

LEVEL-D
SIMULATIONS
767-300ER

FSX UPDATE
Operations
Manual
&
Guide



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DISCLAIMER

This manual is a companion document to the Level-D Simulations 767-300ER.

All system descriptions, procedures, general information, and checklists contained herein (though based on the aircraft produced by a real-world aircraft manufacturer) are for flight simulator purposes only, and are not intended to be used in real world operations whatsoever.

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FSX Update Edition

June 2007

Level-D 767-300ER Operations Manual & Guide

Introduction for FSX

Welcome to the Print Edition electronic update for the Level-D Simulations 767-300ER for Flight Simulator X. Thanks for supporting the production of the print edition of the manual. For this electronic update to the Print Edition manual, the changes to the 767 for FSX will be contained in the Introduction, Flight Management and Tutorial chapters.

Printing this Update

To print these pages on BOTH SIDES of the paper with your personal printer, print the ODD side first, then flip the pages over and print EVEN pages. For higher quality output, consider taking the pdf to a commercial print outlet. Page numbers are numbered consecutively to coincide with the page numbers of the print edition. A table of contents for this FSX update has been included at the end of this document and is meant to be placed after page 10 of the print manual.

Overview

With FSX and the SP1 update, the Microsoft Flight Simulator ACES team have made some significant changes to the platform and have added many new features. Some of these changes have required modifications to the 767. The most noticeable differences to the Level-D 767 are evident with the VNAV descent modelling, menu system, and configuration settings. But, there are also some subtle changes to the 767 and systems that may not be immediately apparent.

The Level-D Simulations 767-300 for Microsoft Flight Simulator is a complex simulation. The panel is a complete reproduction of a 767-300 cockpit in both the traditional (2D) multi-panel environment, as well as a fully functional virtual (3D) cockpit. The included aircraft comes in a variety of aircraft liveries (which can be freely downloaded from the Level-D Simulations home on the internet at <http://www.leveldsim.com>) and can be installed to FSX using the updated for FSX Repaint Manager utility provided by Flight1 (and installed to the Program directory). Selection of one of the included aircraft via the normal flight simulator menu loads both the aircraft and the panels.

The Introduction offers an overview of the program, panel layout, menu options, setup considerations, and 767 specifications. The “Level-D” and “B767 Specific” menu are described in detail within this section. The remaining sections of this manual explain the aircraft systems and controls.

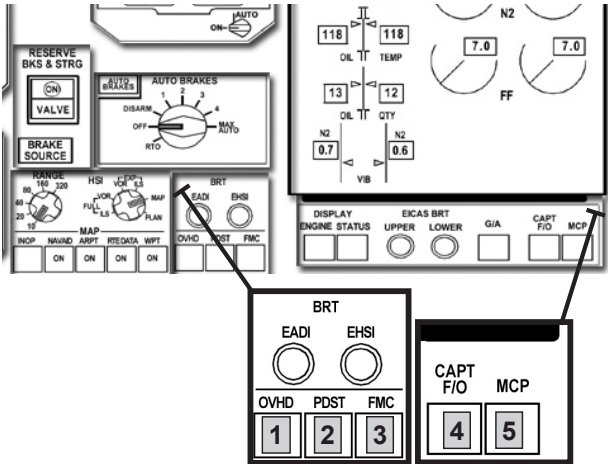
The panel is initially loaded in a “ready-to-fly” state. All systems are set correctly for normal flight operations. The aircraft can be flown manually using all normal simulator controls available in MSFS. To use the automatic pilot and navigation capabilities of the aircraft, it is recommended that the AFDS and FMS sections of this manual be reviewed thoroughly.

Cockpit Panels (2D)

The aircraft may initially load with the 2D cockpit presented. With the FSX version, the Virtual Cockpit may load first. The 767 simulation is a multi-panel environment where different views are attained by switching the visible panels on and off. These views can be controlled via the MSFS menu, control buttons on the main panel, or by using keyboard keystroke combinations. The following panel views are available...

Panel Type	Panel Contents	Display Control
Captain visible overhead	Left side main cockpit window posts and light switches	<SHIFT><1>
Captain main panel	Left side main cockpit instrument display	<SHIFT><2> "CAPT" button
First Officer (F/O) visible overhead	Right side main cockpit window posts & light switches	<SHIFT><3>
First Officer (F/O) main panel	Right side main cockpit instrument display	<SHIFT><4> "F/O" button
Overhead systems panel	Complete overhead panel	<SHIFT><5> "OVHD" button
Pedestal controls	Throttle quadrant, fire controls, and radios	<SHIFT><6> "PDST" button
Flight Management Computer (FMC) CDU	FMC control display unit	<SHIFT><7> "FMC" button
Autopilot Flight Director System (AFDS) MCP	Windowed version of the autopilot control panel	<SHIFT><8> "MCP" button
Standby instruments	Standby attitude, altimeter, and airspeed gauge display	<SHIFT><9>

Control buttons are provided on the main panel to toggle the display of available cockpit panels.

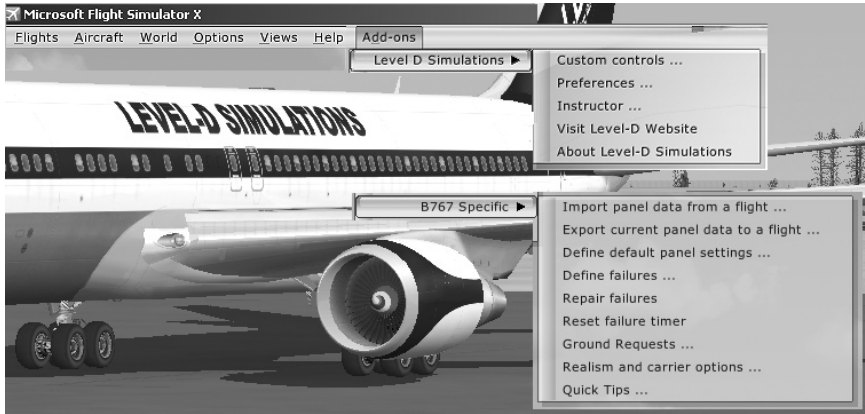


Virtual Panel (3D)

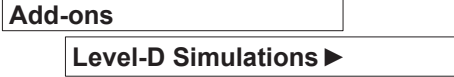
The virtual cockpit display is a three-dimensional rendering of the the 767 flight deck. Virtual Cockpit preferences are set from the *FSX Options> Settings> Display* menu. The 3D panel can be set as the default view from the FSX menu. All controls found on the main (2D) panels are available within the virtual cockpit. Any switch actuated in the virtual cockpit is also actuated on the 2D panels, and vice-versa.

The FMC cannot be controlled from the FMC displays within the virtual cockpit. To operate the FMC, the normal 2D window must be displayed. Mouse clicking on the FMC within the virtual cockpit causes the 2D FMC CDU to display in a separate window. This window may also be displayed using the <SHIFT><7> keyboard combination. Changes to the FMC are made from within the windowed FMC CDU while operating in the virtual cockpit.

Menu System



The Level-D Simulations menu is available from the "Add-ons" FS menu bar at the top of the simulator window. There are 2 Level-D menus: the top menu, "Level-D Simulations", is for general settings related to current and future Level-D products; the bottom menu, "B767 Specific", is for setting options specific to the 767. Some of the menu selections have sub-menus which are explained in further detail below. Selection of "Quick tips ..." displays the quick tip dialogue box seen when the panel is first loaded. Selection of "Visit Level-D website" opens up the default internet browser and automatically displays the Level-D website. Selection of "About Level-D Simulations" displays the credit roll call for the Level-D Simuations team.



Presents a sub-menu for Custom Controls, Preferences, and Instructor options available for Level-D products.

Custom Controls...

