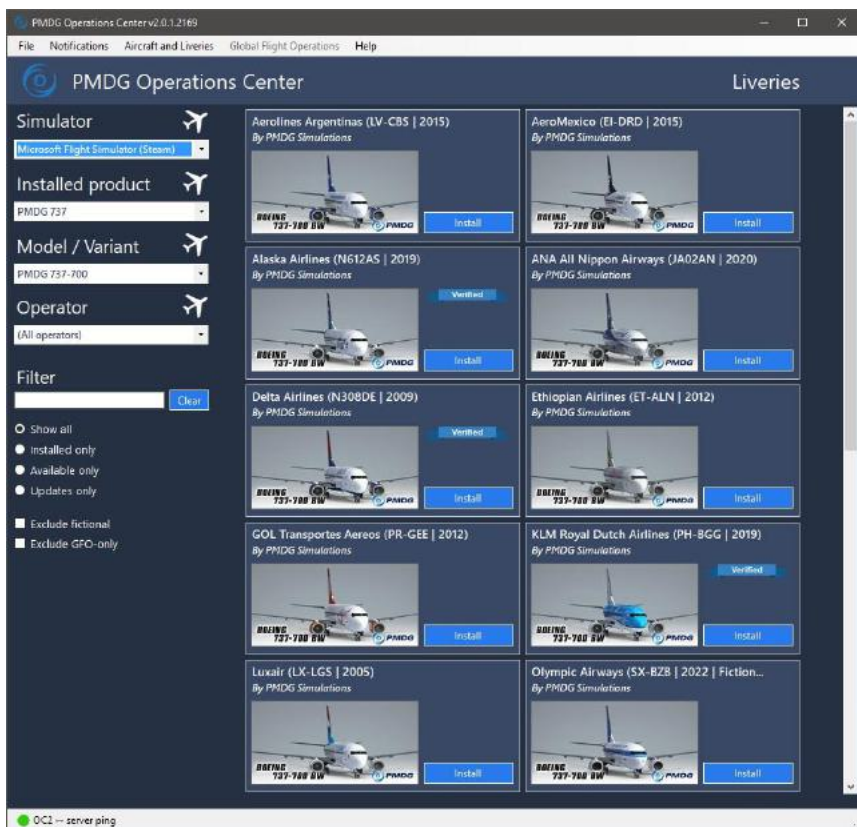
Once you have OC2 open, navigate to the 'Aircraft and Liveries' menu, and from there, select 'Liveries' in the dropdown:





INTRODUCTION

The 'Liveries' screen will open:



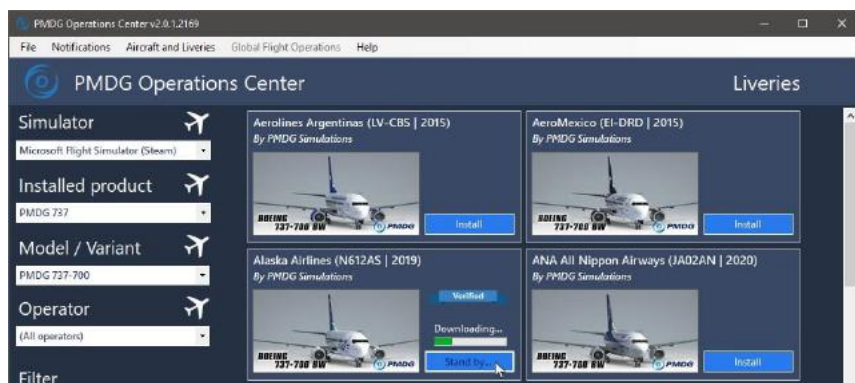
In the menu to the left, choose, from top to bottom:

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 737 is selected.
3. **Model/Variant** — Select the -700, -700BBJ or -700BDSF
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.

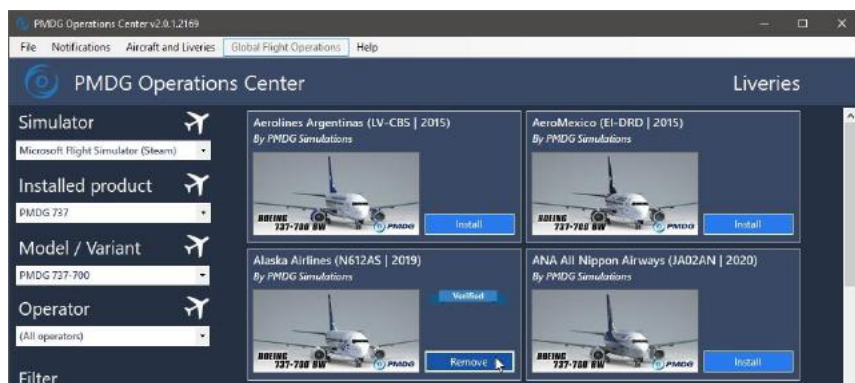


Once you have made your Simulator, Product and Model/Variant selections, and have decided which livery to install, click on the 'Install' button next to the livery you want installed.

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.



INTRODUCTION

SETTING UP THE PMDG 737 IN MSFS

Types of Mouse Interaction

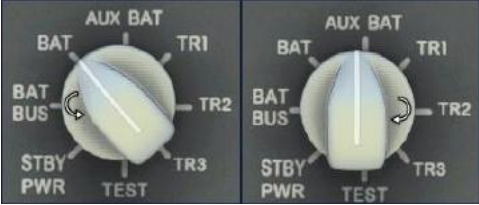
We have implemented two types of mouse interaction in the NG3:

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:

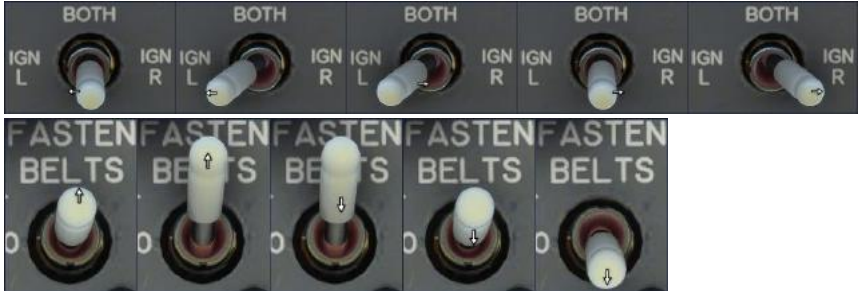
LEFT AND RIGHT TURN ARROW CURSORS



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 move 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.



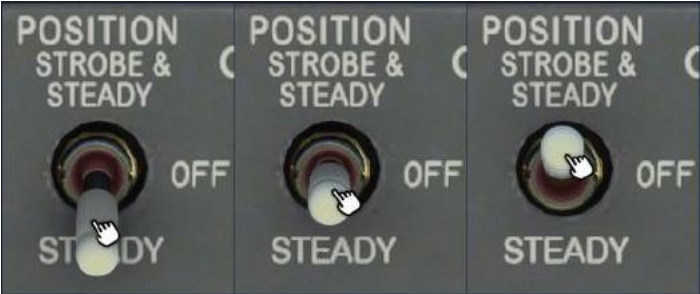
INTRODUCTION

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.

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.



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-737\Documentation

MS Store distribution:

<MSFS root directory>\Community\pmdg-aircraft-737\Documentation

In this folder you will find a PDF:

PMDG_737_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 before the new selection will become active. You do not need to return to the Main Menu – just hit 'ESCAPE' and then 'HOME' to restart your flight, after which your new selection will be active.*

INTRODUCTION

Setting Up the Cockpit Camera

To use PMDG Type interaction, you need to re-assign the following:

- 1) ‘TOGGLE COCKPIT VIEW FREELOOK (HOLD)’ in the MOUSE → CAMERA → COCKPIT CAMERA options.
- 2) ‘TOGGLE INSTRUMENTS VIEW FREELOOK (HOLD)’ in the MOUSE → CAMERA → INSTRUMENT VIEWS options.

^ CAMERA	
^ COCKPIT CAMERA	
ZOOM COCKPIT VIEW	MOUSE WHEEL UP
UNZOOM COCKPIT VIEW	MOUSE WHEEL DOWN
TOGGLE COCKPIT VIEW FREELOOK (HOLD)	MID-CLICK
COCKPIT LOOK UP (LOCKABLE)	AXIS Y-
COCKPIT LOOK RIGHT (LOCKABLE)	AXIS X+
COCKPIT LOOK LEFT (LOCKABLE)	AXIS X-
COCKPIT LOOK DOWN (LOCKABLE)	AXIS Y+
v EXTERNAL CAMERA	
VR - COCKPIT FOCUS	
^ INSTRUMENT VIEWS	
TOGGLE INSTRUMENTS VIEW FREELOOK (HOLD)	MID-CLICK

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

IMPORTANT: If you do not re-assign ‘Toggle Cockpit View Freeload (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.



During the development of the PMDG 737 we recorded more than 1,400 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 737 sounds as follows:

1. **Aircraft Engines** — Engine sounds.
2. **Cockpit** — All switch, lever, knob and cockpit (panel) sounds.
3. **Environment** — All rattle, ground roll and wind sounds.
4. **Warnings** — All CAWS sounds



If you are not hearing the engine sounds, make sure you do not have HEADPHONE SIMULATION set to ON. In order to hear the majestic sounds of the PMDG 737, go ahead and make sure this setting is set to OFF:



For an optimal 737 sound experience, ensure that this is turned OFF.





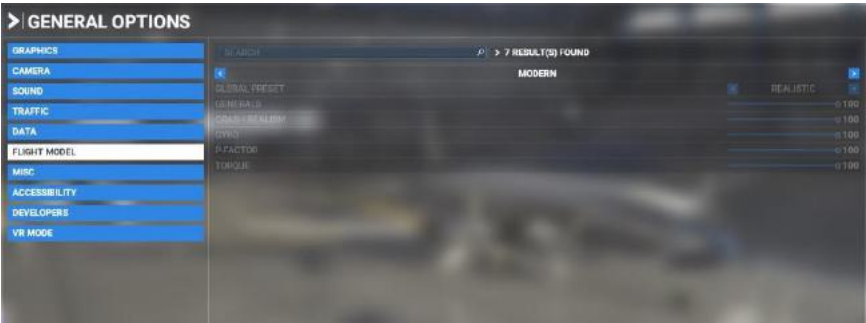
INTRODUCTION

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 PMDG 737 from a realism perspective:

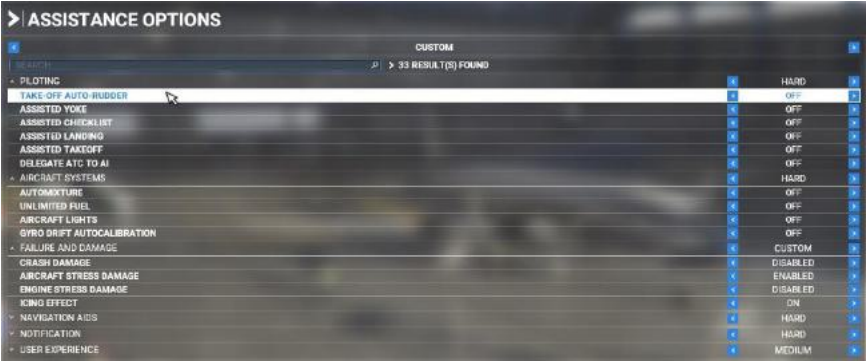
Flight Model

You must use the ‘Modern’ flight model, as the PMDG 737 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.



Take-Off Auto Rudder

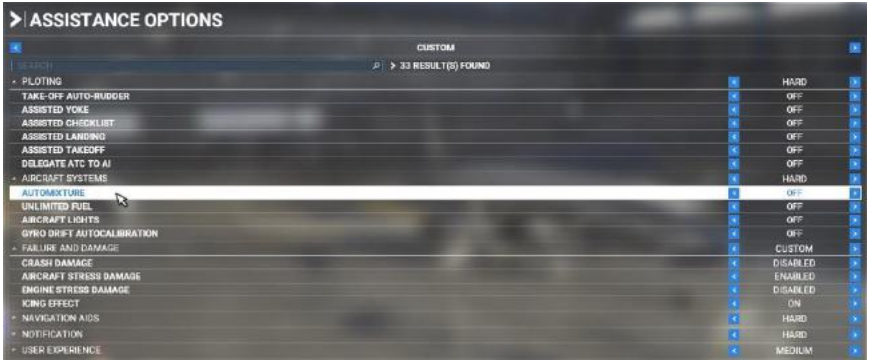
We recommend that you set Take-Off Auto Rudder to OFF:





Automixture

We recommend that you set Automixture to OFF:



Having Automixture set to ON could possibly interfere with the airplane's operation, leading to a sub-optimal experience.

Assisted Takeoff

We recommend that you set Assisted Takeoff to OFF:



Should this setting be left ON, you will notice the engines redlining during rotation as well as pushback.



INTRODUCTION

Other Important Settings

Key command to ARM SPOILERS

We recommend that you assign a key command to ARM the spoilers, otherwise you will not be able to arm them for landing without having to look and find the spoiler ARM position in the cockpit.

- FLIGHT CONTROL SURFACES		
- SECONDARY CONTROL SURFACES		
TOGGLE SPOILERS	NUM 7	
TOGGLE ARM SPOILERS	RIGHT SHIFT + /	
SPOILERS AXIS (0 TO 100%)		
SPOILERS AXIS		
SET AUTO SPOILERS ARMING		
RETRACT SPOILERS		
EXTEND SPOILERS		
DISARM AUTO SPOILERS		
ARM AUTO SPOILERS		

We suggest using RIGHT SHIFT + / for this key command.

Key commands for PAUSE ON and PAUSE OFF

We recommend that you make sure that key commands are assigned to set PAUSE ON and PAUSE OFF.

PAUSE ON pauses the sim, but it will not un-pause the sim when you want to continue flying.

You therefore need to make sure that PAUSE OFF is assigned to a key command, which will un-pause the sim and allow you to continue your flight.

If these key commands are not correctly assigned, you will be stuck and unable to continue/un-pause the sim (PAUSE OFF) if you use our 'Pause at Top of Descent' feature.

- MISCELLANEOUS		
SET PAUSE ON	RIGHT CTRL + P	
SET PAUSE OFF	RIGHT SHIFT + P	



THE PMDG 737 DIDN'T DO WHAT YOU EXPECTED?

Here is a collection of items and features that we saw during development and testing that we think might be likely to trip you up:

The plane is behaving erratically:

Over the years, many developers have gone to great lengths to add realism into the sim. The tools are wide ranging but can negatively impact the aircraft in just as many ways. Certain camera add-ons move the viewpoint to simulate turbulence/breathing/vibration, which can look like the aircraft behaving oddly, while others inject motion into the air. Other programs inject weather in odd ways, which can cause the aircraft to behave erratically, or perform poorly. When you are flying the aircraft and notice any odd behavior, it is best to try flying without one of those programs to narrow down the cause. From there, you can usually find a setting in the other program to help eliminate the issue.

I can't load full fuel:

The density of fuel will vary slightly, depending on where you are in the world. (Fuel Density is essentially the mass of a gallon or liter of fuel. This value is defined by industry standards and varies depending upon where the fuel was extracted, where it was refined and its temperature at time of boarding. None of this is important to you UNTIL you get fuel that is low density (6.4lbs/gal, say) and very warm. Suddenly you may find that you cannot load the desired fuel weight aboard the airplane because the tanks have a limited volume.

This has been modeled in the PMDG 737.

When you are boarding fuel, you can tell if your fuel density will prevent full weight of the tanks from being usable by looking at the density figure shown on the refueling page. In this case the density will be shown with the density value in reverse video (or a bright background behind the text). If you are in a place with poor fuel density, such as China on a hot day in August, you may not be able to get the full advertised range of the aircraft. Something to consider when planning flights!

In the 747 or 777 it worked like this....:

One thing the Beta team consistently noted was that the PMDG 737 is definitely not what you have become accustomed to with the PMDG 747 Queen of the Skies II or PMDG 777. While there are many similarities in that they are both Boeings, the differences between them are numerous



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enough that you will want to be wary of preconceived notions carried over from your earlier experiences with other aircraft. As an example, you may be in for a rude surprise if you are used to how the 777 will automatically configure the GENs, and then turn either the APU or engines off without verifying which source you are using.

When I engage the autopilot, sometimes it reverts to CWS R or CWS P instead of CMD. Why?

If the AFDS senses pressure on the flight controls, it might not engage, instead going into Control Wheel Steering mode (similar to Fly by Wire pitch/roll management). This is a type of reversion. CWS reversion from CMD mode takes 21 pounds of force on the column or 10 pounds of force on the control wheel. (That's the CWS HI detent value. CWS LO detent is 5 and 3 pounds, respectively.) Either of these will trigger the reversion on engagement. If you are not putting physical pressure on your hardware, check to ensure that it is calibrated. There is also a setting in the OPTIONS menu that allows you to have the simulation ignore your hardware while the AP is engaged.

With electric trim, I can't move the trim all the way to the limit.

This is correct behavior. The stop position will vary slightly depending upon which of the airplane body types you are flying, but generally speaking you will lose the ability to trim nose down beyond about 4.0 ANU. It is worth noting that the trim limits are different when the flaps are UP as opposed to deployed as well. For simplicity, your limits are:

FLAPS DOWN: 0.05 - 14.5 (All variants) FLAPS UP

600 : 4.13 - 14.5

700 : 4.30 - 14.5

800 : 3.95 - 14.5 [some models 4.00, some models 4.05]

900 : 3.90 - 14.5

I turned the battery on, but the plane has no power:

The PMDG 737 manages power draw to ensure it has the necessary functions at all times. The aircraft is only giving you about enough power to start the APU or connect ground power. Once either one of those power sources comes online, the rest of airplane will come to life.

How can I operate the manual gear unlock?

In some cases, we have had to improvise a bit in order to give you the ability to test/operate items that normally require two button presses or



two hands. In the case of the manual gear unlock, press the click spot on the lock for 2 seconds and it will simulate the operation that normally requires two hands.

I see CUTBACK when setting up the FMS. What does this do?

Cutback is an automatically managed noise abatement process for the NG airplane. CUTBACK will reduce thrust at CUTBACK altitude and up to the RESTORE to a calculated N1. The calculated N1 is such that at entered V2+20, at restore altitude, present environmental conditions and current weight the aircraft in engine out configuration can maintain a specific (small) climb gradient. Accordingly, weight and V2 must at minimum be entered otherwise the (rather lengthy) iterative calculation for CUTBACK N1 cannot proceed. Turns out that this N1 value is rather small and thus you have a reduced sound footprint. If your V2 is deleted the FMC will cancel CUTBACK (with a warning). If calculated N1 for cutback is excessive then you will also see a warning.

My APU is on, but I can't start engine #2:

The isolation valve is usually set to AUTO. By default, AUTO does not allow air from the #1 side to cross over to the #2 side. The APU feeds into the #1 side, so the isolation valve needs to be set specifically to ON for engine start and returned to AUTO when running the after-start checklist.

I turned off the autopilot, but I can't silence the alarm:

You need to press the autopilot disconnect button on your joystick (or the Z key) twice in order to silence the alarm. Make the first press, wait a second or two and then press it again. If you double-press too fast, it won't silence. Always use the disconnect button, don't use the disconnect "bar" on the MCP – you'll have the siren constantly going off if you do.

How do I save my route?

You must have a valid route entered and activated first and you must be on the ground. Then, go to the RTE page 1, and press LSK 4L < ROUTE SAVE. This lights the EXEC button. If you press it now, it will give the file an automatically generated name. You can also type a custom name into the scratch pad, and it will save the route under that name. The .rte files are saved to \pmdg-aircraft-737\work\Flightplans.

Why are my tire rims orange?

The PMDG 737 realistically models brake heating. If you are seeing the brakes glowing orange, you've overused them. They will not be as



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effective (or effective at all) in this state and if the heat increases further, you run the risk of fire and blowing tires.

You can cool the brakes this by bringing up the CDU and going to MENU/FS ACTIONS/GROUND MAINTENANCE, hit NEXT PAGE, then select COOL BRAKES at LSK 1L.

My [insert passenger/VA program here] is flagging me for excessive V/S:

A common misconception is that passengers are sensitive to vertical speed when they are not. The only difference that the passengers would note would be that their ears were popping more frequently. The departure profile is flown in a pitch-for-speed mode, where you set the throttles on the particular throttle limit and hold speed through aircraft pitch. At lighter weights, these pitch angles may be considerable. In order to reign in some of the thrust for lower pitch and vertical speed, derates may be used.

I cannot get TO/GA to activate:

Make sure that you have BOTH flight directors active. If the flight directors are off the A/T (autothrottle) will command the throttles to the current N1 setting.

I couldn't get LNAV to arm/engage:

LNAV has some specific parameters that must be met for it to arm/engage. These are:

- To arm LNAV while on the ground: The first waypoint in your flight plan must be within 5 degrees of the departure runway course.
- To arm LNAV in flight: Requires a valid interception point for active leg, interception angle less than 90 degrees OR within 3 miles cross tracks error OR within 3 miles from active. LNAV will stay armed until interception.

The bank limiter isn't working as I expected in LNAV:

LNAV uses its own auto-bank limit when turning to follow the LNAV course. It will use a maximum of 25 degrees unless in approach mode or in holding.

***The mouse wheel isn't working on certain knobs:***

There is no mouse-wheel operation on the bank limiter, BARO or MINS knobs: they were made operable only with left/right mouse clicks on purpose to save you from accidentally triggering them while spinning their inner knobs with your mouse-wheel.

I get a NAV DATA OUT OF DATE message on the CDU:

The navigation data included with the PMDG 737 is provided by Navigraph and up to date at the time of release. (November 2019, the AIRAC 1911 cycle) After this cycle expires in early December 2019, you will have to upgrade for a small fee if you wish to maintain up to date real world navigation data.

This data can be purchased here:

<http://www.navigraph.com/FmsData.aspx>

If you don't care about having current data and just want to remove the NAV DATA OUT OF DATE message, you can open the file `fmc_ident.txt`, located at `<MSFS root> \Packages\pmdg-aircraft-737\work\NavData` and edit the third line - `OpProgram= JAN05FEB01/19-` to read a different date range that will not trigger the message.

I see a large mass of TCAS targets on the ND around an airport on the ground:

This is caused by the way vehicles are simulated in ground support addons like GSX and AES (they're "aircraft" objects virtually). This should not occur unless you have increased the TCAS range settings in the options beyond what is realistic.

I have service based failures on but nothing ever happens:

Modern jet aircraft are extremely reliable, and most airline pilots will go through their entire careers without having a serious failure incident on their airplane. The data that the service based failures feature was created with reflects this – these are rare events.

We recognize however that most simmers probably don't have a lifetime to spend waiting for that one-in-ten-million engine failure at V1, so to improve upon the original way this feature was implemented in the PMDG 737, we've created a rate multiplier function that will essentially accelerate the aging of the various parts on the aircraft to give you failures more frequently.



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To access this feature, bring up the CDU and then press MENU, then PMDG SETUP, then AIRCRAFT, then FAILURES. Select the ALL SYSTEMS page at LSK 2L:

When service-based failures are enabled, the RATE field at LSK 3R allows entry of any number from 1 to 1024. This will accelerate the aircraft's aging and you should see more frequent failures in terms of real usage time.

Some annunciator lights fade in/out instead of instant on/off:

In the case of certain lights slowly fading in/out versus illuminating instantly or going out instantly, such as the MCP command and warning lights, this is due to TAA rendering in MSFS. It's a super high quality anti-aliasing but comes at the expense of slow refresh rate on emissive and/or transparent objects such as the MCP lights. Another example is if you look at the sheepskin seat cushion and move the arm rest up and down, you see this slow refreshing artifact.

Using DLAA rendering as opposed to TAA eliminates the issue but then you have weird rendering artifacts on transparent objects and a rougher anti-aliasing on edges.

According to Asobo DLAA will be drastically improved with the introduction of native DX12 implementation in a future sim update. For the moment we suggest that you choose what works best for you – if you are OK with these lights fading in/out, TAA will give you a better-quality experience all round. Otherwise, you can choose to use DLAA, where the lights will instantaneous, but the penalty will somewhat lesser quality in your overall experience.

SHIFT + 3 Keyboard Shortcut Toggles Marker Beacon Sound:

It is, in some instance, possible that Shift+3 has two different assignments in MSFS by default:

1. View change in the cockpit
2. Marker Beacon volume knob ON/OFF on the ACP panel.

If you press Shift+3 to change the view, you will toggle the marker beacon volume on/off at the same time. We recommend that you reassign either the view change or marker beacon shortcut to another key to prevent this conflict.



Speed Brake (In)Effectiveness:

You will probably find the speed brake to be very ineffective. Despite Boeing's "The aircraft has a powerful speedbrake installed" (quote from the FCTM) this is not quite so.

The speed brake, especially at speeds slower than 250kt, is more of a massage of your back than an actual aid to slow down and expedite the descend.

At the minimum clean speed it adds as little as 300fpm to your rate of descend. Therefore careful energy management is required in order to get your 737 down.

If you really need to get down: Don't increase speed, but reduce it and get your flaps out. Those will greatly help with the descend.

Recommended settings to be used are:

- 220kt, Flaps 5, full speed brake
- 180kt, Flaps 10, full speed brake

NOTE: Flaps 10 can greatly help the rate of descend because it fully extends the leading edge flaps. However: This setting only makes sense when NOT flying a short field performance aircraft!

The Short Field Performance package will make the leading edge flaps extend fully only with landing flap settings and therefore SFP aircraft are much harder to slow down.

Trouble keeping your speed in VNAV? Try a DCT:

The 737's VNAV path is very dependant on correct wind entry.

Since forecast winds in the flightplan (and even in automated uplinks) in real life as well as in the simulator are rarely exactly what you'll actually see in the descend, there will necessarily be a mismatch between the VNAV calculated energy management and the actual energy the aircraft has at a certain point.

However there's a feature in the 737 FMC that can help you out:



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When you are following the VNAV path (VNAV PATH mode on the FMA) and the target speed is getting more than around 10kts off the magenta bug, you can do the following:

Take the upmost waypoint of the LEGS page (the waypoint you're currently flying to), copy that into the scratchpad and enter it again on top of the legs page.

This will create a direct to that point. Execute this.

The aircraft will not change its path, however it will recalculate its VNAV path using the actual wind experienced at the altitude where the direct has been entered. This will greatly enhance the accuracy of your VNAV path.

Now it will show you if you are high or low and you can react accordingly. Use the speed brake if you're high (or start slowing down to get your flaps out) or use thrust if you're low.

The magenta target altitude setting on the PFD lagging:

You may notice the magenta target altitude setting on the PFD lagging behind the MCP selected altitude.

This is in fact a feature and not a bug and it does resemble the real aircrafts behavior.

The mouse click areas are very small:

If you find that the mouse click areas in the virtual cockpit are very small, it means that you have lens correction turned on. This is a known issue in the simulator.

We recommend that you turn lens correction off here:

GENERAL OPTIONS->GRAPHICS->LENS CORRECTION

First Time Load After Install May Have Unexpected Problems:

We recommend that you end the flight and close MSFS after having loaded the airplane for the first time after you've installed it.

Restart MSFS and load the aircraft a second and subsequent time to ensure that all parts and pieces of the code are working as expected. Common problems that may occur on the initial load include sound stutters and missing annunciations, amongst others.

***The Parking Brake Does Not Engage:***

To set the parking brake, you must FIRST apply full brake then set the parking brake latch on the pedestal. The red light will illuminate, and the latch will be locked in place.

To release the parking brake, you must apply full brake pressure. If you are using keyboard for the brakes you need to press the brake key for 2-3 seconds.

NOTE: If you set the Neutrality slider in MSFS' sensitivity options to -45%, the brake latch won't engage.

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DETAILS AND QUIRKS OF THE PMDG 737

During the design and development of PMDG products, we integrate input from numerous experts and users of the aircraft. This combined with our detailed research and design process allows us to add behaviors, quirks and nuances to our simulations that add a true flavor of realism to the simulation.

These behaviors are the kinds of items that an experienced 737 pilot or maintenance technician will see and recognize them as hallmarks of a truly detailed simulation product.

The following behaviors are a non-conclusive list of behaviors that you will find in the PMDG 737 that are simulated precisely as they appear in the actual airplane:

Air Conditioning System:

- You may think that these temperature readings on the air conditioning gauge are a result of a simple simulation, where you set a target temperature and then simply modify the zones temperatures to eventually achieve this figure over some time. There has been always a lot more to it in all our products, simulating the whole flow path of air from engine bleed to air compressor to the mix manifold to trim air ducts etc., with all valves along the way fully simulated. What is new in the PMDG 737 is the temperature simulation of individual zones based on a detailed heat exchange model that considers thermal loads such as:
 - o Electric loads (e.g., operating display screens and dome/floods lighting in the cockpit, cabin lighting)
 - o Supplementary heating sources (footer/shoulder heaters & windshield air)
 - o Number of passengers on board and distribution to zones
 - o Solar heat (areas of windows in each zone, time of day, current cloud coverage)
 - o State of doors
 - o Interaction conductivity of different aircraft compartments (cabin, cargo bays etc.) with exterior and between each other

Change the temperature selector at the top right of the overhead in different configurations to have a look.



Auto-flight System:

- The autopilot/flight director system on a modern airliner is a very precise instrument, but it is not foolproof. You may see the airplane vary slightly from the desired speed, track or altitude as the airplane works to manage energy in order to accomplish the path-defined goal. It will make decisions to turn slightly inside or outside of the path, accept a slightly fast or slow condition, or even pass through an altitude slightly in order to prevent exceeding acceleration limits or engine spool up/down capabilities.
- When you press a switch on the MCP, that mode may not engage instantly, but instead will exhibit a small time delay necessary to bring all the various components through their self-checks prior to actuating.

Cockpit Shaking Feature:

- Implemented first in the PMDG 747-400 Queen of the Skies II, this feature provides the feeling of shaking of the cockpit with the associated rattling sounds under various conditions:
 - o Ground roll
 - o Touch down
 - o Engine excessive vibration or failure
 - o In-flight turbulence
 - o Stall conditions (angle of attack)
 - o High speed buffeting
 - o Excessive g-force
 - o Speed brakes application

Doors:

- Most door warnings that you receive while on the ground will result from faulty, cluttered or obstructed sensors. While on the ground, cycling a door open/closed will usually cure the problem for you. If the problem does not clear, takeoff is inadvisable.
- Door warnings received in the air have potentially serious consequences. Follow checklist procedure carefully to avoid aircraft damage or loss of pressurization.
- If you allow GROUND OPERATIONS to run, the flight attendants will manage the cabin doors automatically, including the arming, disarming opening and closing of doors at the appropriate time.



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Electrical System:

- You can fail any bus on the airplane and suffer the appropriate penalties as equipment powered by that bus falls offline.
- The PMDG 737 has a live, real-time amperage consumption model. Every system on the airplane has its real-world electrical consumption tracked in real-time. Many items use only 0.005 amps, but the airplane has numerous electrical consumers, so load shedding behavior will vary depending upon what systems you have consuming power at the time load shedding occurs!
- Every piece of equipment on the airplane that uses electricity is correctly wired to its appropriate electrical sources. If you lose a DC bus, you might lose the switches that are powered by that DC bus, and thus lose interaction with the items those switches control. Something to think about if you are experiencing power failures.