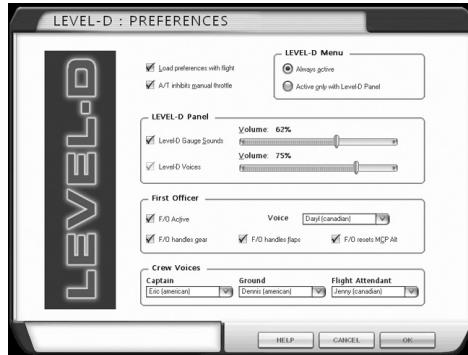
Presents a sub-menu of custom keyboard and joystick assignments. These settings are in addition to the default FS keyboard & joystick commands. Use the "Event category" pull down menu to filter the display of keyboard assignments to a specific category. The custom control assignments for the

displayed category may be printed using the “Print selected category” button. A complete listing of the Level-D 767 keyboard commands are available later in this manual.

To change a default assignment, highlight the desired panel function and press the “Change assignment” button. Follow the on-screen instructions to make the changes. Use the “Delete key assignment” button to delete a custom control assignment. Use the “Reset defaults” button to reset the custom controls to the default assignments. This action deletes all user defined assignments.

Load preferences with flights

Check this box to cause preference options to be loaded with other 767 panel data when recalling a saved flight via the MSFS menu. When unchecked, the preference options are not changed when loading saved flights.



A/T inhibits manual throttle

Check this box if the joystick throttle is interfering with the autothrottle settings. Joystick interference can be seen as random throttle changes not appropriate for the phase of flight.

Level-D Menu

Select the radio button next to the preferred choice for the display of the “Level-D” menu item in the FS menu bar.

Level-D Panel (Gauge Sounds & Voices)

Controls the status and volume for sound events specific to the panel. When checked, Level-D panel sounds are played at the level selected on the slider bar. When unchecked, the respective Level-D panel sounds are not played. This option has no effect on the FS default sound configuration.

Level-D Simulations offers a virtual F/O to assist you during in-flight operations. When activated, the First Officer will provide callouts, raise and drop the gears, flaps, and reset the MCP altitude.

First Officer Controls the status of the “virtual First Officer”: provides automatic callouts and performs the selected tasks.

F/O Active Activates the F/O to make automatic callouts and perform the selected tasks. Use the voice drop down menu to select the desired voice for the F/O callouts.

F/O handles gear When checked, First Officer raises and lowers landing gear.

F/O handles flaps When checked, the First Officer automatically raises and lowers the flaps at the appropriate minimum flap speeds.

F/O resets MCP Alt When checked, the F/O sets the MCP altitude.

Crew Voices Drop down menus for the selection of crew voices.

Instructor...

Presents a sub-menu for the selection of Instructor preferences

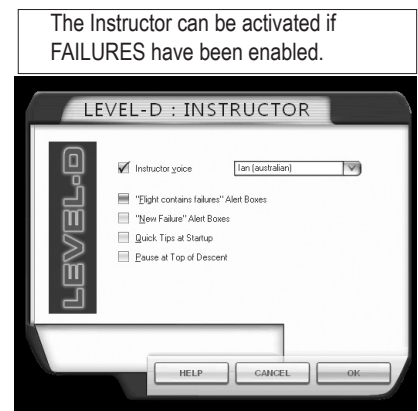
Instructor voice Check this box to enable audio for the Instructor. Use the drop down menu to the right to choose instructor voices.

“Flight contains failures” Alert Boxes When enabled, an alert box will display failure(s) the flight is loaded.

“New Failure” Alert Boxes If a random failure(s) is enabled, warnings will display when each new failure(s) occurs.

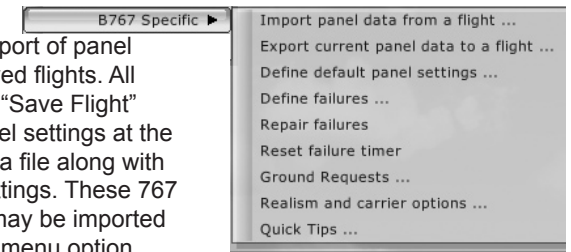
Quick Tips at Startup Check to enable Level-D “tips” at FS startup.

Pause at Top of Descent Check this box to pause the program when the aircraft reaches the FMC’s calculated T/D (Top of Descent). An arrival runway must be programmed. Simulation rate of 1X only.



Add-ons

Permits import and export of panel settings to and from saved flights. All flights saved via the FS “Save Flight” menu have the 767 panel settings at the time of saving stored in a file along with the default simulator settings. These 767 specific panel settings may be imported and exported using this menu option.



Import panel data from a flight... Option to import 767 panel settings from a previously saved flight into the current simulator session. Secondary checkbox option to “Import FMC Data with Panel Settings”. Check to enable importation of FMC data.

Export current panel data from a flight... Option to export the current 767 panel settings to a previously saved flight. All 767 specific data for the saved flight is overwritten with the new data from the existing simulator session.

Both of these options use the same selection boxes that list the saved 767 flights that are available for import/export. Select the desired flight and follow the directions in the dialogue boxes to perform the selected operation.

Define default panel settings... Option to define start-up panel settings.

Define failures... Displays a submenu for the definition of 767 system failures.

Use the radio buttons to make either “Random Failures” or “Count Down Failures” the active dialogue box. Select the type of failure and the failure rate using the menu items contained within each box. For random failures, use the slider bar to select the types of failures within each system that are available to the random failure generator. The rate of random failures is set using the Mean Rate dialogue boxes. For the countdown failures, select the type of failure using the pull down menu, then select the countdown time using the dialogue boxes next to the failure type.

Repair failures Select this item to repair all active & pending failures. This action restores the failure menu so that all failures are available once again for selection.

Reset failure timer Select this item to reset the timer for a countdown failure.

Ground Requests Use this menu on the ground to handle requests for items that occur outside of the aircraft.

Ground Requests are also available via the Communications panel on the overhead panel.

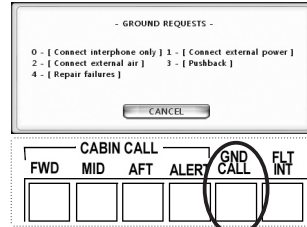
0 Connect interphone only Requests the connect/disconnect of the interphone. Text changes to indicate the status of the ground connection.

1 Connect external power Request connect/disconnect of the external power source. External power is indicated on the overhead electrical panel by the AVAIL light in the EXT PWR switch.

2 Connect external air Request connect/disconnect of the external air. The text changes to indicate the status of the external air.

3 Pushback... Presents a sub-menu for pushback control. Select the distance for the pushback using the dialogue box. Use the slider bar to specify if a turn should be performed during the pushback. Check the "Push and Start" box to indicate that an engine start will be performed during pushback. Check the "Disconnect interphone" box to have the ground crew automatically disconnect the interphone after pushback.

4 Repair failures Initiates a request that the ground crew repair all failures. This function is the same as the Repair Failures selection found above, except that the request is verbally played as a cockpit to ground interaction.



Realism and carrier options...

Carrier options

Standard-style EADI or Speed tape EADI Drop down menu for the selection of two different EADI presentation styles. The standard style EADI displays a fast/slow gauge along the left side of the display. The speed tape EADI presents a speed tape in place of the fast/slow gauge, along with a reformatting of the AFDS mode Annunciators.

Dual cue / Single cue Flight Director Toggles the presentation of the flight director between the single cue (bat wing) & the double cue (crosshair) format.

Climb Thrust Derate Washout Sets the removal altitude derate climb power on Thrust Rating Panel.

None Derate climb is never reduced.

12000 At 10000 derate is removed proportionately up to 12000ft. Upon reaching 12000ft climb thrust equals normal climb thrust.

30000 At 10000 derate is removed proportionately up to 30000ft. Upon reaching 30000ft climb thrust equals normal climb thrust.

AFDS automatic multi-channel When checked, the AFDS automatically engages for an autoland without pilot action. When un-checked, the autopilot channels must be manually selected by the pilot to engage the AFDS for an autoland.

GPWS altitude callouts When checked, altitude callouts are automatically generated based on Radio Altitude during the descent for landing. When un-checked, no altitude callouts are made.

EADI Displays A/T flag When checked, the EADI annunciates "A/T" when the autothrottle is engaged. When unchecked, "A/T" is not annunciated on the EADI at any time.

Airspeed BUGS option Speed bugs can be set automatically using a hidden mouse click area in the lower left corner of the airspeed gauge. The speed bugs are set according to the following schedule when the mouse area is clicked:

On the ground (for Takeoff):

Checked: V1, VR, V2 (MCP bug), Vref30+40, Vref30+80.

Un-Checked: V1, V2 (MCP bug), Vref30+20, Vref30+40, Vref30+60, Vref30+80.

In flight (for Landing):

Checked: Vref30, Vref30+40 Vref30+80.

Un-Checked: Vref30, Vref30+20, Vref30+40, Vref30+60, Vref30+80

Load carrier options with flights Check this box to cause carrier options to be loaded with other 767 panel data when recalling a saved flight via the MSFS menu. When unchecked, the carrier options are not changed when loading saved flights (situation files).

Realism

Battery discharge Battery discharge can drain the battery dead.

Electric load shedding Realistic electrical load shedding occurs.

Pneumatic loads Realistic pneumatic/air load occurs, requiring duct pressure of 30 psi or greater for engine start.

Engines damage Engines are subject to damage when operated abnormally.

Realistic fuel feed Engine fuel feed requires correct fuel panel configuration. Above 18,000 feet, engine restart is not possible without fuel pumps. Also, engine flameout is possible above 18,000 feet with the fuel pumps turned off.

Automatic door opening Cabin and cargo doors open & close automatically.

IRS position drift IRS positions are subject to drifting error.

IRS needs position entry IRS coordinates must be entered during alignment.

IRS real align duration When checked, IRS position align = 10 minutes. When unchecked, IRS position align = 2 minutes.

Autoland restrictions The autoland system is subject to systems limitations (see AFDS section). When unchecked, an autoland can be performed at any time.

Failures repaired by ground crew Failures are repaired when engines are shutdown.

FMC tunes ILS When a landing runway is selected in the FMC, the ILS frequency is automatically tuned into the ILS receiver when the aircraft is within 20 nautical miles of the landing runway.

Load realism options with flights Check this box to cause realism options to be loaded with other 767 panel data when recalling a saved flight via the FS menu. When unchecked, the realism options are not changed when loading saved flights.

Level-D 767 Specifications

The 767-300ER is an extended-range, higher gross weight version of the aircraft. The Boeing Aircraft Company’s development of the -300ER began in January of1985. As of December, 2006, airlines had ordered five hundred and thirty-four 767-300ER’s, and 514 orders had been filled.

	Imperial (lbs)	Metric (kg)
Operating Empty Weight	197,000	89,545
Max Takeoff Weight	408,000	185,454
Max Zero Fuel Weight	288,000	130,909
Max Landing Weight	310,000	140,909
Max Fuel Weight	161,740	73,518
Range:	6,289 m	10,121 km
Typical city pairs: Los Angeles/Frankfurt		
Max Cruise Altitude		43,100 feet
Normal Speed (FL350)	M0.80 (530m / 851k)	
Max Seating Capacity		350

Power Plant, Controls & Fuel

Two high-bypass turbofans in pods, pylon-mounted on the wing leading edges. Powered by two **General Electric CF6-80C2** engines rated at **61,500 pounds of thrust** per engine. Engine controls include the throttles, fuel cut-off switches, EEC switches, fire handles, and the Thrust Rating Panel (TRP). The FMC contains performance information for the engines and coordinates with the autothrottle and TRP to control engine power for de-rated takeoffs as well as VNAV climb, cruise and descent. Fuel in one integral tank in each wing, and in centre tank with refuelling point in port outer wing.

Fuel Load
Metric (FSX Settings> General> International> HYBRID (Feet, Milibars)

Tank	Kilograms	Liters
Main Wings	18,449 X 2	22,977 X 2
Center	36,473	45,425
TOTAL	73,371	91,379

Imperial (FSX Settings> General> International> U.S. SYSTEM (Feet, Inches)

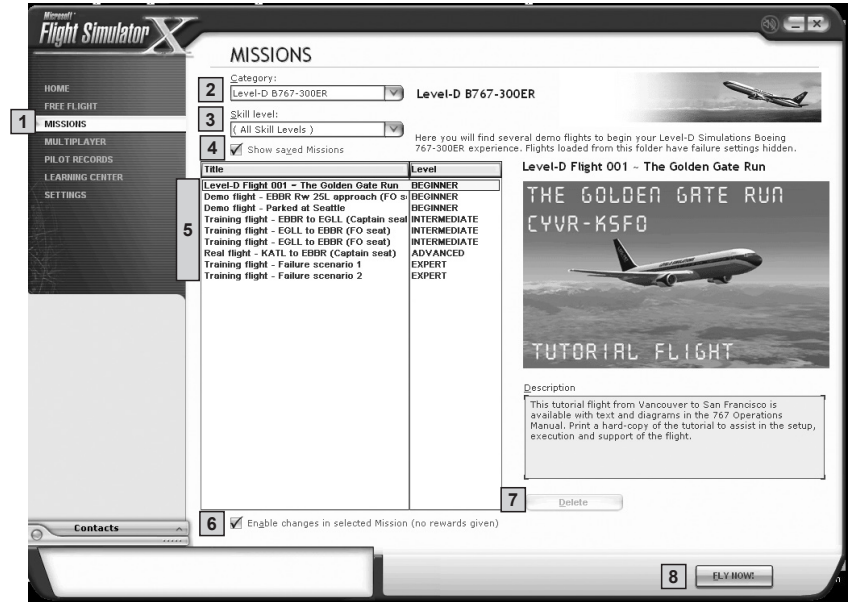
Tank	Pounds	Gallons
Main Wings	40,669 X 2	6,070 X 2
Center	80,400	12,000
TOTAL	161,738	24,140

Aircraft Dimensions

Wing span	47.57 m (156 ft 1 in)
Length	54.94 m (180 ft 3 in)
Fuselage	53.67 m (176 ft 1 in)
Height overall	15.85 m (52 ft 0 in)
Tailplane span	18.62 m (61 ft 1 in)

Missions

The missions included with the Level-D 767 for FSX are available from the FSX “Missions” menu.

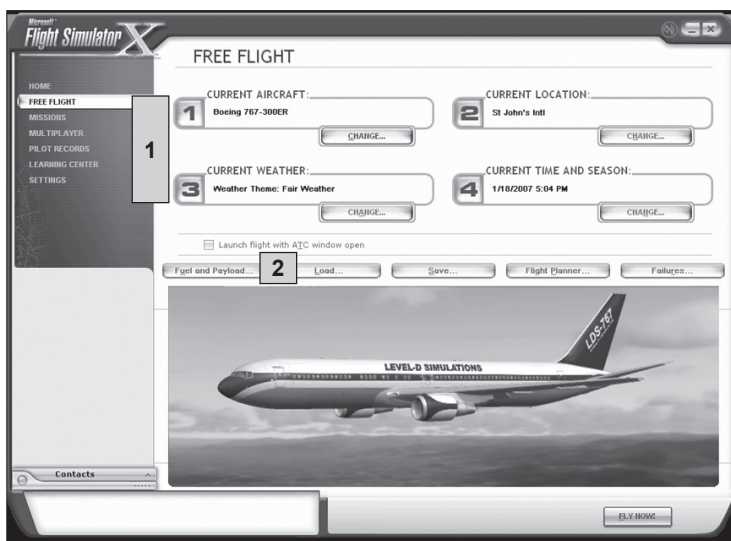


1. Missions menu.
2. Category. From the dropdown **select** Level-D B767-300ER.
3. Skill Level. **Choose** “All Skill Levels” from the dropdown menu to view all Level-D 767 Missions.
4. Show saved Missions. Enable checkbox to view the user-saved mission files. If you choose to save a file during the execution of a mission, the files will be displayed below the mission name in the missions listing (5).
5. Missions Listing. **Choose** a mission. User-saved mission files will display below missions if “Show saved Missions” is enabled.
6. Enable changes in selected Mission (no rewards given). **Enable** checkbox to allow changes to the mission. There are no rewards granted for the successful completion of Level-D 767 missions.*
7. Delte. Option to delete selected user-saved mission file.
8. Fly Now! Get going...