Engines:

- If you have failures enabled, monitor your engine oil pressure/temperature, EGT and vibration readings regularly. Unhandled failures result in a cascade of other failures. For example, an engine oil leak will eventually trigger an electrical generator failure, an oil pressure failure and inevitably (in a probabilistic manner) result in increased vibration, fuel flow and finally complete engine seizure.
- Failures such as an ENG OVHT are dynamic, and will be triggered slightly differently each time, requiring that you follow the checklist to resolve them effectively.

Fire Controls – Engines:

- Bottles and Squibs are tracked. If you fire the bottle for one side, it won't work for the other side.
- Fire Bottle Squibs can and do fail to test. If this happens, you should catch it during the TEST function.
- Engine overheats may not necessarily result in the need to shut down an engine... but you will have to follow the procedure in the QRH to find out.

Flight Controls:

- Flap deployment speed is affected by the mode that the system is operating in. When the trailing edge flaps are moved using the



ALTERNATE flap system, they are EXTREMELY slow. And you lose access to the full range in some cases!

- Rudder control inputs are moderated by aerodynamic forces. Full rudder deflection in even moderate IAS is thus impossible. This Q-System model facilitates yaw stability and prevents inadvertent yaw induced roll. Nevertheless, rudder authority is sufficient to allow for runway alignment (de-crab) or even a sideslip (wing low) approach even at high cross winds.

Flight Management Computer:

- Unlike the FMC in the PMDG 747 and PMDG 777, the flap setting/Vref speed combination you select on the APPROACH REF page is a target speed. The airplane will automatically slow to this speed as you get closer to your destination.
- All speed restrictions in the 737 FMC are treated implicitly as at-or-below restrictions. For example, if you have a 300-knot restriction but your ECON descent speed is 275, the airplane will cross the restriction at 275, it will not speed up to 300.

NOTE: A message *[UNABLE 300 KT AT XXX]* will be issued unless the pilot explicitly enters 300B/ (300 knots at or below). During the descent, even if you set an AT speed (e.g., 300) that violates monotonic speed (or speed always decreasing), the FMC will ignore it, but provide a warning.

Fuel Density Model:

- Depending on where you are in the world, the fuel you take on board will vary in density. For most flights, this does not cause any issues, but in areas where the density is particularly low, you may find that the fuel will take up the capacity of the tanks without reaching the advertised weight values.
- When density is below the level where the tanks can take on a full fuel load (by weight), the density is displayed in reverse video.

Ground Friction Model:

Beginning back in 2016 with PMDG 747-400 Queen of the Skies II we have been included an enhanced ground friction model with PMDG's products. This model more accurately controls the relationship between the airplane, the runway surface, the wheels, tires and brakes. The airplane's inertial energy is constantly evaluated based upon a number of factors in order to provide a more realistic experience with taxiing, stopping and turning at low speeds. No longer is it necessary to taxi around



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using 50% thrust just to keep the airplane moving along the taxiway.

This enhanced physics model also provides for a more accurate single engine taxi experience for users who wish to simulate this real world procedure in place at some airlines.

Tiller Steering

Most large medium-to-large business jets as well as transport category aircraft use a steering tiller during movement on the ground. The operation of the tiller steering is not uniform across all aircraft types. Some aircraft have tillers that provide nose wheel steering only when an activating button is pushed while others provide steering input at all times if the tiller is displaced, much like the steering wheel of an automobile. Still others provide steering input via an always-on tiller and via rudder pedal inputs. The 737 (and indeed all Boeings) fit into this last group.

The 737 has an always-on steering tiller that is capable of controlling nosewheel steering through 78 degrees of displacement. This yields 75 degrees of actual turning effect when nosewheel slip is accounted for. In addition to this steering, the 737 pilot can utilize up to 7 degrees of nosewheel steering simply by displacing the rudder pedals like you would in any small GA airplane. This provides for a simple, precise method for maintaining centerline on long straight taxiways and also provides for exceptional crosswind input control during takeoff and landing.

The PMDG 737 allows you to select whether you wish to steer the airplane on the ground using only your rudder axis, or if you have two axes available, whether you want to simulate the dual steering inputs available via the tiller and rudder interlink. When you select RUDDER AXIS only, you will have full steering range available to you via your rudder pedals. When selecting a TILLER + RUDDER AXES, you will have 78 degrees of steering via the tiller and 7 deg of steering via your rudder axis.



Ground Service Vehicles:

- In addition to the static representation of ground connection carts seen in our previous versions the 737 now has dynamic animation of ground service vehicles:
 - o Ground power unit and external power pit
 - o Air conditioning and air start units driven in place by tractors
 - o Galley service & cabin cleaning trucks
 - o Mobile air stairs
 - o Cargo belts
 - o Fuel pump truck
 - o Lavatory, potable water, and maintenance vehicles.
- All these are fully integrated to the aircraft (doors/cargo bays will open in time, fuel truck will connect to under-wing refuel panel, etc.) and will become alive either under the Automatic Ground Operations feature or you can call any individual vehicle/service manually whenever you need it.

Hydraulic System:

- Violating operating limitations on pumps will cause the case drain fluid to overheat, resulting in an OVERHEAT warning.
- We have used realistic times for pumps to come online and drop offline.
- Engine Driven Pumps (EDP) turn if the engine is turning. The "pump switch" on the overhead is not actually turning the pump on or off. Instead, this switch controls a solenoid that cuts off fluid flow to the system respectively from the EDP. That solenoid is held in the closed (off) position by DC power, so loss of that associated DC bus will cause the solenoid to fail-open, thus allowing the EDP to provide pressure to fluid on that side of the airplane once again. This could be bad if you had that pump disconnected for a reason!
- Overheat sensors in the Electric Motor Driven Pumps (EMDPs) will trip pumps offline to protect them from overheat. It is important to note that these are different sensors (and different temperature ranges) than those that control the OVERHEAT lights- so even when the overheat LIGHTS go out, you still may not be able to activate the EMDP because for a while longer while it is still cooling.



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- EMDP cooling time will depend upon whether the pump is running, or whether the pump is OFF. (Should take approximately 5 minutes to cool to normal temps when running, but approximately 30 minutes when off because the fluid provides cooling to the pump. This of course will vary slightly, depending upon fluid temperature and wheel well temperature depending upon condition.)
- Hydraulic Quantity indication is affected by gear/flap/spoiler/flight control position, as well as thermal shrinking. You will notice changes in hydraulic quantity indicated during flight as you change the configuration of the airplane, set the parking brake, etc.
- Hydraulic quantity is displayed as measured to the standpipe within each reservoir. You may retain some pressure and functionality even when the system shows no quantity because there is fluid below the standpipe!

Landing Gear:

- Brakes are subject to Brake Temperature Soak. The brake temperature will climb for a period of time after heavy brake use.
- Wheel well fire warning can be triggered by sucking hot brakes up into the gear bay. Follow the checklist if you get a wheel well fire indication!
- You will notice that the volume of the gear-bay turbulence sound changes as the nose gear forward bay doors open and close during extension and retraction. This sound is entirely code controlled and dynamic, so if you lower the gear using the alternate extension, the turbulence noise will be louder on the flight deck than it is when those doors close as they normally do during extension.

Lighting Systems:

- The diagram used to determine the power source for every bulb on the flight deck takes up 165 standard sized print pages.

Physics-based Wing Flex:

- The wing now utilizes a fully physics-based wing flex model. The wings will sag while on the ground, depending on how much fuel is in them. While in flight, the wings will be lifted upward by the



amount of lift being generated but bent in a characteristic way under the weight of the aircraft.

- Environmental factors are also included in the calculations, so turbulence and gusts will also influence the wing flex behavior. As the wings react to these environmental factors, the engines and engine pylons will as well.

Pneumatic System:

- The bleed pressure produced by each engine is directly computed based upon bleed production of the engine for current RPM and appropriate combination of high- and low-pressure stages bleed air as controlled by the HPSOV (High Pressure Shut-off Valve), and the PRSOV (Pressure Regulating and Shut-off Valve). The logic of these two valves (condition to open/close, target pressure values to regulate, etc.) is simulated in detail, resulting in highly accurate bleed pressure production values for each engine.

Sounds:

- This package uses over 1400 digitally recorded sounds to replicate the living, breathing work environment of a 737 pilot.
- While in the external views, you will hear sounds made by ground equipment, windmilling engines, wing fuel pumps, electric hydraulic pumps, air conditioning packs and the APU. All of these sounds layer together to provide a very realistic exterior sound environment.
- We recorded sounds for nearly every switch on the flight deck and then linked them in such a way as to ensure that they are synchronized to switch movements whether fast or slow.
- Many sounds in the product have multiple recordings that trigger randomly to produce a subtle different in the sounds each time a particular one plays. This is a technique borrowed from music production (Armen and Ryan are both musicians), where randomized drum samples are often used to produce a more human sounding programmed drum performance.
- Some mechanical systems on the airplane can be faintly heard from the flight deck (electric hydraulic pumps, for example) and you will hear them from the flight deck if you listen closely.



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- Sound level mixing was done over many hundreds of hours in order to provide the best mix of sounds to accurately replicate the cockpit sound environment.

Towing and Pushback

- With PMDG 737 we have revamped our pushback simulation to give you some interesting and exciting new features.

As with our 777 and 747, ground operations is capable of simulating the pushback process, but we have added a number of new features to the capabilities of the system. To start with, you can now select from four different pushback styles:

Straight Back: This is exactly as it sounds. The airplane will be pushed directly out of the gate in a straight line to a spot at the distance specified in the menu.

Standard L: In this mode, the airplane will be turned in the direction and deflection selected by the user in the menu. The airplane will be pushed to a distance as set in the menu page, with its tail turned in the direction specified.

Dot-The-I: In this mode, the airplane will be pushed off the gate, with the tail turned in the direction specified. It will then be pulled forward until it is approximately centered on the tow-in line for the gate from which it originated.

Cross the T: This pushback style is identical to Dot-The-I, except that the airplane is pulled approximately an equal distance beyond the centerline of its original gate.

These pushback styles can be triggered on demand or set up to initiate automatically at the completion of ground services, per the user's taste.

We have included one additional pushback feature which we think users will enjoy: Manual Pushback.

In this mode it is possible for the user to drive the pushback tractor by manipulating the joystick control forward/aft to control speed and left/right to control steering. Driving a tug with precision can take some practice, so take it slowly when using this method of pushback and we are sure you will find pleasure in being able to position the airplane precisely where you want it with minimum of fuss.



When learning to use this feature, we recommend setting your outside view directly in front of the airplane, down low, so that you can watch the steerable wheels on the pushback tug. Once you see how their movement relates to the direction the tug turns and how that affects the airplane, you will find that driving the pushback tug from any viewpoint becomes quite natural. To center the steering wheels, simply center your joystick.

One limitation to manual pushback: We have limited your turning radius in order to prevent you from damaging the airplane during pushback. You don't want to break the bird!

Please note that MSFS does not currently support us placing a camera inside the tug as we have done on other simulation platforms. We have requested this feature and hope that the capability will be made available to us in the future, as pushing airplanes around on the airport surface can be quite challenging and fun.

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THINGS THE WIDE BETA TEAM WANTED YOU TO KNOW

- For the older style lights, you can still use the gang bar to turn all of the landing lights on – and right click to turn them all off. For the newer style lights, the same functions are available using a click spot over the LANDING label for the switches.
- For LED style lights, the landing lights and taxi lights are integrated into the wing root. The light is not present on the nose gear structure.
- When planning, normal remaining fuel values are much higher than you are used to. A good minimum is at least 4,000 pounds.
- When soft disconnecting the AT, the disconnect switches need to be clicked twice with a 1-2 second pause in between to avoid the auto throttle disconnect Autopilot Status Annunciator (ASA) message and associated caution.
- Proper takeoff procedure with respect to your physical throttle:
 - o Advance the throttles to approximately 50% N1.
 - o Press TO/GA (don't use the MCP A/T button, it takes half a second or so to "capture").
 - o Wait until you see THR REF annunciated on the FMA.
 - o Push the throttles fully forward. They are dead now because the AT is active.
- The APU will run while airborne, and is required for ETOPS legs, but be aware that APU bleed is ineffective above 10000 ft. In such cases the APU is available for backup electrical use only.
- Unlike the 777, the transfer of power between the engine generators and the APU is manual. Remember to reach up and transfer the power source from the engines to the APU prior to cutting fuel to the engines. Pilots of the 747 will likely be less prone to forgetting this step.
- Don't forget to press the MIC button on the ACP panel (below the radios panel) corresponding to the radio you want to transmit on, or no-one will hear you online. Yes, it's modeled that closely!



CUSTOMIZE YOUR PMDG 737 EXPERIENCE

With the PMDG 737 product line we continue to use the methodology that allows you to change just about anything in the airplane without ever having to leave the simulation. From your fuel load to the passenger load, cockpit configuration, external model options, failures, maintenance and cockpit equipment: ***everything can be configured live, in MSFS, without having to pull down a menu and without having to leave the cockpit.***

Accessing FMS Based Menus from a Dark Airplane:

Since we have moved all the configuration options into the FMS in order to promote simulation continuity, we also had to give you a way to access those menus even if the airplane is not currently powered.

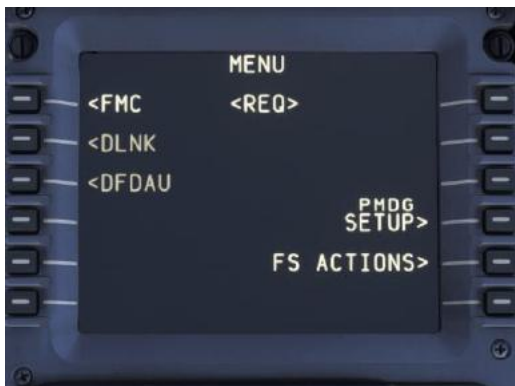
To access the FMS based Setup/Configuration menus from a Cold & Dark cockpit, simply press and hold the MENU button on the FMS until the FMS screen comes to life.



INTRODUCTION

PMDG 737 Home CDU Menu:

At any time while flying the PMDG 737, you can press the **MENU** button on the CDU, and you will be presented with the top menu for the CDU system:



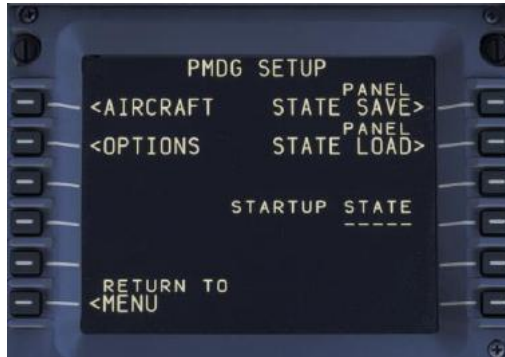
On the left side of the screen, you can select the <FMC prompt to enter the aircraft flight management functions. On the right side you will find the PMDG SETUP> and FS ACTIONS> prompts. These options are the core of your ability to customize your PMDG 737 flight experience.

If at any time you get lost in the CDU, simply press the MENU button and you will be brought immediately back to this page!



PMDG SETUP MENU

Pressing the PMDG SETUP> prompt at will display the following menu:



The PMDG SETUP page is the “home base” from which you will configure your PMDG 737 to suit your needs. From this menu you can adjust the specific options for your airplane cockpit as well as many options to control various aspects of the simulation experience itself.