* The missions included with the 767 for FSX do not present a “reward” for successful completion. We are still exploring the limits of mission creation with the 767 and hope to release “reward mission modules” in the near future. Perhaps users will be inspired to try to create their own Level-D 767 missions, or work to add to the Golden Gate Run?

Situation Files

When our real world Captain and First Officer arrive at the flight deck, they are usually greeted with an aircraft that is powered and ready for flight. But, what if you want to start the aircraft from a cold and dark panel state? Or, you'd like to have just the aircraft powered and IRS aligned? If you're interested in starting your workday as you choose, we have included some start-up flight deck configurations that can be imported to any location your 767 is parked at. You can also setup and save your own "situation" file. Once that file is saved, you can then quickly import the panel settings for every departure location. It's a simple and efficient way to start a flight. This page describes how to save a file for future use.



1 SETTING & SAVING

- From the FREE FLIGHT screen/menu, choose any Level-D 767 aircraft. No need to worry about location, weather, time & season or fuel. Choose "Fly Now". The simulator will load with the engines running.
- Shut down the aircraft. Follow the "Shutdown" & "Complete Shutdown" Checklist(s) from the Normal Procedures & Checklist. Once you're satisfied with the panel state you have, then...
- Save the flight: Press "Save..." Choose OK. That's it. The file has been saved. Enjoy your flight.

For subsequent flights, simply follow these directions:

2 LOAD

- From the FREE FLIGHT screen of FSX menu select "Load..." button.
- Choose the file you have saved from the "Load Flight" screen. Press "Fly Now!"

IMPORT

- From the Add-ons > B767 Specific menu select "Import Panel Data from a Flight..."
- Select any of the available 767 flights or one you have created. **NOTE** Secondary checkbox option to "Import FMC Data with Panel Settings". Check to enable importation of FMC data.
- Choose IMPORT and press OK. The panel (and aircraft) will revert to the state (the exact settings you have saved), and you can begin your workday as you choose!

The 767 for FSX includes mission and situation files

- Golden Gate Run ~ CYVR to KSFO (Aircraft Operating Tutorial with 9 panel states)
- EBBR Approach • EBBR to EGLL & EGLL to EBBR • KATL to EBBR
- Failure Scenario 1 & 2 • Parked at Seattle

Configuration Manager

The Level-D 767 includes a Configuration Manager utility to change the aircraft setup. By default the program is installed to the desktop and is configured as depicted on this page. To change the default weights, run the Configuration Manager.

1. Select the type of flight from the menu

- > Empty
- > Short Haul Flight
- > Long Haul Flight

2. Select (Passenger) Load type

- Empty
- Random
- Full

3. Choose Cargo Load

Click on the Cargo Load button.

4. Configure the Cargo Holds

A cargo subscreen page will display. The cargo holds (1 to 5) are “loaded” by holding and dragging the mouse over each of the five cargo areas. Load bags and cargo on the basis of 2/3 in the rear holds (with no more than 500kg (1100lbs) in Hold 5) and 1/3 in the front holds (as depicted).

5. Propose the fuel load quantity

Propose the amount of fuel you will need for your flight by pressing on the MINUS or PLUS buttons located to the left and right. This is a “proposed fuel amount” only. Once FSX is started and the Level-D 767 loads, you will have to manually load the fuel via the menu bar to match the amount you have “proposed”. The FSX fuel load must match the Configuration Manager’s proposed amount. This is important for the %MAC & CG takeoff trim values calculation.

Watch your weight! The Configuration Manager will display incorrect / overweight amounts in red.

Do not exceed these limits

Max Takeoff Weight	408000 lbs	185454 kg
Max Zero Fuel Weight	288000 lbs	130909 kg

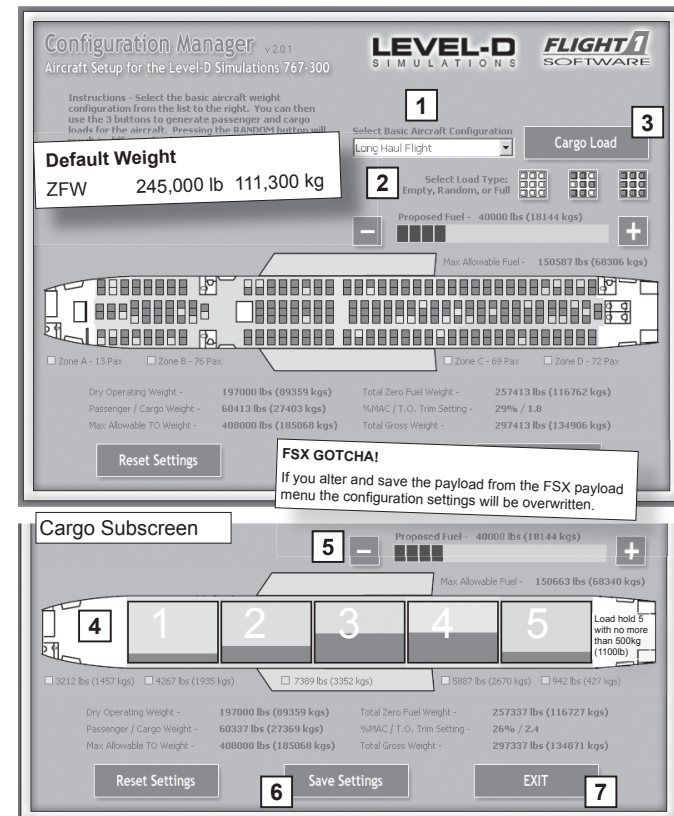
6. Choose Save Settings

The configuration manager records the Zero Fuel Weight and Takeoff Weight within the aircraft.cfg.

NOTE It does not record/change the fuel amount.

A loadsheet text file entitled “767loadsheets.txt” will be generated with this information. The “767loadsheets.txt” file is saved (by default) to the C:\Program Files\Microsoft Games\Microsoft Flight Simulator X\SimObjects\Airplanes\LVL_D_B763 folder.

7. Exit the Configuration Manager



3D & 2D Configuration for FSX

The FSX version of the Configuration Manager does not include a “No VC” panel option. By default 2D panels and VC cockpit are active.

The Virtual Cockpit preferences are set from the *FSX Options> Settings> Display> Cockpit Settings* menu.

For users who prefer to fly with a 2D panel only (NO VC), some one-time editing of the individual model configuration files must be done.

To enable 2D panel view (NO VC) follow these steps:

1. **Open** a model.xx (xx=GE, RR or PW) directory from the ...\\FSX\\SimObjects\\Airplanes\\LVL_D_B763 folder

There are 3 files inside each model.xx folder: 767300.mdl, 767300_interior.mdl & model.cfg

2. **Open** the model.cfg file with a text editor (Notepad)

The model.cfg text string:

```
[models]
normal=767300
interior=767300_interior
```

Delete the interior=767300_interior text string.