There are a few things to keep in mind while learning how to tune the PMDG 737 to suit your tastes:

- <AIRCRAFT: The PMDG 737 allows you to configure the equipment options you want on your 737 and in your cockpit and then bind them to the registration number of the livery you are currently flying. This gives you the opportunity to set up the flight deck for individual liveries according to the configuration used by different airlines or on specific airplanes and quickly switch between them. The items listed under <AIRCRAFT are airframe specific, so you can change them when loading different liveries.
- <OPTIONS: The PMDG 737 allows you to set global options such as the mechanical failures model, performance tuning, key commands and sound options that remain in place even as you switch between different liveries or 737 body types.
- Panel SAVE STATE> and LOAD STATE>: The save/load state prompts allow you to save the current setup of the panel to a file that you can then reload at any time in the future. Saved panel states are independent of specific saved flights so if, for example, you wished to save the current state of the cockpit as you left it at the conclusion of your flight, you can then reload this panel



INTRODUCTION

condition in the future and find all switches and system in the desired settings. (This is not the same as saving a flight because it merely saves the condition of the airplane, thus allowing you to load your panel configuration into any flight you wish.)

- **STARTUP STATE:** This prompt allows you select a saved panel state that you would like the simulation to use as your default panel condition every time the simulation is launched. For example, if you were to select a Cold and Dark scenario as the STARTUP STATE for the airplane, you will be presented with that cold and dark panel state whenever and wherever you choose to load the PMDG 737.



Understanding Panel vs. Flight Save/Load States:

When it comes to saving your flight, there are a few things that you should clearly understand in order to avoid confusion.

Saving a Flight: Saving a flight is done via the MSFS LOAD/SAVE menu. This will save the airplane position, status and configuration into a file that can be loaded at a later time via the MSFS LOAD/SAVE menu.

Saving a Panel State: Saving a panel state is a bit different. Panel states allow you to save the airplane's current configuration without any regard to the phase of flight or location of the airplane. This being the case, panel states are entirely mobile and thus give you great flexibility.

For example, let's say that you want to create a condition in which the airplane is on the ground with the APU running, the IRS's aligned and everything ready to start the engines. You do this by setting the airplane up as you desire, then going to the PMDG SETUP menu in the FMS and pressing STATE SAVE>.

You will be prompted for a name for the panel state, and the FMS will then create the necessary files in your <MSFS ROOT>\Packages\pmdg-aircraft-737\work\PanelState folder.

Once this state is saved, you can have the airplane in any location in the MSFS world and use the STATE LOAD> prompt to instantly put the airplane into the desired configuration.

We have created some panel states that we thought might be desired by users. Each of these states have been pre-configured to set up the airplane in the correct state as described in the file name:

APPROACH
APRON
APRONLONG
CLIMB
COLDDARK
COLDDARKGPU
CRUISE
FINAL
HANGAR
RUNWAY
TAXI



INTRODUCTION

These panel states can be loaded at any time and the airplane will be instantly configured according to the panel state selected. This can be convenient for quickly setting up a flight to start precisely where you want!

Save/Load Effect on Failures:

In the PMDG 737 the current state of failures is always saved. If you have a particular failures mode saved, and various failures are already active or armed to become active, they will remain as such when you load the flight that was saved in that condition.

This can be useful for saving flights enroute without losing any of the activities that have taken place earlier in the flight sequence.

Some users may not want the failure conditions to transfer to a newly loaded flight. If this is a concern, then please be certain that you clear all failures and disable failures from the FAILURES menu prior to saving the flight.

Save/Load from the MSFS menu:

You can also conduct save/load operations from the MSFS menu. The PMDG 737 will intercept the save/load function and create both the MSFS save file and the PMDG 737 panel save file for you using the name you select.

You will then be able to load your flight and panel state from the MSFS menu as well and the airplane condition will be just as you left it.

On the PMDG SETUP menu you will notice a STARTUP STATE prompt. You can use this prompt to force MSFS to load the PMDG 737 in exactly the same configuration every time you launch the simulator.



AIRCRAFT SETUP MENUS



The AIRCRAFT menu allows you to configure the equipment, displays and mechanical fitness of your airplane to suite your needs.

When using the PMDG 737 you should think of aircraft options in terms of airframes. Through this menu system we allow you to define the equipment contained on the flight deck of a limitless number of aircraft, defined by airframe tail numbers.

For example, if you wished to define the specific equipment carried on N738SW, you can do so, saving the information via the AIRCRAFT menu. You might then define a different equipment setup on N738PM and save that configuration via the AIRCRAFT menu.

Thus, you can quickly return to whatever configuration you choose by simply loading that aircraft's configuration file via the AIRCRAFT menu.

How this helps you:

The PMDG 737 tracks everything in terms of individual airframes. As you fly N737BW, for example, that airplane will accumulate flight time. Any changes you make to the equipment carried on that aircraft can be saved and the simulator will load those options the next time you choose to fly N737BW.

If you wish to use a different aircraft configuration, simply select it via the AIRCRAFT menu and the changes will be instantaneous.

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How this works behind the scenes (For sim techs and nerds!):

You don't need to read this section to use the AIRCRAFT menu, but we are including it for those who want to know details about how the AIRCRAFT menu system works.

Each livery comes with a pre-defined definition ini file that defines all of the options related to that particular airplane. The file is fully editable.

The definition file is named to match the tail number on the livery and gets copied to the **<MSFS root> \Packages\pmdg-aircraft-737\work\Aircraft** folder by the livery installer. A backup original copy is left in the texture folder so that you can use the AIRCRAFT menu to revert to the original configuration file if you make changes that you no longer wish to keep.

When you select a livery, and then launch the simulator, the PMDG 737 will determine what equipment is installed on the airplane by reading the definition file for that livery's tail number. When the sim launches your cockpit will be set up according to that definition.

If you make changes to the cockpit layout and save the definition file using the AIRCRAFT menu, those changes will be present in the airplane any time you load that livery.

Therefore, the key thing to remember is that each aircraft should be viewed in terms of its tail number. When you load a livery, the definition file matching the airplane's tail number will be used to populate your cockpit, display and maintenance options.

If desired, you can save multiple definitions for the same airplane in order to simulate changes in the equipment carried over time. For example you could set one set of options for the N738SW setting, then manually make changes and save the file as N738SW2.ini. Then, if you desire to use the second configuration, simply select it from the menus as will be described below.

NOTE: The livery number displayed in the AIRCRAFT menu will always match the tail number installed with the livery. This is because the maintenance and flight time tracking must be tracked for that individual tail number!

Do **not** manually change the tail number in the DETAILS pane of the aircraft select screen in MSFS. This will mess up or otherwise disable the livery options.



The following matrix should help you to visualize how the airplane-specific equipment, display and maintenance options are tracked for individual tail numbers:



Using the AIRCRAFT menu:

When you load a livery from the MSFS Aircraft Selection menu and then launch the simulator, the PMDG 737 will load the definition file that describes how that aircraft is laid out in terms of cockpit equipment, displays and mechanical fitness.

The AIRCRAFT menu is designed to give you the ability to change the equipment installed in the cockpit, change the way information is displayed to you on the cockpit displays, and to interact with the mechanical reliability of the airplane.



INTRODUCTION

You do this through the following menu prompts:

- < EQUIPMENT
- < DISPLAYS
- < FAILURES

We will explore the content of these menus in a moment, but for now just remember that any time you make a change, the PMDG 737 will automatically save the change you made to the aircraft's definition file. This has the effect of making the change permanent until you make future changes.

NOTE: There is no danger to changing the contents of the AIRCRAFT menu, even while the aircraft is in flight!

Restoring a Definition File:

In the event that you make changes and later wish to revert to how the airplane was configured at the time you installed the livery, simply press the RESTORE ORIGINAL> prompt on the AIRCRAFT page.

This will copy the original definition file from the backup folder to the active folder, replacing the one you have already altered. (This cannot be un-done!)

Using a Different Definition File:

In some circumstances, you may decide that you want to use a different aircraft configuration than the one that is defined for that livery. As an example, if you fly with a particular configuration frequently and have grown comfortable with that cockpit setup, it may not be convenient to have to remember every single configuration change that you made in order to get a different livery configured to match your preferred settings. In order to make things easy, we have allowed you the option to load a different aircraft definition than the one that is loaded by default with any livery. You can do this using the Load From ANOTHER > prompt on the AIRCRAFT menu.



Selecting the LOAD FROM ANOTHER > prompt will take you to the following menu:



This menu will list all the available aircraft definition files currently loaded or that you have created.

To load the N737BW configuration displayed in the example above, you simply press the line select key, and then confirm the entry.

This will cause the configuration definition for N737BW to be used with whatever livery you currently have loaded.

NOTE: If you switch liveries, you will need to re-select the N737BW definition if that is your wish. Every time you load a livery from the free flight MSFS menu, the PMDG 737 will load that livery's definition file!

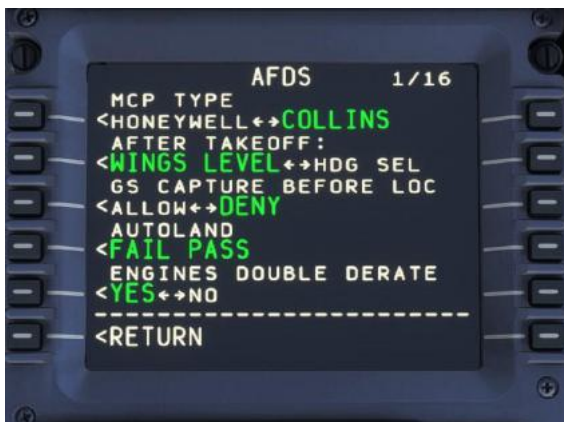
Using a Fixed Definition File for All Flights:

You may find that you settle into a favorite cockpit configuration that you want to use no matter which livery you are flying. In this case you can set the configuration as your FIXED CONFIG by using the FIXED CONFIG prompt to select it from displayed list.

Once you have selected an airline definition file as your FIXED CONFIG it will remain until you delete. (Press the DEL key, then the FIXED CONFIG prompt to delete.)



INTRODUCTION

EQUIPMENT Options:

When purchasing an airplane from Boeing, the airline customer will choose from a package of equipment options that provide advanced capabilities beyond what the basic airplane is capable of.

These options are available for you to select from in the EQUIPMENT pages so that you can experiment with the mix of data equipment options that are interesting to you as a pilot.

There are numerous pages of options available that will allow you to customize the displays in the cockpit of your 737. You can use the PREV PAGE and NEXT PAGE buttons on the CDU to move forward and back through the pages.

In the list that follows, we have provided images to show you the difference between equipment types when applicable. We also document some of the known conflicts between equipment types (if any) so that you are aware that turning some features ON may disable other features.

You can't hurt anything by experimenting with combinations of features, so feel free to turn things on or off and add/remove equipment capabilities as your needs or interest may allow!

If you get into a simulated flight and decide you'd like to try some changes, you can do so live, in the simulator, without having to worry about disrupting your current flight.



PAGE 1/16 - AFDS

- **MCP TYPE:** Choose between the original Honeywell or newer Collins manufactured autopilot Mode Control Panel.

Older Honeywell MCP:



Newer Collins MCP:



Conflict Note: “Fail Operational” autoland capability is only compatible with the Collins MCP. It is not compatible with the Honeywell.

- **AFTER TAKEOFF – WINGS LEVEL/HEADING SELECT:** This option allows you to decide if the airplane will maintain a wings-level attitude, or turn to follow the heading bug immediately after takeoff. Most airlines use the Wings-Level option.
- **GS CAPTURE BEFORE LOC:** This option allows you to determine whether the autopilot/flight director will command the airplane to follow the glide-slope on an approach even if the localizer has not yet been captured. Airlines generally provide specific policy guidance on this topic, and they will select the equipment option so that the airplane adheres to corporate policy. Generally speaking, the DENY option is the safer, more conservative option.
- **AUTOLAND:** Fail Operational allows for reduction of drift angle during crosswind autoland and provides steering guidance on the runway after touchdown through the rudder servo, thus allowing for CATII-B visibility approaches. Uses a third self-contained inertial reference unit located inside the ISFD (see previous page) and requires the Collins Mode Control Panel.

INTRODUCTION

PAGE 2/16 - ENGINES

- **DOUBLE DERATE:** Allows the reduction of takeoff thrust to that equivalent of the CFM56 engine rated approximately 4,000lbs thrust lower than the engine is actually capable of producing. Hence double derate for the 26,000lb thrust engine results in an N1 takeoff thrust setting corresponding to that of the 22,000lb thrust engine.
- **TO-BUMP:** An increase in takeoff thrust is provided when this is set to YES. Maximum takeoff thrust does not provide the required performance, thus a takeoff 'bump' is used to achieve desired performance.

PAGE 3/16 - DATALINK

- **COMPANY COST INDEX:** Allows you to set a default cost index, which is delivered via simulated datalink on the PERF INIT page.
- **ALTN MIN RWY LENGTH:** Allows you to set the minimum runway length for an airport in the database to be considered an alternate.
- **ALTN ILS REQUIREMENT:** Allows you to set a requirement for ALTN airports to be equipped with an ILS.

PAGE 4/16 - EGPWS

- **V1 CALLOUT:** Allows you to select the GPWS "V1" callout to ON or OFF.
- **BANK ANGLE CALLOUTS:** This option allows you to select whether or not you will hear aural bank angle warnings if you exceed prescribed bank angles.
- **APPR MINIMUMS CALL:** This option selects the aural callout type that plays when approaching your minimum altitude on an approach. The airplane can issue no warning, or it can call out "Approaching Minimums" or "Approaching Decision Height" or "Plus Hundred."
- **MINIMUMS CALL:** This option selects the aural callout type that plays at your minimum altitude on an approach. The airplane can issue no warning, or it can call out "Minimums," "Minimums Minimums," or "Decision Height."
- **2500 FEET CALL:** Most airlines use the "Twenty-Five Hundred" call, but some airlines have adopted the "Radio Altimeter" aural advisory instead. You can choose which you wish to hear.

PAGE 5/16 – EGPWS 2

- **CALL 2500:** Here you can set 3 options for the 2500 ft call: YES (always on), SMART (call will be made only if you are established on an ILS glideslope), and NO (call will not be made).



- **CALL 1000:** Here you can set 3 options for the 1000 ft call: YES (always on), SMART (call will be made only if you are established on an ILS glideslope), and NO (call will not be made).
- **CALL 500:** Here you can set 3 options for the 500 ft call: YES (always on), SMART (call will be made only if you are established on an ILS glideslope), and NO (call will not be made).
- **CALL 400:** Set the 400 ft call to ON or OFF.
- **CALL 300:** Set the 300 ft call to ON or OFF.

PAGE 6/16 – EGPWS 3

- **CALL 200:** Set the 200 ft call to ON or OFF.
- **CALL 100:** Set the 100 ft call to ON or OFF.
- **CALL 50:** Set the 50 ft call to ON or OFF.
- **CALL 40:** Set the 40 ft call to ON or OFF.
- **CALL 30:** Set the 30 ft call to ON or OFF.

PAGE 7/16 – EGPWS 4

- **CALL 20:** Set the 20 ft call to ON or OFF.
- **CALL 10:** Set the 10 ft call to ON or OFF.
- **AIRSPEED LOW AURAL:** Set the airspeed low alert to ON or OFF. This option will be unavailable if LOW SPEED ALERT (under the DISPLAY section) is set to OFF.
- **TERRAIN PEAKS MODE:** This setting allows alter the manner in which the Enhanced Ground Proximity Warning System (EGPWS) will display terrain on the navigation display. With peaks mode active, the terrain display will continue to show you the location and altitude of the highest terrain in the viewable area of the display even if the aircraft is more than 2,000' above the highest terrain conflict based upon standard EGPWS detection logic.

When not in peaks mode, EGPWS will remove display of terrain related information when the airplane is more than 2,000' above the highest terrain in the viewable area based upon standard EGPWS detection logic.