The model.cfg text string should now read:

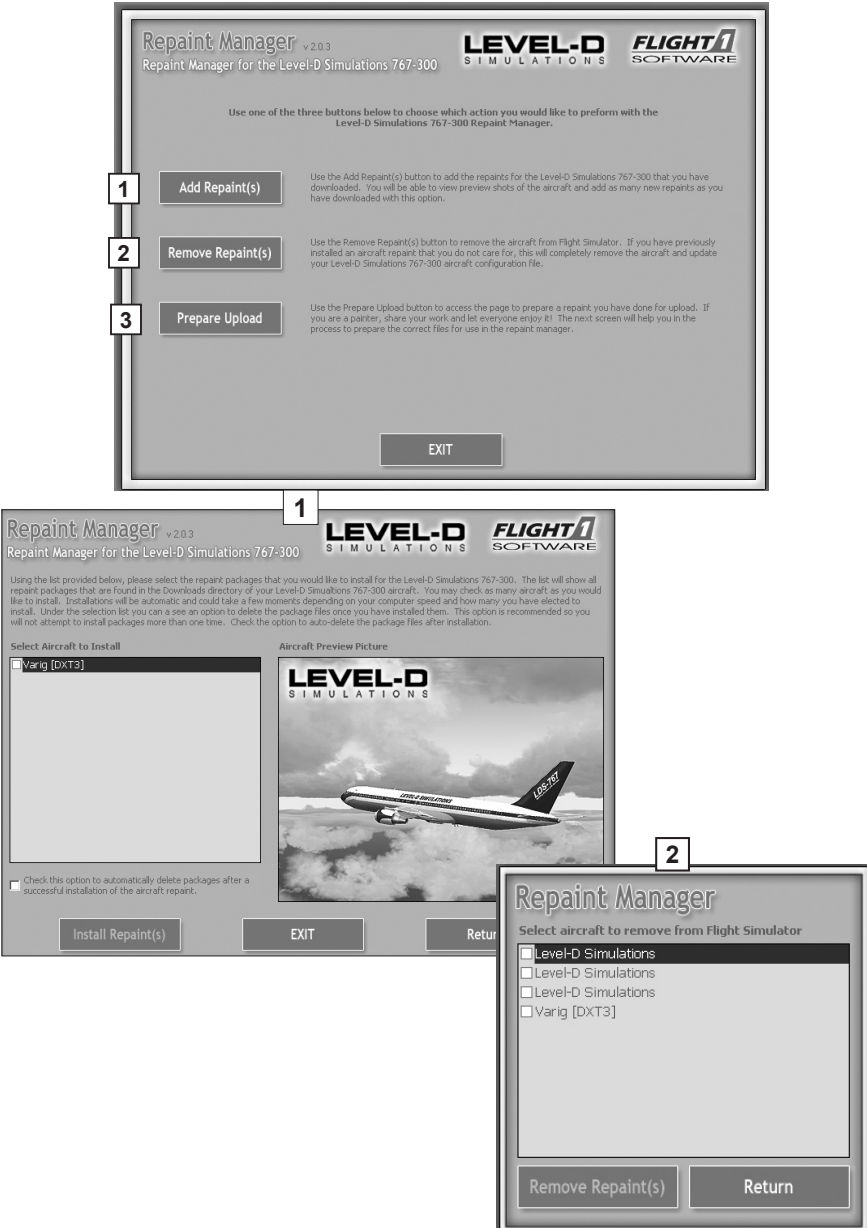
```
[models]
normal=767300
```

3. **Save** the file: *File> Save*
4. **Close** the model.cfg file.
5. **Repeat** the procedure for each model.xx file.

Repaint Manager

The Repaint Manager is the utility program used to install 767 liveries to FSX. The Repaint Manager is available from the Windows START> menu. The installation directory is ...\\FSX\\SimObjects\\Airplanes\\LVLD_B763\\RepaintManager_767.exe.

The utility offers 3 options to ADD, REMOVE or PREPARE aircraft liveries. The instructions for the operation of the Manager are included on the MAIN, ADD (1), REMOVE (2) and PREPARE (3) screens.



Repaint Manager for FSX information

- Installs FS9 .LDS files to FSX.
- Packages FSX repaint files with the .LDX file extension (new FSX format).
- An aircraft texture.cfg file will be copied to the folder if not present in the package.

NOTE

- When packaging an aircraft repaint, make sure to include a texture.cfg file in the texture folder that correctly links the proper subfolders (an unmodified version of the texture.cfg is located in the LVLD_B763\\Media\\Base Textures folder).
- Make sure to include a thumbnail.jpg file that is 400 x 200 pixels in size. **NOTE** If you do not include a thumbnail image with your repaint, FSX will display the “?” icon below on the left. A 767 “No Preview” thumbnail.jpg is provided in the ...\\LVLD763\\Media folder.



- Finally, make sure the aircraft “title” and “ui_variation” entries in the aircraft.cfg file are named appropriately.

Keyboard Assignments

These are the default keyboard sequences assigned to the Level-D panel mouse clicks. You can change them from the Level-D Simulations> Custom Controls> menu. MS Flight Simulator keyboard commands may be viewed (by default) at C:\Program Files\Microsoft Games\Microsoft Flight Simulator X\UIRES\kneeboard_keys.htm.

AutoPilots

Left AutoPilot	CTRL+SHIFT+7
Center AutoPilot	CTRL+SHIFT+8
Right AutoPilot	CTRL+SHIFT+9
Disconnect Bar (cycling)	Z
Flight Director (captain)	CTRL+F
Altitude HOLD Mode	CTRL+Z
Vertical Speed (V/S) Mode	CTRL+P
Flight Level Change (FLCH)	CTRL+I
Vertical Navigation (VNAV)	CTRL+V
Lateral Navigation (LNAV)	CTRL+N
Heading Select Mode	CTRL+H
Heading HOLD Mode	CTRL+J
Localizer (LOC) Mode	CTRL+O
Back Course (BC) Mode	CTRL+B
Approach (APP) Mode	CTRL+A
Altitude Window (+)	SHIFT+CTRL+Z
Altitude Window (-)	CTRL+TAB+Z
V/S Window (+)	SHIFT+CTRL+P
V/S Window (-)	SHIFT+TAB+P
Heading Window (+)	SHIFT+CTRL+H
Heading Window (-)	CTRL+TAB+H

AutoThrottle

AutoThrottle Switch	SHIFT+R
Airspeed (SPD) Mode	CTRL+M
N1 Mode	SHIFT+CTRL+N
Go Around (GA) Mode	SHIFT+CTRL+G
IAS/MACH Selector	SHIFT+I
Speed Intervention	SHIFT+CTRL+M
Speed Window (+)	SHIFT+CTRL+V
Speed Window (-)	CTRL+TAB+V

Crew Alerting System

Master Switch	M
Cancel Messages	C
Recall Messages	K
Decision Height (+)	D
Decision Height (-)	TAB+D
Lower EICAS Mode	X
Ground Prox G/S Overdrive	TAB+M (F/O Panel)
Ground Prox Flaps Overdrive	TAB+C (F/O Panel)
Ground Prox Gear Overdrive	TAB+K (F/O Panel)

Electric systems

Battery Master Switch	CTRL+= (EQUAL)
Standby Power (+)	TAB+X
Standby Power (-)	SHIFT+TAB+X
APU Generator	SHIFT+CTRL+A
External Power	SHIFT+CTRL+TAB+P
Left Bus Tie Breaker	SHIFT+CTRL+Y
Right Bus Tie Breaker	SHIFT+TAB+Y
Left Utility Bus	SHIFT+CTRL+, (COMMA)
Right Utility Bus	SHIFT+CTRL+TAB+, (COMMA)
Left Generator	SHIFT+CTRL+X
Right Generator	SHIFT + CTRL + TAB + X
APU Starter (+)	NUM DEL (NumPad DEL KEY)
APU Starter (-)	TAB+ NUM DEL (NumPad)