- **SHOW WATER IN CYAN:** This setting allows you to choose whether sea-level bodies of water will appear in cyan on the ND's EGPWS terrain display.

INTRODUCTION

PAGE 8/16 – ETOPS

- **ETOPS: ExTended OPerationS** is a regulatory system by which specifically equipped twin engine turbine powered aircraft are allowed to fly extended operations over water or away from suitable landing fields. ETOPS requirements place operational and regulatory compliance mechanisms in place at the operating airline, but the majority are largely transparent to the pilot.
- **DUAL BATTERY PACKAGE:** This is another ETOPS package that you can also select as an option on non ETOPS airplanes. The dual battery system provides a minimum of 1 hour of backup battery power to the emergency systems required to safely complete a flight. The single battery airplane will provide at least 30 minutes. It is worth noting that the ETOPS battery system will provide an optimal 1:12 of battery life with normal electrical demand.
Conflict note: If you elect to have your 737 be ETOPS qualified you will automatically be given the dual battery package.
- **ETOPS CARGO FIRE SYSTEM:** Boeing offers two cargo fire suppression options for the 737: Single bottle or dual bottle. Obviously the dual bottle system provides greater extinguishing capability than a single bottle system, which is why ETOPS certified aircraft are required to have the dual bottle system.
Conflict Note: If you elect to have your 737 be ETOPS qualified, you will automatically be given the dual fire bottle system.

PAGE 9/16 AND PAGE 10/16 – FMS AND FMS2

- **FMS DEFAULT ALTITUDES (list of seven):** This option allows you to customize the default acceleration altitude, engine out acceleration altitude, default thrust reduction altitude, default thrust cutback altitude, default thrust restore altitude, default transition altitude, and default transition level in order to comply with the standards typically used by your airline and/or country.

For example, the transition altitude in the United States is 18,000 feet, but in other countries this value will vary. If you live in a country where 5,000 feet is normally used then you can set this value to 5,000 and you will not have to change the transition altitude in the FMS on every flight.

It's important to understand that these values will be overridden by what's saved in a panel state or saved flight due to the way the FMC is initialized. If you wish to have these values in a panel state, load the panel state first, adjust the values, then save the



state with a new name such as "(livery name)_CLDDRK" or whatever you'd like.

- **MAXIMUM FIX PAGES:** Sets the maximum number of fix pages between 2 and 6, to allow for adjustments between the limits in different FMC software versions.
- **DES UNDERSPEED MARGIN:** Selectable under-speed margin (5-15 knots) for VNAV PTH in DES (descent) mode.

PAGE 11/16 – FUEL

- **AUX FUEL SYSTEM:** Select which type of auxiliary fuel tank configuration is in use. Please note that AUX fuel tank configurations are not available for all aircraft types. If there is a configuration available for the aircraft you are flying, it will be offered to you here.





INTRODUCTION

PAGE 12/16 – INSTRUMENTS

- **STANDBY INSTRUMENTS:** This option allows you to decide whether you want to have the ISFD, ISFD with RMI, or SEPARATE standby instrument option installed. The ISFD (Integrated Standby Flight Display) is an electronic, solid state digital display that contains its own backup battery source of power. The SEPARATE standby gauge configuration provides the AI, ASI and ALT as separate instruments, as pictured below.



ISFD

ISFD/RMI

Separate

- **HGS INSTALLED:** This option allows you to decide if the Heads Up Guidance System is installed in the flight deck of your 737. The HGS system modeled in the PMDG 737 is fully functional, fully collimated and provides an incredible improvement in situational awareness during flight.
- **HGS AUTO AIII MODE:** This option determines whether your HGS includes the Autoland AIII mode for use during instrument approaches. The AIII mode improves pilot situational awareness



during low approaches by providing additional information such as the runway outline displayed on the HGS in front of the pilot's eyes during the final phase of an instrument approach.

- **HGS GS REF LINE IN PRI:** This option allows you to determine whether your HGS installation provides a visual reference to the glide slope in order to simplify flying an instrument approach.
- **YAW DAMP GAUGE:** This option allows you to install a yaw damper gauge on the flight deck, above the standby gauges.

PAGE 13/16 – OPT EQUIP

- **PERF IMPRV PACKAGE:** The Performance Improvement Package (PIP) is an array of features that increased the efficiency of the NG by altering the profile of several different features to make them more aerodynamic. Included in these changes are redesigned engine exhaust nozzles, wheel well fairings, beacons, and inlets and exhausts.
- **SHORT FIELD PACKAGE:** Select whether to have the short-field performance package installed. The short field package provides greater performance capability through a series of aerodynamic improvements, as well as a two position tail skid and increased deflection during ground spoiler operation.
- **AUTO PROBE HEAT:** Selects whether or not the flight data probes are heated automatically or not. When set to YES, the OFF position becomes AUTO.
- **FLIGHT TEST PACKAGE:** We included this package for those who might want enjoy seeing the visual aspects of the standard flight test gear carried aboard an airliner during flight testing. The gear includes a tail drogue and extra air data sensors protruding through red window plugs in the forward cabin area. This is a visual model enhancement only and does not provide any data display anywhere on the flight deck.
- **BRAKE PACKAGE:** Choose between carbon and steel brakes for your 737. Carbon brakes are more expensive to fit than steel brakes, but they last longer. The primary advantage to carbon brakes however, is that you will not get “brake fade” from extremely hot brakes. With steel brakes, as they brakes absorb heat they lose effectiveness.

INTRODUCTION

PAGE 14/16 – OPT EQUIP 2

- **EXT LIGHT PACKAGE:** Offers the option of several different light types, including incandescent, LED, and pulse options.
- **EYEBROW WINDOWS:** Boeing no longer offers eyebrow windows as an option on the 737, but this setting allows you to decide if your airplane has the older style windows, or not.
- **CABIN LAYOUT:** You can use this setting to choose between a single class cabin (all coach) or a two class setup with a mix of first class and coach seating. Your choice here will be reflected in the weight and balance system.
- **AIRSTAIRS INSTALLED:** Select whether to have the airstairs at door 1L installed and available for use.
- **CUTOFF SWITCH STYLE:** Selects either the old paddle-style fuel cutoff levers, or the newer cap-style switches as on the 747, 757, 767, 777, and 787. Note that some aircraft have these new switches as a default, such as the 900ER, so they cannot be selected manually in those aircraft.

PAGE 15/16 – OPT EQUIP 3

- **WIFI ANTENNA:** Many airlines are retrofitting their fleets to include onboard internet services for customer use. The airplanes so equipped have a SATCOM antenna mounted on the top of the fuselage. This setting will allow you to choose whether your aircraft has a SATCOM antenna installed or not and if it will be 2KU or KU band.
- **YOKE CHECKLISTS:** These settings allow you to determine if a checklist appears on the yoke clip of the captain and/or first officer. You can use the yellow marker to keep your place on the checklist if desired.
- **HEADRESTS:** Selections for CAPT and F/O. These settings allow you to show or hide the modeled headrests. This is useful if you are using a camera program that occasionally shifts the viewpoint into the headrest, which can cause clickspots to disappear.

PAGE 16/16 – OPT EQUIP 4

- **AUTO IGNITION:** Changes the center position of the ignition selector between OFF and AUTO. The AUTO function sets the ignition control to automatically protect against flameouts.



- **PRESSURIZATION PANEL:** Choose between OLD and NEW style pressurization panel.
- **WINDOW SHADES:** Choose whether window shades have been installed in the airplane.



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DISPLAYS Option Pages:

When purchasing an airplane from Boeing, the airline customer will choose from a package of options describing what data is shown to the pilots on the cockpit displays.

These options are available on the DISPLAYS pages so that you can experiment with the mix of data options that are interesting to you as a pilot.

There are numerous pages of options available that will allow you to customize the displays in the cockpit of your 737. You can use the PREV PAGE and NEXT PAGE buttons on the CDU to move forward and back through the pages.

We have included images where helpful, but you should feel free to turn items on and off while in the simulator- you won't hurt anything by cycling back and forth to see what the options look like or how they change your flying experience!



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The following customization options are available from the DISPLAYS menu:

PAGE 1/9 DISPLAYS, PFD

- **DISPLAYS TYPE:** This option allows you to change the displays between PFD/ND and EFIS/MAP display format.

NOTE: This option is currently disabled, and is set to PFD/ND. The ability to swap between PFD/ND and EFIS/MAP will be implemented in a future update.

PFD/ND:**EFIS/MAP:**

- **FLIGHT DIRECTOR TYPE:** Select the style of flight director that will be displayed. The split axis option provides independent pitch and roll steering cues, while the single cue option provides a single chevron shape.
- **GROUND SPEED DISPLAY:** Displays your current ground speed on the PFD as shown here:





INTRODUCTION

- **VREF + 20 BUG:** Display the associated bug on the PFD speed tape.
- **100 KNOTS BUG:** Display the associated bug on the PFD speed tape.

PAGE 2/9 - PFD

- **RISING RUNWAY:** Turn the rising runway symbol on/off for display on instrument approaches.
- **PFD/ND NPS:** Displays the RNP/ANP navigation performance scale symbology.
- **PITCH LIMIT IND POP UP:** This option determines whether a pitch limit indication will appear on the PFD when pitch is approaching the pitch limit.
- **ROUND RAD ALT DIAL:** Allows the radio altitude to be shown in round dial format.
- **AOA DIAL:** Display the angle of attack indication at the top right corner of the PFD. (Replaces the altitude readout indication if that was previously selected.)

PAGE 3/9 - PFD

- **LANDING ALT BAR:** Displays the landing altitude bar on the PFD altitude display.
- **2500 FT HEIGHT ALERT:** Shows ALT in white on the PFD when at or below 2500 ft until below 500 AGL.
- **LOW AIRSPEED ALERT:** Flashes the PFD airspeed box in amber for 10 seconds when airspeed decreases into the amber minimum maneuver speed bar.
- **SHOW LANDING FLAPS:** Displays on the PFD the landing flaps setting that has been selected in the FMS for approach and landing.
- **FPV HEADING SCALE:** Shows a magnetic heading scale along the land/sky transition on the PFD attitude indicator when the FPV is displayed.

PAGE 4/9 – EFIS/MAP

- **EFIS/MAP ROUND RAD ALT:** Shows the radio altitude in round dial format when in the EFIS/MAP layout.



- **EFIS/MAP 80 KNOT BUG:** Displays the 80 knot bug on the airspeed indicator in EFIS/MAP mode.
- **EFIS/MAP FPV:** Displays the flight path vector on the attitude indicator in EFIS/MAP mode.

PAGE 5/9 - ND

- **TRACK UP:** Alternate between a track-up navigation display and a heading-up navigation display. The normal display used throughout the industry is the track-up display as this provides best situational awareness while operating in LNAV.
- **VSD:** Allow use of the Vertical Situation Display for terrain awareness. (Press the CTR switch twice to display it.)
- **RANGE ARCS:** Display range arcs on the navigation display when appropriate for the selected display mode.
- **SHOW NEXT ALT CONSTR:** Displays the next altitude crossing constraint next to the waypoint on the ND without the DATA switch on.
- **VOR COURSE LINES:** Display VOR course lines on the navigation display as appropriate to navigation mode and location.

PAGE 6/9 - ND

- **MIN RUNWAY LENGTH:** Airports with runways below this length will not be shown on the ND.
- **TCAS 3NM RANGE RING:** Display 3nm range ring with TCAS.
- **OTHER TRAFFIC:** This toggle allows you to choose whether TCAS only shows you proximate traffic (realistic) or shows you all traffic in your vicinity. (Not realistic but convenient for online flying!)
- **RANGE:** Allows you to manually change the display range for TCAS traffic. (Useful for online fly-ins if you need to limit the number of aircraft displayed on the screen.) We recommend leaving this set to 40nm.
- **ALT SEPARATION:** Allows you to manually de-clutter traffic that is above/below you. (Useful for online fly-ins if you need to limit the number of aircraft displayed on the screen.) We recommend leaving this set to 2800FT.



INTRODUCTION

PAGE 7/9 – ENG

- **ENGINE SIDE BY SIDE DISP**: Changes the layout of the engine display between the normal and side-by-side formats. Note that the use of the side-by-side format will disable the lower engine DU.

**Normal****Side-by-Side**

- **EGT COLOR CHG INHIBIT**: Set the elapsed time allowed to trigger an EGT over temp display.
- **OIL QTY INDICATION**: Choose between percent or quarts.
- **LOW OIL QTY INVERSE**: Invert the color of the oil quantity display when low oil quantity is detected.
- **HIGH VIBRATION ALERT**: Show indication of high vibration.

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- **MAX CONT THRUST BUGS**: Displays the bugs denoting max continuous thrust when appropriate on the engine display.
- **SHOW REF N1**: Displays the reference N1 on the engine display at all times, never, or only when a derate or the assumed temperature method is used.

PAGE 9/9 – FUEL/CTRLS

- **FUEL LOW ALERT BELOW**: Choose the fuel level that triggers the low quantity alert – 1000 or 2000 pounds.
- **FUEL TOTAL DISPLAY**: Changes the display of the fuel tank quantities to include a total fuel value below the tank values.



- **WEIGHT UNITS:** Changes the preferred weight units between KGS (kilograms) and LBS (pounds).
- **FCS INDICATOR:** Determines whether the flight control indications are displayed on the STAT page.
- **BRAKE TEMP INDICATOR:** This option determines whether or not the brake temperature will be shown on the STAT page.

FAILURES Customization Pages:

The failures and maintenance logic is covered in great depth in the FAILURES AND MAINTENANCE section.

OPTIONS MENUS



The configuration options located under the OPTION menu provide you with the opportunity to modify your simulation experience to suit your tastes. These include performance tweaks, assigning key-driven commands to cockpit functions, adjusting the way the sound environment is simulated and many more. The OPTIONS menu is broken into sub-menus to categorize options for ease of organization.

- **<SIMULATION:** This menu will allow you to change a number of features in the simulation such as maintenance failures, user interface items and other global features that apply across all aircraft tail numbers to customize the simulation to your tastes.
- **<PERFORMANCE:** The options contained in this menu will allow you to tweak slightly certain items that may be of benefit to users suffering from poor performance on older machines. Going through these items will help you to avoid using unnecessarily performance hungry options if you are concerned about performance on your computer.
- **<COLORS:** This menu will allow you to customize PFD, MFD, instrumentation and cockpit lighting colors in the simulation.



SIMULATION Configuration Menu:**PAGE 1/7**

- **SERVICE BASED FAILURES:** When using service based failures, you will experience a highly realistic statistical model for mechanical failures that uses the airplane's age and operating experience in order to predict equipment failures in a fashion similar to the real world operating experience of 737NG type airplane operators. This model was created using real world data defining the Mean Time Before Failure for nearly every operational part of the airplane. This being the case, equipment will wear out, and mechanical failures will happen, requiring you to use the Quick Reference Handbook to manage mechanical failures, and the Aircraft Maintenance menus in the FMS to service the airplane as you use it.
- **ENGINE OIL USE LAST:** Sets the simulation to use the engine oil level from the last flight.
- **SYNC CAPT AND F/O EFIS:** Normally both pilots are responsible for setting their own altimeter's barometer setting. For simplicity, we have allowed you the option to have all the altimeters in the cockpit set to match, without regard to which altimeter you set. This will prevent you from having to move around the cockpit in order to sync the altimeters. Note that we recommend turning this feature off if using a multi-crew cockpit.
- **SYNC CAPT AND STANDBY BARO:** Same as the above option, only it relates to setting the standby/ISFD altimeter's barometer setting.

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- **<IRS OPTIONS:** *Full explanation on Page 82.*

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- **SET MSFS LOC CRS:** When it comes to navigation data, MSFS has an inherent weakness in that data related to ILS/LOC stations is hard coded into the simulator and is not updated to keep it current with the normal magnetic shift. The end result is that the localizer final approach course in the MSFS world will sometimes vary from the real world. Since many users are also using real-world navigation charts, this can create some confusion and can also create problems if the LOC course is not correctly set to match the MSFS hard-coded information. (The airplane cannot fly the localizer properly if the CRS knob is set incorrectly.) To compensate for this, we recommend setting this option to ON, and we will read the appropriate MSFS localizer course and adjust the setting for you, thus saving you time and frustration.
- **REALISTIC AP ENGAGEMENT:** This option can be used to simplify the autopilot engagement process if desired. When set to “Realistic Engagement” the autopilot will require that the airplane is in a balanced trim condition prior to accepting a pilot command to activate. Thus, if you are holding control input in place to maintain the desired flight path, you would need to re-trim the airplane until control force is no longer required to maintain the desired flight path. Selecting “OFF” will simplify the engagement logic for those who are just learning how to fly the simulator, thus reducing your workload. If you notice the autopilot failing to take control of the airplane when you press the AP button, refer back to this paragraph as a refresher!

If you set the autopilot engagement limitations to REALISTIC, then you must be within a small margin of “in trim” (no control forces required to keep airplane on desired path), you cannot be actively trimming, and the flight director should be nearly centered. If you violate any of these conditions, the autopilot will not engage.

- **SHOW THRUST LEVER POS:** When the airplane is being flown using auto-throttles, the throttle position quickly gets out-of-sync with the position of your joystick throttle. This can create an uncomfortable change in thrust when you disconnect the auto-throttle on approach or immediately prior to landing. In order to eliminate the need for you to quickly adjust your throttles to avoid



a thrust change we have devised a system that will allow you to easily sync your throttle position to the auto-throttle position:

By selecting Show Thrust Lever Position to ON, you will notice that moving your throttles while the auto-throttles are engaged will cause a small cyan marker to appear on the EPR/N1 thrust tapes on the upper EICAS. The cyan mark is showing you the current physical position of your joystick throttle. Simply put the cyan mark to the same location as the white throttle tick mark displayed on the same tape, and you will have your throttles properly synchronized with the current auto-throttle setting.

- **A/T MANUAL OVERRIDE:** This option allows you to decide how you want the autothrottle react to changes in your joystick throttle position. In the airplane, moving the throttles will momentarily change the thrust of the engines, but they will return to the previous position when released, unless the autothrottle is in HOLD mode. You can realistically simulate this by selecting the <IN HOLD MODE ONLY option.

If you wish to simplify the process a bit while learning to fly the airplane, you can select <NEVER (in which case any movement of your joystick throttle will be ignored by the auto-throttle) or you can select <ALWAYS (in which case the auto-throttle will always allow you to override the desired thrust by simply moving your joystick throttle.

We recommend setting this to <IN HOLD MODE ONLY.

NOTE: If the autothrottle is in HOLD mode and you move your joystick throttles, the engine will change power. If you have trouble with this, then simply set this option to NEVER.

- **HI IDLE IN FLARE:** Determines whether the thrust is maintained at high idle through the flare. While setting the option on may more faithfully simulate approach idle, due to MSFS limitations, it may also delay thrust reverser deployment after touchdown.

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- **CALLOUT AIRSPEED ALIVE:** Selects whether F/O calls out "airspeed alive" on the takeoff roll.
- **F/O CALLOUTS (3 options):** Selects voice callouts by the pilot not flying (PNF) for 80 knots, V1 and VR.

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- **CALLOUT POSITIVE RATE:** Selects whether the F/O calls out “positive rate” after takeoff.

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- **CALLOUT V2:** Selects voice callouts by the pilot not flying (PNF) for V2.
- **CALLOUT POSITIVE RATE:** Selects voice callouts by the pilot not flying (PNF) for “positive rate” after takeoff.

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- **PAUSE AT TOP OF DESCENT:** Some users appreciate having the simulation pause when the aircraft reaches the VNAV Top of Descent for the programmed route of flight. This allows the user to step away from the simulation without having to worry that the airplane will overfly the T/D point. You can select the function on/off here as desired.
- **AUTO TIME COMPRESSION:** Selects the maximum time compression rate for the PMDG automatic time compression feature (this can also be set on the AUTO CRUISE page).
- **TC/SR BUTTON:** Selects whether the clock’s TC/SR (Time Compression/Sim Rate) button turns on PMDG automatic time compression or standard MSFS time compression.
- **AP DISCO ON CTRL INPUT:** This option allows the sim to ignore any hardware connection to the simulator when the AP is on. This is particularly useful if your hardware is prone to send spikes that occasionally disconnect the AP.

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- **HIDE SEATS:** These options show or hide the captain or first officer seat in the virtual cockpit.
- **HIDE YOKES:** These options show or hide the captain or first officer yoke in the virtual cockpit.
- **YOKES MOVE WHEN LOWERED:** This option controls the behavior of the yokes when they are hidden (lowered). Note that this is not a real option on the actual 737, the yokes only have one position (normal) in real life.

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In order to use a joystick axis as a steering tiller, it is necessary to adjust two settings:



In MSFS OPTIONS, CONTROLS OPTIONS, you must assign the Rudder Axis to the desired control input on your flight control hardware, or if using a game controller, assign the desired controls the Rudder Left Axis and Rudder Right Axis. If you wish to also use a tiller input for steering, you should then assign the Nose Wheel Steering Axis to the desired control on your flight control hardware. Moving the axis up/right should result in rightward movement, while down/left should result in leftward motion. If necessary, use the "Reverse Axis" button to enforce this behavior.

STEERING HARDWARE TYPE allows you to tell the PMDG 737 where to watch for your steering inputs while on the ground. There are two options here.

- **RUDDER ONLY:** When selecting this option, the PMDG 737 expects to see ground steering inputs coming only from your rudder pedals/gamepad and will give you full 78-degree steering authority via the rudder pedal axis.
- **TILLER + RUDDER:** When selecting this option, the PMDG 737 expects to see tiller steering inputs coming from the NOSE WHEEL STEERING AXIS in MSFS and pedal steering inputs coming from the RUDDER AXIS. This will give you a realistic 78 degrees of steering via the tiller and only 7 degrees of steering via the rudder pedals, just like the real 737. The limited steering range via the pedals makes them very convenient to use for maintaining long, straight taxi paths or during crosswind takeoffs and landings. The tiller is useful for large steering inputs at slow speeds.

If your steering inputs feel over-sensitive or "twitchy" we strongly recommend that you go into the MSFS control settings and adjust the sensitivity and dead zones to suit your taste. All hardware is slightly different and settings that work well for you can be found easily using the MSFS controls configuration menu.



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IRS OPTIONS Sub-Menu:

Under the SIMULATION menu (page 1) there is an IRS OPTIONS sub-menu at LSK 6R that contains a group of options related to the Inertial Reference Systems on the airplane.

- **ALIGNMENT TIME:** Normally, the IRS takes approximately ten minutes to align, a period of time during which the airplane cannot be moved. Sometimes this is not convenient in a simulation, so we have offered some alternatives to allow you to align the IRS more quickly:
 - o **REALISTIC:** This option will force the minimum ten minute alignment while the IRS senses planetary rotation in order to bring itself to full alignment.
 - o **FAST (30 SEC):** This option will align the IRS in 30 seconds, thus requiring that you be aware of the alignment requirement without making you wait ten minutes.
 - o **INSTANT:** This option will for immediate IRS alignment.
- **USE LAST MEMORY POSITION:** A modern IRS/FMS is capable of remembering where it was when it was powered off. You can simulate this by setting this feature to YES.



PERFORMANCE Options:

With the performance tuning menu, you can adjust the update rates of the cockpit displays in order to optimize their influence on your simulation experience. You can also turn off the captain's or first officer's displays in the VC.

In general, we recommend that users adjust their scenery, traffic and simulator settings in order to improve performance of the simulator. As a last resort, you can adjust the rate of frame updates in on the displays within the PMDG 737.

The performance tuning methodology operates under the premise that fewer updates to the displays in the cockpit will mean greater performance in the simulator itself. Your results will vary depending upon your hardware and your simulator settings, and we generally recommend leaving this performance as it is set in the default.

For those who are not interested in having all of the displays powered at all times, you can gain back some performance by disabling the first officer's displays in the VC, for example. If you prefer flying in the right hand seat, you can disable the captain's displays instead. You do this via the DISABLE DISPLAYS toggle in the PERFORMANCE TUNING menu (see picture on this page).

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- **FPS LIMIT:** Here you can adjust the frame rate (FPS) limit of the PFD, the ND/MAP, EICAS and lower EICAS, ISFD and HGS by entering the desired FPS limit. Enter the desired limit into the scratchpad and press the LSK of the item you want to change. When the entries are blanked with two dashes, the display is unlocked and will display the highest FPS it can.
- **DISABLE DISPLAYS:** This setting allows you to disable the First Officer's display or the Captain's display. To show both displays, set this value to NONE.

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- **TERR IMAGE DETAIL:** This setting controls the ND range at which the terrain display begins averaging individual terrain samples together so as to not affect performance. If you experience a performance hit with the terrain display on, try setting this option to medium or low.
- **TERR IMAGE SIZE:** This setting controls the resolution of the internal bitmap terrain cells are drawn to before being displayed on the ND. Higher settings look better at the possible expense of performance.
- **TERR DITHER COLORS:** This setting determines whether or not the terrain map is dithered, which results in a realistic "dot" type look to the display. If turned off, the display will be drawn with solid colors. This setting is mainly visual and you can set it to your preference.
- **TERR SWEEP:** This setting turns the raster sweep effect on or off. In the real aircraft, the terrain mode draws to the ND using the same internal hardware that the weather radar does. This is simulated and you will see a sweep effect across the ND simulating the raster hardware's buffered display method.



COLOR Options:



We have included the color option feature in order to offer you the ability to customize PFD, EICAS, instrumentation and cockpit lighting colors in the simulation.

In order to adjust a specific item's color value, click on the LSK next to it.



In the above image you will see that there are two different methods to change the color of the PFD SKY:

Method 1:

Enter the RGB (Red, Green, Blue) color values in LSK 1 [Red], LSK 2 [Green] and LSK 3 [Blue] by entering the values into the scratch pad and then pressing the corresponding LSK.

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Method 2:

Enter the HEX (hexadecimal) color code into the scratch pad and then press LSK 4.



FAILURES AND MAINTENANCE

Due to the depth of information required to adequately describe the failures and maintenance system, we are giving this topic its own space in the manual.

For users who do not wish to interact with the potential for mechanical failure in their simming experience, you can simply skip over this section. The mechanical reliability of your PMDG 737 is set to “perfect” by default.

If you wish to experience the potential for mechanical failures, there are currently three ways in which you can challenge yourself:

1. **RANDOM:** When you activate random failures, you will have the opportunity to set the rate of random failures while also setting limits on the total number of events that may be triggered. This method will allow you to challenge yourself and your airplane knowledge while also setting limits on the number of times that a failure will be triggered during the scope period.
2. **SERVICE BASED FAILURES:** When you activate service based failures, you will experience mechanical reliability that closely approximates the mechanical reliability of the airplane in normal service operation. Each mechanical system aboard the airplane has been programmed to operate using a “Mean Time Before Failure” (MTBF) model to determine if/when a component may fail. The MTBF data is compiled from industry experience with the 737 airplane type, and augmented to make the data compliant with the expected utilization rate of this simulation product.
3. **Programmed Failures:** We have provided you with the ability to set programmed failures for individual sub-systems. You can immediately trigger a specific system failure by choosing it from a list, or you can tell the system to randomly select a failure from within that system.



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Failures: Top Menu:

Entering the failures menu from the SETUP menu will display the following menu:



From the FAILURES top menu, you can select from individual systems (use the PREV PAGE and NEXT PAGE to scroll up and down) or you can go into the ALL SYSTEMS to set random or service based failures, or you can select an individual system from within which you can set specific failures.

All Systems: Top Menu:



This menu allows you access to establish the RANDOM and SERVICE BASED FAILURES modes. This page will also allow you to enter the maintenance performance section.



Random Failures Sub-Menu:



The random failures menu allows you to set up a process for random failures to be triggered at a specific rate, with a limit to the total number of events that may be triggered.

To turn the random failures mode on, simply set the RANDOM FAILURES selector to YES. This will turn the random failure settings to white to indicate that they are now active for manipulation.



Use of the random failure feature is pretty straight forward. First, choose the approximate number of failure events you would like to see triggered during an average 10 hour period of simulation. The rate at which failures will occur will roughly approximate the theoretical [EVENTS PER HOUR / 10 HOURS].

Note that the actual rate may vary slightly so it is possible that you might see failures triggered in rapid succession, and you may see more than



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the desired number of failures in a specific ten hour period, but the average rate of failures will closely approximate your settings.

If you wish to limit the number of events that are triggered you can set this number by turning LIMITED EVENTS to YES and the setting the hard-limit in the EVENT LIMIT line.

You can use this limit if you want to trigger a rapid series of events, but also want to limit the total number failures.

Service Based Failures Sub-Menu:



Service Based failures will provide you with a highly realistic simulation of failures on and operational airplane. As you fly the simulator, the total flight time and system operation of the airplane is tracked. The combination of factors will be compared against known data predicting the Mean Time Before Failure for every component on the airplane.

As failures take place, you will need to use the Quick Reference Handbook to resolve the failures and your judgment as captain to determine whether it is feasible to continue on to your destination, or whether a diversion for maintenance is required.

When operating under the serviced based failures process, you may fly for many hours without seeing any mechanical unreliability in your airplane. Conversely you experience a streak of mechanical failures from the mundane to the critical.

When operating with the Service Based Failures module active, it will be necessary to occasionally have your airplane "serviced" by your line maintenance crews.



Maintenance Sub-Menu:

The following functions are available to you in the maintenance page:

- **<CLR ACTIVE:** When failures are triggered, you can use the CLR ACTIVE button to reset any failures that have already been triggered.
- **<CLR ALL:** This will clear failures that have already triggered as well as failures that are armed to be triggered at a later time.
- **<NEXT SERVICE IN:** This indicates to you the approximate amount of time until the next service period for the airplane is due.
- **<SERVICE ALL:** This setting allows you to simulate the effect of maintenance personnel servicing the airplane in accordance with the normal maintenance schedule. It is worth noting that flight crews normally have very little interaction with the routine servicing of an airliner. The servicing process is generally managed by the airline maintenance department and is largely transparent to the crew. In this case however, you are responsible for complying with the service requirements for the airplane to ensure that the airplane remains in proper mechanical condition.

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System Failure / Maintenance Menu:

If you wish to work with mechanical failures located within an individual system, you can do so quite easily by selecting the system from the list displayed under <FAILURES.

In the example graphic shown above, we are shown the ELECTRICAL page of the failures menu. There are four items displayed here from which you can choose:

- <PROGRAMMED: This menu will display all of the potential mechanical failures that the system is capable of simulating. You can then individually activate, arm, disarm or deactivate the failures listed.
- <RANDOM: This menu will allow you to activate/deactivate random failures within this system, just as you would with the global random failures method described above.
- <SERVICE BASED FAILURES: Allows you to interact with the service based failures just as you would in the top menu described above. (Will be grayed out if service based failures are not selected active in the top menu.)
- <MAINTENANCE: Allows you to interact with the maintenance functionality for the selected system.