Engines

Igniters (+)	TAB+NUM 4
Igniters (-)	TAB+NUM 1
Left Starter (+)	TAB+NUM 8
Left Starter (-)	TAB+NUM 9
Right Starter (+)	TAB+NUM 2
Right Starter (-)	TAB+NUM 3
Left EEC	SHIFT+CTRL+F5
Right EEC	SHIFT+CTRL+F6
Left Engine Anti-Ice	SHIFT+CTRL+F8
Right Engine Anti-Ice	SHIFT+CTRL+F9

Flight Control Surfaces

Manual Stab Trim Up	NUM 7 (NumPad)
Manual Stab Trim Down	NUM 1 (NumPad)
Left Stab Trim Cut Off	SHIFT+CTRL+NUM 7
Right Stab Trim Cut Off	SHIFT+CTRL+NUM 1
Alternate Gear	CTRL+G (F/O Panel)
Alternate Flaps	CTRL+X
Left Yaw Damper	CTRL+D
Right Yam Damper	CTRL+TAB+D
Wing Anti-Ice	SHIFT+CTRL+F7

Flight Management Computer

FMC Keyboard (ON/OFF)	SHIFT+ K
FMC Line Select Key 1L	SHIFT+CTRL+1
FMC LSK 2L	SHIFT+CTRL+2
FMC LSK 3L	SHIFT+CTRL+3
FMC LSK 4L	SHIFT+CTRL+4
FMC LSK 5L	SHIFT+CTRL+5
FMC LSK 6L	SHIFT+CTRL+6
FMC LSK 1R	SHIFT+CTRL+TAB+1
FMC LSK 2R	SHIFT+CTRL+TAB+2
FMC LSK 3R	SHIFT+CTRL+TAB+3
FMC LSK 4R	SHIFT+CTRL+TAB+4
FMC LSK 5R	SHIFT+CTRL+TAB+5
FMC LSK 6R	SHIFT+CTRL+TAB+6
FMC INIT REF Key	SHIFT+Y
FMC RTE Key	SHIFT+T
FMC DEP/ARR Key	SHIFT+D
FMC VNAV Key	SHIFT+V
FMC FIX Key	SHIFT+TAB+F
FMC LEGS Key	SHIFT+C
FMC HOLD Key	SHIFT+O
FMC PROG Key	SHIFT+G
FMC MENU Key	SHIFT+U
FMC NAV/RAD Key	SHIFT+N
FMC PREV PAGE Key	SHIFT+- (NumPad MINUS)
FMC NEXT PAGE Key	SHIFT++ (NumPad PLUS)
FMC EXEC Key	SHIFT+X

Fuel Feed (Use number pad numbers)

Left Aft Pump	CTRL+TAB+1
Left Fwd Pump	CTRL+TAB+2
Right Aft Pump	CTRL+TAB+6
Right Fwd Pump	CTRL+TAB+5
Left Center Pump	CTRL+TAB+3
Right Center Pump	CTRL+TAB+4
Left Fuel Control Switch	SHIFT + CTRL + F11
Right Fuel Control Switch	SHIFT + CTRL + F12
Fuel CrossFeed	F

Hydraulic & Brake systems

Left Main Eng Pump	CTRL+U
Center Elec Pump 1	SHIFT+CTRL+B
Center Elec Pump 2	SHIFT+CTRL+TAB+B
Right Main Eng Pump	CTRL+TAB+G
Left Demand Pump (+)	SHIFT+; (SEMI-COLON)
Left Demand Pump (-)	SHIFT+TAB+;
Center Demand Pump (+)	SHIFT+=
Center Demand Pump (-)	SHIFT+TAB+=
Right Demand Pump (+)	SHIFT+CTRL+;
Right Demand Pump (-)	SHIFT+CTRL+TAB+;
Deploy Ram Air Turbine	SHIFT+CTRL+TAB+'
Autobrakes (+)	U
Autobrakes (-)	TAB+U
Reserve Brakes	SHIFT+CTRL+R

Inertial Reference System

IRS Display Selector (+)	SHIFT+F5
IRS Display Selector (-)	SHIFT+TAB+F5
IRS Sys Display (+)	SHIFT+F6
IRS Sys Display (-)	SHIFT+TAB+F6
Left IRU Mode (+)	SHIFT+F7
Left IRU Mode (-)	SHIFT+TAB+F7
Center IRU Mode (+)	SHIFT+F8
Center IRU Mode (-)	SHIFT+TAB+F8
Right IRU Mode (+)	SHIFT+F9
Right IRU Mode (-)	SHIFT+TAB+F9

Miscellaneous Commands

CRT Screens Brightness (+) ..	SHIFT+B
CRT Screens Brightness (-) ..	SHIFT+TAB+B
Cabin Door	SHIFT+E
Cargo Door (Forward)	SHIFT+E+2
Cargo Door (Rear)	SHIFT+E+3
No Smoking (+)	SHIFT+CTRL+[
No Smoking (-)	SHIFT+CTRL+TAB+]
Seat Belts (+)	SHIFT+CTRL+= (EQUAL)
Seat Belts (-)	SHIFT+CTRL+TAB+=

Navigation

Instrument Source Selector (+)	SHIFT+\
Instrument Source Selector (-)	SHIFT+\\
NAV1 Tuning (AUTO/MAN)	SHIFT+CTRL+Q
HSI Range (+)	SHIFT+F11
HSI Range (-)	SHIFT+TAB+F11
HSI Mode (+)	SHIFT+F12
HSI Mode (-)	SHIFT+TAB+F12
Heading Ref (MAGN/TRUE)	TAB+H

Pneumatic systems

Trim Air	SHIFT+CTRL+O
Left Recirc Fan	TAB+F
Right Recirc Fan	CTRL+TAB+F
Left Pack (+)	SHIFT+Q
Left Pack (-)	SHIFT+TAB+Q
Right Pack (+)	SHIFT+J
Right Pack (-)	SHIFT+TAB+J
Left ISLN Valve	SHIFT+CTRL+L
Center ISLN Valve	SHIFT+CTRL+J
Right ISLN Valve	SHIFT+CTRL+K
Left Engine Bleed	SHIFT+CTRL+TAB+L
APU Bleed	SHIFT+CTRL+TAB+J
Right Engine Bleed	SHIFT+CTRL+TAB+K

Thrust Rating Panel

Take Off Power	CTRL+F5
Climb Power	CTRL+F6
Derated Climb 1	CTRL+F7
Derated Climb 2	CTRL+F8
Continuous Power	CTRL+F11
Cruise Power	CTRL+F12

Keyboard Assignments with **BOLD TEXT** denotes that they have been reassigned for the 767 for FSX version.

Installation Directories

Aircraft

...\\Microsoft Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763

Aircraft Repaint Manager (Program)

...\\Microsoft Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763

Aircraft Repaints (Installation Directory)

...\\Microsoft Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763\\Downloads

Configuration Manager (Program)

...\\Microsoft Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763

Crew Voices

...\\Microsoft Flight Simulator X\\Level-D Simulations\\B767-300\\Sounds

FMC saved Flightplans (xxxxxx.RTE)

...\\Microsoft Flight Simulator X\\Level-D Simulations\\navdata\\Flightplans

FSX Categories (fsx.cfg)

...\\Documents and Settings\\username\\Application Data\\Microsoft\\FSX

Keyboard Assignments (767LVLD_REF.htm)

...\\Microsoft Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763

Language Modules

...\\Microsoft Flight Simulator X\\Level-D Simulations\\Language modules

License (Flight1 Key)

C:\\Flight One Software

Mission files

...\\Microsoft Flight Simulator X\\Missions\\Level-D B767-300ER

Model configuration (model.cfg)

...\\Microsoft Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763

Modules (LVLD.dll & FSUIPC)

...\\Microsoft Flight Simulator X\\Modules

NavData SID, STARs, APP (xxxx.xml) & AIRAC data

...\\Microsoft Flight Simulator X\\Level-D Simulations\\navdata

Operating Manual & General Information

...\\Microsoft Flight Simulator X\\Level-D Simulations\\B767-300

Situation files (xxxxx.FLT, xxxxx.FMC & xxxxx.WX)

...\\Documents and Settings\\USERNAME\\My Documents\\Flight Simulator X
Files

Software Developer's Kit

...\\Microsoft Flight Simulator X\\Level-D Simulations\\Level-D SDK

Level-D Simulations Team

Main Development

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Yutaka Mitsushi

Aircraft & Panel Artwork

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Aircraft Sounds

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Operations Manual

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Dennis Di Franco (ftp server & pdf formatting)
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Lee Hetherington (TCAS Logic module)
Mark McGrath (Weight & Balance)
Ian Mitchell (PROCIO Utility)
Tero Partanen (video recording & real simulator sessions)
Fraser Turner (thrust reverser and wing flex code)
Nico Kaan (S.D.K. testing)

VNAV DES

The descent logic in the FSX version of the 767 has modified from the FS9 version. Below is a point description of the Pegasus FMC logic and the associated VNAV descent characteristics.