***Failures Master List:***

The following failures are possible:

APU: (2)

- APU Air
- APU Severe

Automatic Flight: (4)

- Autothrottle INOP
- Flight Control Channel A INOP
- Flight Control Channel B INOP
- Autoflight System INOP

Doors: (7)

- Air Stair Hatch
- Door 1Left
- Door 1Right
- Door 2Left
- Door 2Right
- Forward Cargo Door
- Aft Cargo Door

NOTE: Door failures can manifest either as indication problems or as an actual failure of the door seal with associated impact on the pressurization capability of the airplane. The QRH will help you to determine exactly which you are dealing with.

Electrical: (29)

- Integrated Drive Generator 1
- Integrated Drive Generator 2
- IDG 1 Drive
- IDG 2 Drive
- APU Generator
- Main Battery
- Main Battery Charger
- Aux Battery
- Aux Battery Charger
- Static Inverter
- Transformer Rectifier 1
- Transformer Rectifier 2
- Transformer Rectifier 3
- AC Transfer Bus 1



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- AC Transfer Bus 2
- AC Main Bus 1
- AC Main Bus 2
- AC Galley Bus 1
- AC Galley Bus 2
- AC Standby Bus
- AC Ground Service Bus 1
- AC Ground Service Bus 2
- DC Bus 1
- DC Bus 2
- DC Standby Bus
- DC Ground Service Bus
- DC Hot Battery Bus
- DC Hot Battery Bus Switched
- DC Battery Bus

NOTE: Failure of any electrical bus will cause equipment assigned to that bus to fail. Additionally, failure of any generating or backup power capability will have a realistic impact in terms of load shedding behavior and equipment sustainability. Survival loads supported by the standby electrical system will accurately deplete power from the battery/ies providing a realistic timeframe for standby power support.

Engine: (24)

- Electronic Engine Computer 1
- Electronic Engine Computer 2
- Engine 1 Severe Damage
- Engine 2 Severe Damage
- Engine 1 Flame-Out
- Engine 2 Flame-Out
- Engine 1 EGT Exceedance
- Engine 2 EGT Exceedance
- Engine 1 Oil Leak
- Engine 2 Oil Leak
- Engine 1 Oil Pressure
- Engine 2 Oil Pressure
- Engine 1 Oil Temperature
- Engine 2 Oil Temperature
- Engine 1 Vibration
- Engine 2 Vibration
- Engine 1 V1-Cut
- Engine 2 V1-Cut



- Engine 1 Vr-Cut
- Engine 2 Vr-Cut
- Engine 1 V2-Cut
- Engine 2 V2-Cut
- Engine 1 Reverser
- Engine 2 Reverser

Fire: (7)

- Engine 1 Cowl Overheat
- Engine 2 Cowl Overheat
- Engine 1 Fire
- Engine 2 Fire
- APU Fire
- Forward Cargo Fire
- Aft Cargo Fire

NOTE: Failure to handle engine fire events can have follow-on consequences.

Fire Protection Systems: (22)

- Engine 1 Fire Loop A
- Engine 2 Fire Loop A
- Engine 1 Fire Loop B
- Engine 2 Fire Loop B
- APU Fire Detection System
- Forward Cargo Fire Loop A
- Aft Cargo Fire Loop A
- Forward Cargo Fire Loop B
- Aft Cargo Fire Loop B
- Wheel Well Fire Detection Loop
- Bottle 1 Squib Left
- Bottle 1 Squib Right
- Bottle 2 Squib Left
- Bottle 2 Squib Right
- APU Bottle Squib
- Cargo Bottle Squib Forward
- Cargo Bottle Squib Aft
- Left Engine Fire Bottle Discharged
- Right Engine Fire Bottle Discharged
- APU Fire Bottle Discharged
- Cargo Fire Bottle 1 Discharged
- Cargo Fire Bottle 2 Discharged

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Flight Instruments: (10)

- Display Unit Left Outboard (Captain's PFD)
- Display Unit Left Inboard (Captain's ND)
- Display Unit Upper (Engine Display)
- Display Unit Lower (Lower Center Display)
- Display Unit Right Inboard (FO's ND)
- Display Unit Right Outboard (FO's PFD)
- DEU 1
- DEU 2
- Standby ADI
- RMI

Fuel: (13)

- Left Forward Fuel Pump
- Left Aft Fuel Pump
- Center Left Fuel Pump
- Center Right Fuel Pump
- Right Forward Fuel Pump
- Right Aft Fuel Pump
- Fuel Leak
- Crossfeed Valve
- APU Fuel Valve
- Left Spar Valve
- Right Spar Valve
- Left Engine Valve
- Right Engine Valve

NOTE: The location of a fuel leak will be random, requiring the crew to use the QRH procedure to identify and resolve the leak.

Hydraulics: (15)

- Engine Driven Pump (EDP) 1
- Engine Driven Pump (EDP) 2
- Electric Motor Driven Pump (EMDP) A
- Electric Motor Driven Pump (EMDP) B
- Standby Hydraulic Pump
- Engine Driven Pump (EDP) 1 Leak
- Engine Driven Pump (EDP) 2 Leak
- Electric Motor Driven Pump (EMDP) A Leak
- Electric Motor Driven Pump (EMDP) B Leak
- Standby Hydraulic Leak
- Electric Motor Driven Pump A Overheat



- Electric Motor Driven Pump B Overheat
- A SYS Quantity Refill Required
- B SYS Quantity Refill Required
- Standby System Quantity Refill Required

Ice/Rain Protection: (20)

- Captain's Pitot Heat
- Left Elevator Pitot Heat
- Left Alpha Vane Heat
- Temp Probe Heat
- Left Wing Anti Ice Valve
- Left Engine Anti Ice Valve
- Left Side Window Heat
- Left Front Window Heat
- Left Side Window Overheat
- Left Front Window Overheat
- FO Pitot Heat
- Right Elevator Pitot Heat
- Right Alpha Vane Heat
- Aux Pitot Heat
- Right Wing Anti Ice Valve
- Right Engine Anti Ice Valve
- Right Side Window Heat
- Right Front Window Heat
- Right Side Window Overheat
- Right Front Window Overheat

Miscellaneous: (11)

- Transponder 1
- Transponder 2
- TCAS
- Terrain Detection System
- Weather Radar System
- Weather Radar RT Left
- Weather Radar RT Right
- Windshear System
- Integrated Standby Flight Display
- Left Clock Fail
- Right Clock Fail

Navigation: (19)

- Flight Management Computer Left



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- Flight Management Computer Right
- Inertial Reference System Left
- Inertial Reference System Right
- Inertial Reference System Display Unit
- GPS Left
- GPS Right
- Computer Display Unit Left
- Computer Display Unit Right
- ILS Left
- ILS Right
- VOR Left
- VOR Right
- DME Left
- DME Right
- ADF Left
- ADF Right
- Radio Altimeter Left
- Radio Altimeter Right
- 1

Pneumatic: (12)

- Engine 1 Bleed Over Temp
- Engine 2 Bleed Over Temp
- Engine 1 Bleed Over Pressure
- Engine 2 Bleed Over Pressure
- APU Bleed Valve
- Engine 1 Bleed PRSO Valve
- Engine 2 Bleed PRSO Valve
- Left Bleed Duct Leak
- Right Bleed Duct Leak
- Isolation Valve
- Left 9th Stage Bleed Valve
- Right 9th Stage Bleed Valve

Pressurization: (2)

- Pressure Hull Integrity
- Pax Oxygen Masks Deployed

Wheels and Brakes: (10)

- Brake
- Tire
- Nose Tire Balance



- Antiskid Alternate Valve
- Antiskid Normal Valve
- Brake System Control Unit
- Brake Temperature System
- Autobrake Control System

NOTE: For any failure, we strongly recommend that you use the Quick Reference Handbook to practice diagnosing the problem. The QRH makes it extremely easy. Simply look up the warning light or symptoms that you see in the QRH index and then follow the checklist provided!

NOTE2: PMDG does not provide you with a copy of the Boeing 737 QRH. You will need to obtain a QRH if you are interested in diagnosing and troubleshooting failures realistically.

NOTE 3: Some failures, particularly those related to engine overheat warnings, pneumatic bleed over-pressures and door related warnings can have multiple meanings. For example, an engine overheat warning may require that you shut down an engine, or it may simply require a reduction in thrust. A door warning may simply be a faulty warning, or it may indicate a door seal failure that requires emergency action. This makes the simulation exciting and encourages you to use the Quick Reference Handbook to follow the trouble shooting procedures to deduce what type of failure you are dealing with!

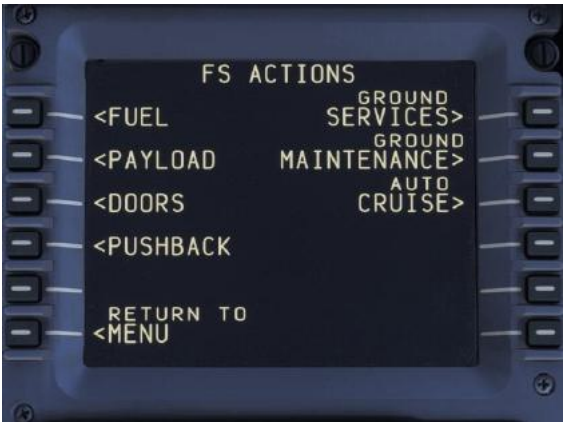
NOTE 4: We suggest you read the DETAILS AND QUIRKS OF THE PMDG 737 section. You will learn some interesting things about the simulation you are about to fly!



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FS ACTIONS MENU SYSTEM

The FS ACTIONS menu gives you access to various sub-systems that will allow you to adjust aspects of your flight in order to realistically simulate an operational airplane environment.



From the FS ACTIONS menu you can adjust the FUEL, PAYLOAD, DOORS, PUSHBACK, GROUND SERVICES, GROUND MAINTENANCE and AUTO CRUISE functionality.

**Fuel:**

The FUEL page allows you to manually set the aircraft's fuel load. Preset level functions on the lower left side of the display set the load to LONG, MEDIUM or SHORT RANGE levels. The fuel quantity may also be set as a percentage of total quantity or as a total numeric value directly.



In order to set the fuel quantity as a total or percentage, type the relevant number in the scratchpad, and then line select it to the TOTAL LBS (or KGS) LEVEL line. The simulator will automatically distribute the fuel quantity properly between the tanks.

On this menu the current gross weight, takeoff center of gravity location, zero fuel weight and maximum taxi weight values are displayed for your convenience.



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Payload (Passenger Airplane):

The PAYLOAD menu allows you to change the aircraft loading as desired right from within the simulator.



You can update the passenger load on your flight by manually entering the number of passengers seated in the first, business and economy class cabins.

You can also manually enter the cargo weights for the forward and aft cargo holds.

Conversely you can enter the percentage load factor you would like to carry on the LOAD LEVEL line on the right side of the display.

You may also use the SET FULL, SET EMPTY or SET RANDOM settings to establish your payload.

On this menu the current gross weight, takeoff center of gravity location, zero fuel weight and maximum taxi weight values are displayed for your convenience. You can alter the ZFW by entering the desired value. After altering any of the aforementioned values, the system will automatically distribute the load evenly.



Payload (Cargo Airplane):

The PAYLOAD menu allows you to change the aircraft loading as desired right from within the simulator.



You can update the main deck cargo load on your flight by manually entering the desired weight.

You can also manually enter the cargo weights for the forward and aft lower deck cargo holds.

Conversely you can enter the percentage load factor you would like to carry on the LOAD LEVEL line on the right side of the display.

You may also use the SET FULL, SET EMPTY or SET RANDOM settings to establish your payload.

On this menu the current gross weight, takeoff center of gravity location, zero fuel weight and maximum taxi weight values are displayed for your convenience. You can alter the ZFW by entering the desired value. After altering any of the aforementioned values, the system will automatically distribute the load evenly.



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Doors (Passenger Airplane):

The DOORS menu allows you to open and close all the doors on the aircraft from a single access menu.



DOORS 1/2: On this page you can open/close the forward entry and rear entry doors, as well as the overwing exits, and extend/retract the airstairs.

DOORS 2/2: On this page you can open and close the lower deck cargo doors and the equipment hatch.

NOTE: For air-stair equipped aircraft, you must close door 1L before you can retract the stairs into the airplane.



Doors (Cargo Airplane):

The DOORS menu allows you to open and close all the doors on the aircraft from a single access menu.



DOORS 1/2: On this page you can open/close the forward entry and rear entry doors and extend/retract the airstairs. On the 700 and 800 BDSF, doors 1L, 2L and 1R are operational. On the 800 BCF, only doors 1L and 1R are operational.

DOORS 2/2: On this page you can open and close the main deck cargo door, the lower deck cargo doors, and the equipment hatch.

NOTE: The main cargo door is electrically operated, and requires the main battery to be on, as well as ground power to be connected in order to operate. The door will also be operational if the APU is running instead of ground power.



INTRODUCTION

Pushback:

The PUSHBACK menu allows you to manage the pushback process from within the simulator.

***Automated Pushback:***

The pushback functionality allows you to set the parameters to be used during the pushback from the gate. Using this menu, you can set the units to FEET or METERS, enter the total pushback distance, the direction the nose will be turned and the number of degrees that will be used in the turn.

Different styles are also available now:

- Straight Out: The aircraft is pushed straight back with no turn.
- Standard L: The classic arced style.
- Dot the I: The aircraft is pulled straight back, angled out, and pulled back near the centerline angled away from the gate.
- Cross the T: Similar to the standard L, but the aircraft is pulled back near the centerline at the specified angle.
- None/Other: To be used on pull-through stands, or with other pushback tools.

Additionally, you can determine whether you will hear voice communication during pushback.

NOTE: In order to receive the START prompt, a tug type must be selected.

***Self-Drive Pushback:***

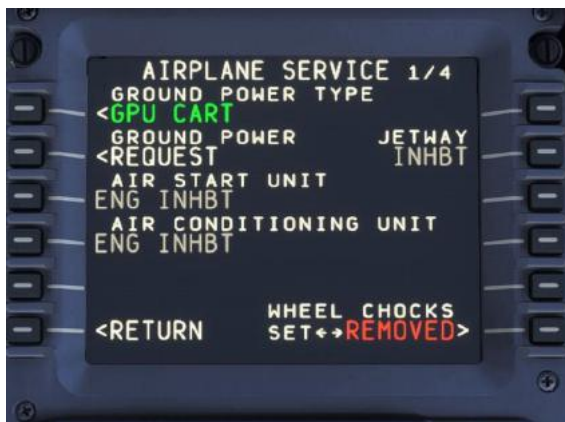
Some parking stands are in particularly tough spots to get out of. These spots are often well known to the ramp support staff. For them, with practice, it can be second nature. For add-on programs, or your basic pushback functionality, there is no chance. Whether a pushback function can't handle the position, or you are looking for a challenge, try selecting the SELF DRIVE pushback style, and then select the tug and have a go. See [page 45](#) for more detailed information regarding pushback.



INTRODUCTION

Ground Services (Passenger Airplane):

The GROUND SERVICES menu allows you to determine which ground services are currently available to your aircraft.



From the GROUND SERVICES menu, you can configure and manage the ground services using the following options:

- Set or Remove wheel chocks
- Ground power (GPU or EPP)
- Air Start Unit
- Air Conditioning Unit.
- Jetway (Request or Release)
- Portable Water Truck
- Lavatory Truck
- Maintenance Van
- Fuel Truck (including the ability to uplift desired amount of fuel and start or stop the refueling).
- Stairs (1L and 2L)
- Air Stairs
- Passenger Bus
- Cabin Cleaning
- Passenger Entry type (Stairs or Jetway)
- Target Pax, including the ability to start boarding
- Forward and Aft Galley trucks
- Forward and Aft baggage loaders
- Forward and Aft baggage carts
- Forward and Aft Target baggage weights, including the ability to start loading



NOTE: It is important to note that all ground services require that the airplane be chocked in place before they will be made available to you by the ground crews. For this reason, you must select the chocks to SET before you will be able to use any other ground services.

If you have other ground services selected and you remove the chocks, the ground crew will also remove the ground services.

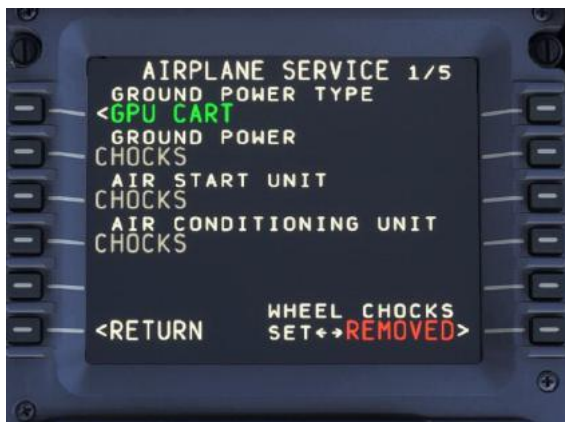
Use of Color: Note that on this menu, any item that is colored in red indicates that the aircraft is not safe to move. If all items are colored in green, then it is safe to move the airplane.



INTRODUCTION

Ground Services (Cargo Airplane):

The GROUND SERVICES menu allows you to determine which ground services are currently available to your aircraft.



From the GROUND SERVICES menu, you can configure and manage the ground services using the following options:

- Set or Remove wheel chocks
- Ground power (GPU or EPP)
- Air Start Unit
- Air Conditioning Unit.
- Portable Water Truck
- Lavatory Truck
- Maintenance Van
- Fuel Truck (including the ability to uplift desired amount of fuel and start or stop the refueling).
- Stairs (only 1L for cargo airplane)
- Air Stairs
- Pallet Loader (for main deck cargo)
- Cabin Cleaning
- Crew Entry type (Stairs or Airstairs)
- Main Cargo Deck Target cargo weight, including the ability to start loading
- Forward and Aft Galley trucks
- Forward and Aft baggage loaders
- Forward and Aft baggage carts
- Forward and Aft Target baggage weights, including the ability to start loading



NOTE: It is important to note that all ground services require that the airplane be chocked in place before they will be made available to you by the ground crews. For this reason, you must select the chocks to SET before you will be able to use any other ground services.

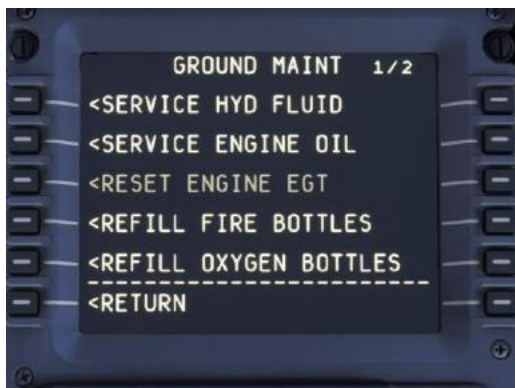
If you have other ground services selected and you remove the chocks, the ground crew will also remove the ground services.

Use of Color: Note that on this menu, any item that is colored in red indicates that the aircraft is not safe to move. If all items are colored in green, then it is safe to move the airplane.

INTRODUCTION

Ground Maintenance:

The GROUND MAINTENANCE menu allows you to request the maintenance crew to perform specific maintenance tasks on your aircraft.



You can request the following maintenance to be performed:

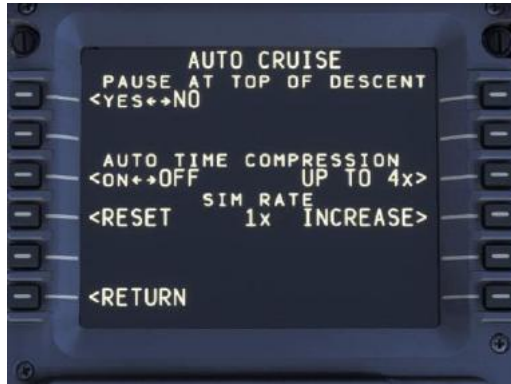
- Service Hydraulic Fluid
- Service Engine Oil
- Reset Engine EGT
- Refill Fire Bottles
- Refill Oxygen Bottles
- Cool Brakes
- Replace Brakes
- Replace Tires
- Reconnect IDGs
- Service APU SCU Motor

NOTE: It is important to note that *all ground services require that the airplane be chocked in place before they will be made available to you by the ground crews.* For this reason, you must select CHOCKS SET in the GROUND CONNECTIONS menu before you will be able to use any other ground services.



Auto Cruise:

The AUTO CRUISE menu allows you to set up various cruise related items in your aircraft.



From the AUTO CRUISE menu, you can choose to enable Pause At Top Of Descent. You can also set the Auto Time Compression option to On or Off and specify the time compression ratio. You can select between 2X, 4X, 8X and 16X.

The Sim Rate can be increased without having to access the MSFS menu. To reset the Sim Rate, press the <RESET LSK and the rate will be set back to 1.



INTRODUCTION

GETTING THE MOST FROM YOUR PMDG 737

We have collected a few pointers to help you get started with the PMDG 737. Whether you are a veteran PMDG customer or completely new to flight simulation, these tips will help you get more out of the simulation purchase you have just made!

Using the Landing Lights:

The Boeing 737 has four landing light switches. To simplify the activation of these lights, a left click on the gang bar will move all four. To turn off all four: right click the gang bar when using PMDG type mouse interaction. When using the (default) MSFS type mouse interaction, click on the top half of the gang bar (an open hand cursor will indicate the retract position).

If the landing light option is the LED option, the same left/right click or open hand cursor functions can be used on the hidden click spot over the LANDING label.

***TrackIR:***

One of the limitations that the MSFS world places on you as a pilot is the inability to easily lean back and forth, or to move your body around to more easily facilitate reaching or seeing switches, knobs or displays.

We strongly recommend that you explore the possibility of installing a TrackIR package as this greatly improves the sense of "being there" by allowing you to overcome this limitation within MSFS:

<http://www.naturalpoint.com>

For the most part using your mouse to move your head and zoom in/out is perfectly acceptable, but occasionally geometry within the cockpit can impede your ability to enter data into the FMS, for example.



In order to reduce this inconvenience as much as possible, we have made it possible for you to retract the yoke toward the floor of the airplane in order to “free up” a clear line-of-sight to the FMS keyboard from the normal head position.

Alternate TO/GA Click Spot:

When flying the real airplane, the TO/GA buttons are placed quite comfortable under the tips of your fingers at the top of the throttle columns.

Unfortunately, we don't all have fully operable replicas of the 737 throttles to use with our MSFS setups, so we have added a few features to help you manage the TO/GA process as if it were right under your fingertips.

You can click on the actual TO/GA button if you like, but this is arguably not very convenient, especially when initiating a go-around at low altitude.

This is why we have placed a “TO/GA Click Spot” on the screw in the uninhabited lower left corner of the MCP for your ease of use.

To activate TO/GA mode, click on the screw as shown in the image below:



PFD/ND/EICAS/CDU Pop-ups:

If you want or need to pop up any of the display screens in the 737, you can do so by pressing RIGHT ALT on your keyboard, and then clicking on the display you want to pop up.

INTRODUCTION

LIMITATIONS OF THE SIMULATOR

In the process of developing this highly sophisticated simulation, it became apparent to us that many of the default functions are simply not effective for use when producing a realistic simulation of a complex airliner. As such, we have developed a simulation that to that largest degree possible does not use any default functionality.

Systems that have been completely customized for realism and functionality include:

- Autopilot Functions
- Engine Performance Model
- All Mechanical Subsystems

Limiting our dependence upon the simulator has allowed us to use this very popular simulation platform as a worldwide operating environment without being severely limited by the original design of the simulation. Occasionally however, this means that we had to accept certain limitations on our simulation in order to accomplish our goals.

The vast majority of limitations we have found will never be experienced by most users. A few should be kept in mind however, as they are essential and important to the simulation:

Time Acceleration Limit:

- Time Acceleration should be limited to 16x to ensure proper autopilot function.
- Time Acceleration should be limited to 16x to ensure proper fuel system function. (The mathematical iterations required for damping and control law become prohibitive for most desktop machines when run at speeds at greater than 16x, so we have not tuned the autopilot or fuel system for operation at acceleration rates faster than 16x.)

External Load/Fueling Programs:

- Do not use any non PMDG product to alter the aircraft.cfg file.
- Do not use any non PMDG product to alter the fuel load of the airplane.
- Do not use any non PMDG product to alter the loading of the airplane. (PMDG uses actual manufacturer data to model the Cl/Cd, moment influence and drag models for our aircraft. Using



this data, the aircraft's reference point is placed realistically ahead of the nose of the airplane as per the manufacturer's specifications. Most add-on aircraft use the erroneous concept of placing the model's reference point at the center of the airplane. This results in reduced realism and impacts negatively the accuracy of the airplane's behavior.)

Hardware toe brakes:

If you use hardware toe brakes such as those created by CH Products, we would like you to be aware that in order to implement the proper "tripping off" of the auto-brake system, we had to put some limitations in place in order to prevent the inherent MSFS logic from inadvertently taking over the autobrake release logic inappropriately:

To release the autobrake with your hardware toe brakes you must:

- Apply the brakes twice, quickly; and
- Apply greater pressure than the autobrake is currently applying.

This is different than the brake-directed disengage function on the airplane, but it was unavoidable.

External route export programs:

Flight plan .rte files created with external flight planning programs or websites will have the runways, SIDs, STARs and approaches contained within them stripped when importing into the FMC, resulting in just the enroute portion being entered. Routes saved with the FMC itself will still retain these items.

This was done because these programs in many cases insert nonsensical terminal procedure data that will either crash the FMC or cause general weirdness in the route. In addition, COROUTES do not contain runways and terminal procedures in real life because they often change with the prevailing winds and the day's departure routing. The runways, SIDs, STARs and approaches are manually entered by the crew when assigned by ATC even if a COROUTE was used for the enroute portion of the flight.



THE COLLINS WXR-2100 WEATHER RADAR

The PMDG 737 does not currently include a simulation of the Collins WXR-2100 unit commonly found on the 737 and other airliners. If/when access to this functionality becomes available, we will implement the weather radar.



FMC SAVED FLIGHT PLANS AND COMPANY DATALINK

Flight plan file management:

Flight plan files for all PMDG products are saved in the PMDG .rte format and are located in the following locations, depending on which distribution of the simulator you have installed:

MS Store:

`C:\Users\{username}\AppData\Local\Packages\Microsoft.FlightSimulator_8wekyb3d8bbwe\LocalState\packages\pmdg-aircraft-737\work\Flightplans`

Steam:

`C:\Users\{username}\AppData\Roaming\Microsoft Flight Simulator\Packages\pmdg-aircraft-737\work\Flightplans`

The system is able to load or save flight plans from any folder in the **Flightplans** folder.

Loading flight plan files

Loading an FMC route is accomplished through the FMC CDU's RTE page, using either the CO ROUTE (LSK 3R) or the ROUTE REQUEST (LSK 3L) prompt.

CO ROUTE is used to directly load a route for which you already know the file name. Enter the name into the scratchpad without the extension and press LSK 3R.

ROUTE REQUEST will allow you select a flight plan file located in the **Flightplans** folder. Once the file is selected the route will be loaded by simulating the FMC datalink procedure used to load routes on the real life aircraft.

The ORIGIN (LSK 1L), DESTINATION (LSK 1R) and FLT NO (LSK 2R) fields of the RTE page are optionally used to define the request. If you press the ROUTE REQUEST with these 3 fields empty you will be able to select any flight plan file manually. If you have already filled in the origin field, both the origin and destination fields, or the flight number field the FMC will filter the available routes it displays based on the criteria you've entered.

Initiating a ROUTE REQUEST at LSK 3R will bring up a new page titled "REQUEST CO ROUTE" that lists all the subdirectories that include flight plans meeting the selection criteria and also indicate how many flight plan



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files were found in each subdirectory. Selecting one of the subfolders will bring up a new page listing all the relevant flight plans in it. Once you select one of the flight plans the name will be highlighted and a REQUEST> prompt will appear in 6R. Pressing LSK 6R will return to the RTE page and initiate the uplink procedure for the selected route.

While in the REQUEST CO ROUTE page or in the subfolder files listing pages, you can further filter the displayed routes by typing on the scratchpad. Any characters typed on the scratchpad will filter the displayed routes to those with a file name starting with the entered characters.

If there is only one flight plan file matching the RTE page selection criteria (origin + destination or flight number) the REQUEST CO ROUTE page is not displayed and the uplink procedure is initiated immediately, directly from the RTE page. This opens up a lot of interesting methods of organizing your flight plans – you could make a folder with routes organized by flight number, simply enter that number into the FMC and press ROUTE REQUEST and the datalink simulation will load the correct route automatically.

Using Simbrief to create a flight plan and weather data

In your SimBrief Downloader, define an additional two folders pointing at

MS Store:

C:\Users\{username}\AppData\Local\Packages\Microsoft.FlightSimulator_8wekyb3d8bbwe\LocalState\packages\pmdg-aircraft-737\work\Flightplans

Steam:

C:\Users\{username}\AppData\Roaming\Microsoft Flight Simulator\Packages\pmdg-aircraft-737\work\Flightplans

under **PMDG Flightplan**

and

MS Store:

C:\Users\{username}\AppData\Local\Packages\Microsoft.FlightSimulator_8wekyb3d8bbwe\LocalState\packages\pmdg-aircraft-737\work\WX

Steam:

C:\Users\{username}\AppData\Roaming\Microsoft Flight Simulator\Packages\pmdg-aircraft-737\work\WX

under **PMDG Wind Uplink**.



Make sure you check the tick mark next to the PMDG FLIGHTPLAN and PMDG WIND UPLINK entries.



Now follow these simple steps.

1. Create a flight plan

Create a flight plan through the SimBrief web interface.

2. Generate OFP

Click on Generate OFP and press OK at the prompt.

3. Download created data via the Simbrief Downlaoder app

Launch the SimBrief Downloader app and make sure your newly created flight appears in the LATEST FLIGHT PLAN field entry at the top. Now press **EXPORT SELECTED FORMATS**. Your flightplan and weather data are now saved in the correct folders for the FMC to fetch and use upon request.

Tips and Hints

Before you request WIND data for the PMDG 737 aircraft make sure your PERF INIT page is complete and EXEC'ed. Furthermore, there must be a valid FMC position available which in turn means that at least one IRS unit is fully ALI|GN'ed and in the NAV position. The 737 FMC unlike other Boeings will only read data for one defined cruise altitude and only cruise waypoints. Hence the need to have PERF INIT complete and EXEC'ed and an FMC position valid.

When you request descent forecast data for the first time (the relevant CDU pages contain no data), wind data will be retrieved for a predefined set of 3 altitudes and need to be EXEC'ed. You may subsequently manually edit any or all of those predefined altitudes with values of your choice. In the latter case you should post another DES FOREACT request. The FMC will then automatically load wind data for your new edited altitudes which you have to EXEC again.

In general be aware of the fact that unlike previous generations of FS, forecasted data are generated by software that has no direct control over the internal MSFS weather. Forecasted values may thus vary from actual in sim weather. Fortunately the FMC just like its real world counterpart will



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mix actual with forecasted data using specific real world functions, both vertically (climb/descend) and along the route.

NOTE: if you perform long flights in real time (for example the PMDG 737 BBJ with auxiliary tanks can easily perform a 10 hour flight) then your DES FORECAST data by the time you are close to the Top of Descent (T/D) maybe out of date. It is advised in this case to have your flight saved in SimBrief, reload the flight, generate again the OFP and re-download the latest WX data file. Now post another request for DES FORECAST and EXEC.