ON Path (within speed limits & altitude limits)	Above path (speed window closed):
Pitch mode = VNAV PTH	Pitch mode = VNAV SPD
A/T mode = throttle decreases to IDLE, then sets HOLD	A/T mode = IDLE to Hold
• Idle descent phase: Speed limits +/- 15 knots, up to Mmo/Vmo-11 knots or down to speed protection;	• Aircraft pitches to VNAV speed + 15 (limited by Mmo/Vmo-11 knots) and DRAG REQUIRED message displays.
• Past idle phase: Speed limits +/- 10 knots, up to Mmo/Vmo-11 knots or down to speed protection.	Below path (speed window closed):
Overspeed reverts to:	Pitch mode = VNAV SPD
Pitch mode = VNAV SPD	A/T mode = SPD
A/T mode = IDLE to HOLD	• Aircraft pitches to -1250fpm and thrust increases to maintain VNAV speed.
• Aircraft pitches to VNAV speed and DRAG REQUIRED message displays.	<u>NOTE</u> Above path / below path = more than +/- 500 ft
Underspeed reverts to:	Opening the MCP speed window during the VNAV PATH descent results in the pitch mode changing to VNAV SPD. The aircraft leaves the VNAV PATH and pitches to MCP SPD. Programmed “not below altitudes” will be kept if encountered, however speed constraints will not.
Pitch mode = VNAV PATH	
A/T mode = SPD	
• Aircraft throttles increase to maintain min speed and THRUST REQUIRED message displays if A/T is disengaged.	

Q: Is it normal for the VNAV to drive the descent at a different speed than what's defined in the VNAV DES page?

A: In VNAV PATH, VNAV will follow the path, allowing actual speed to be off by up to +/- 15 knots. So if the path prediction is a bit off or you have winds that would not be unusual. You can now add throttle to adjust if you're getting too slow because AT is in HOLD mode.

Make sure that the actual aircraft weight matches what you have in the FMC. Other than winds this is the most likely cause of an incorrectly calculated path.

Previous 767 flyers are going to have to get used to the idea of the descent speed wandering to maintain the path. Unlike previous versions, the FMC is now calculating a true idle descent and the throttles DO NOT MOVE once they go to idle. If you are using a weather program then it is unlikely that the behaviour of FSX in interpreting windspeeds is going to match the way the FMC does it. There will be differences, so you will *have* to manage your descent speed, either by adding throttle (which is easy now because the A/T will be in HOLD mode) or by using the speedbrake. Once the end of idle descent waypoint has been passed, the throttle will be in SPD mode. Speed will be maintained as with previous versions of the 767, within the limits of the throttles ability to do so.

FMC Messages

FMC messages alert the flight crew to conditions that could degrade the system operation and advise the crew of input errors. The messages are categorized as alerting and advisory messages.

The FMC light illuminates and the EICAS advisory message FMC MESSAGE displays when there is an FMC alerting message.

FMC Alert Messages

- display in the CDU scratchpad
- illuminate the amber FMC light on the center instrument panel
- cause the EICAS advisory message FMC MESSAGE to display
- illuminate the CDU message light (MSG).

Use the CLEAR key or correct the condition responsible for the message to remove the message.

DISCONTINUITY	The LNAV mode is active and the route is not defined after the next waypoint (except when the waypoint is before a manually terminated leg, such as a VECTORS leg).
DRAG REQUIRED	VNAV mode is active. Additional drag is required or the autothrottle is currently off and less thrust is required to maintain the current VNAV descent path.
END OF ROUTE	The LNAV mode is active and the end of the active route has been overflowed. The AFDS will maintain the current heading. To delete a waypoint at end of route, press the DEL key, select the waypoint and press the EXEC key.
ENTER IRS POSITION	The entered position does not match one of the IRS comparison checks, or the IRS is in navigate mode and has not received a present position entry. Use the CLEAR key to remove this message.
FUEL DISAGREE – PROG 2/2	The totalizer (TOT) fuel quantity and FMC calculated (CALC) fuel quantity disagree by a significant amount. The FUEL DISAGREE message is inhibited if the fuel quantity is entered manually on the PERF INIT page. Deleting the manual entry will reset the fuel quantity to the totalizer value, the title to CALC and enable the FUEL DISAGREE message.
INSUFFICIENT FUEL	The estimated fuel at destination is less than entered RESERVES value.
IRS NAV ONLY	The FMC position has not been radio updated for at least 12 minutes. If the FMC position has not been radio updated within at least 12 minutes, an IRS NAV ONLY message is displayed in the scratchpad. If this message is displayed, check that both NAV radios are set to AUTO so that the FMC can auto-tune the radios to receive an update.
IRS POS/ORIGIN DISAGREE	The inertial reference position differs from the current origin airport.
NO ACTIVE ROUTE	During LNAV mode, an active route has not been activated.

RESET MCP ALT	Displays 15 nautical miles (2 minutes) prior to the top of descent point (T/D) when VNAV is the active mode and the MCP (AFDS) is not set to a lower altitude than the VNAV CRZ altitude.
TAKEOFF SPEEDS DELETED	The V speeds have been deleted due to changes in takeoff performance or configuration data.
THRUST REQUIRED	The VNAV mode is active and the autothrottle disconnected. Displays when additional thrust is required to track VNAV descent path and maintain speed.
UNABLE NEXT ALT	The active VNAV climb mode cannot comply with the next altitude constraint. If the climb speed profile results in a climb angle that will cause the airplane to miss a waypoint altitude constraint, the CDU scratchpad message UNABLE NEXT ALT is displayed. Select a steeper speed climb angle.
VERIFY POSITION	The difference between the FMC position and other position data exceeds a comparison variable. Possible conflicts include <ul style="list-style-type: none"> • the left and right FMC position differ • the radio position differs from the FMC position

FMC Advisory Messages

FMC advisory messages are displayed on the CDU scratchpad and illuminate the CDU message light (MSG). There are no EICAS messages associated with these messages and they do not cause the FMC light to illuminate. Those messages which are caused by an entry error must be cleared before the entry can continue.

DELETE	The DELETE key has been pressed.
KEY/FUNCTION INOP	The selected key and/or function is inoperative.
INVALID DELETE	The deletion of the selected data is invalid.
INVALID ENTRY	The format or range of the entered text is incorrect for the field or the airway or TO waypoint does not match with the navigation database.
MANUALLY TUNED	An attempt to remotely tune a VOR that is currently manually tuned.
NOT IN DATABASE	The entered data is incorrect for the route (airway does not match the waypoint connector) or the input does not match the AIRAC navigation database.
NOT ON INTERCEPT HEADING	The LNAV mode is unable to intercept the route. The aircraft is outside the active capture criteria and the present heading will not intercept the active leg.
ROUTE FULL	The current route has exceeded the FMC capacity.
RUNWAY N/A FOR SID	The selected runway is not compatible with the selected SID/DP.

FMC Programming Messages

The Level-D 767 FMC also includes several programming help messages that are not available in the real world FMC. These are exclusively Level-D simulator messages to assist the user when programming a SID or STAR via the CDU. The messages can be cleared using the CDU's CLR key.

DEP RWY REQD - RTE PAGE	A departure runway is required on the route page.
DEST REQD - RTE PAGE	A destination airport is required on the route page.
LEGS REQD	Waypoints are required on the leg page.
ORIGIN AND DEST REQD	The user is prompted to enter an ORIGIN and DESTINATION airfield.
ORIGIN REQD. - RTE PAGE	A departure airport is required on the route page.

Welcome to Level-D Simulations 767-300ER Flight 001 from Vancouver to San Francisco, brought to you by members of the beta team.

We are not professional pilots. But, some of our technical advisors *are* real world 767 pilots. They have read through this document and are satisfied with the information we have provided. They aren't going to let any of us fly their real '67 just yet, but they haven't officially said no to our requests to dead-head a couple flights for a week or two (at our expense of course).

This tutorial for Flight Simulator X will provide new and intermediate users with general guidelines to effectively fly the Level-D 767. This is not the definitive guide: that document would encompass several thousand pages, and require the user to devote thousands of hours of study. The Level-D 767-300 does not simulate every aircraft function or airline specific option: that aircraft simulator add-on has never been built, and, if it was available to the consumer would likely cost a great deal more than the current Level-D 767 retail cost.

It is also important to note that no two airlines operate their aircraft in the same manner. Each airline adopts SOP's (standard operating procedures) for the aircraft in their fleet. While your airline may operate with different standards than those set forth, we have chosen to adopt a mix of standards to ensure the safe operation of the LDS767.

This is the fourth version of the "Golden Gate Run" tutorial flight. Each version has been improved, clarified and expanded with input from the team and users. Every effort has been made during the creation of this tutorial to include all relevant materials to successfully operate the 767 in all phases of flight. Color images have been included (when warranted) to provide accurate reference screenshots to assist the user. The scope of the tutorial does not include all aspects of flight simulation. For specific information regarding Microsoft Flight Simulator X, weather programs, departure / arrival charts, route building, air traffic control, etc, consult the relevant sources on the internet.

This version of the tutorial introduces pre-built mission files that allow the user to choose different panel set-ups while on the ground at Vancouver. It is recommended to choose the "Cold & Dark" mission to get the most out of this tutorial. We encourage you to save your own situation files for the climb, cruise, descent and arrival phases of flight. User-saved files can be chosen from the FSX File> Load menu option. When loading a saved Level-D 767 situation file the panel and systems will reload and stabilize quickly.

Our flight will use the Expanded Checklist for its structure.

The Level-D 767 is a complex simulation. It will take you many hours to master the aircraft. Don't get discouraged by the complexity of the simulation - follow along, step by step (pause the sim if you have to), but stick at it. The reward is the journey, not the accomplishment of the task. While this tutorial serves a useful purpose, please take the time to read the operations manual to gain a deeper understanding of the individual systems and procedures of the 767-300.

Enjoy the flight from Vancouver to San Francisco, Captain: we know that you will feel a great sense of satisfaction learning and mastering the Level-D Simulations 767.

Mission Setup



The missions included with the 767 for FSX do not present a "reward" for the successful completion of the Golden Gate Run. We are still exploring the limits of mission creation with the 767 and hope to release "reward mission modules" in the near future. Perhaps users will be inspired to try to create their own Level-D 767 missions, or work to add to the Golden Gate Run?

Simulator Settings



It is important that FSX and the 767 be configured with the settings listed below before we can begin the tutorial.

Let's adjust some FSX & Level-D settings.

FSX Settings

From the FSX menu bar, **choose** SETTINGS. Set the following options:

General > Deselect "Pause on Task Switch"

International > Hybrid (feet, milibars)

This tutorial will use the International "Hybrid" units of measure option, which means that all weights will be shown in kilograms. Imperial measurements (pounds) will be displayed throughout the tutorial when possible.

Click OK

Level-D Settings

From the **Add-ons> B767 Specific>** menu, confirm:

Realism and carrier options

from Carrier dropdown menu, **choose...**

- » Speedtape EADI
- » Dual cue Flight Director
- » Climb Thrust Derate Washout > None

& confirm or set...

- ✓ AFDS automatic multi-channel
- ✓ GPWS altitude callouts
- ✓ EADI Displays A/T flag
- ✓ Airspeed BUGS option
- ✓ Load carrier options with flights

from Realism, **set or confirm**

- ✓ Battery discharge
- ✓ Electric load shedding
- ✓ Pneumatic loads
- ✓ Engine damage
- ✓ Realistic fuel feed
- ✓ Autoland restrictions
- ✓ FMC tunes ILS
- ✓ Load realism options with flights

From the **Level-D Simulations> Preferences>** menu, set:

- ✓ Level-D Gauge Sounds> 50%
- ✓ Level-D Voices> 80%
- ✓ First Officer options> User Choice
- ✓ Crew Voices> User Choice

Click OK

Tutorial Conventions

? This tutorial contains text and layout conventions.

CHECKLISTS

Checklist Item..... Checklist Action

Explanation of the Checklist Item and Action.

Checklist Items and Actions appear in **bolded text** and may be followed by an explanation of the task in smaller text. The checklist item and action denote a task that is part of the Normal Procedures Checklist. Checklists contain, in abbreviated form, information required by the flight crew to operate the aircraft. The checklists are grouped in sections and in chronological order. Not all checklist items require an action. Some will simply require verification that certain switches, panels, and/or systems are in the listed checklist action description or ready state.

In the example below, the flight crew must verify that the EEC switches are in the required ON position. No action is required if the switches are in the ON position.

EEC Switches ON

Check to make sure both switches are ON. These switches are always left ON

BOLD TEXT

In general, **bolded text** denotes an action that must be completed. These can include important menu items or required physical tasks (**Press, Enter, Open, Choose**).

FOLDERS

Numbered folders (i.e. **1**) denote the option to import numbered tutorial panel states (Golden Gate (1), (2), (3), etc.) and allow for a quick starting point of the corresponding section of the tutorial.

Charts



Charts for Vancouver & San Francisco are available at chartfinder.vatsim.net, www.czvr.ca or www.oakartcc.com.

Print the charts listed below:

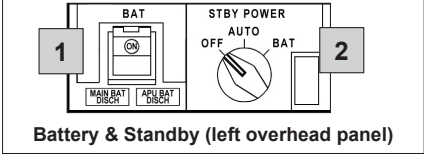
CYVR	VANCOUVER INTL
Miscellaneous	TAXI & PARKING AREAS
Departure	VANCOUVER DEP
KSFO	SAN FRANCISCO INTL
Arrivals	GOLDEN GATE FOUR
	QUIET BRIDGE VISUAL
Approach » 28R	ILS OR LOC

Flight Deck Preparation

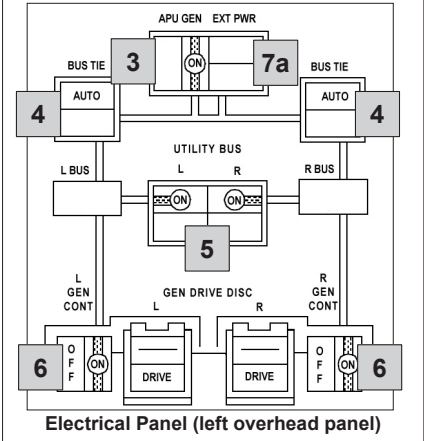
1 When the simulator loads, you are greeted with the aircraft in a “cold & dark” state. Providing electrical power to the aircraft is the first order of business. **Open** the overhead panel <SHIFT><5> or press the OVHD button (located on the main panel).

The Normal Procedures & Checklist will be our guide for this tutorial, which is written with the “flow” concept. But, before we get to the flow, we have to do some jumping around on the overhead panel to get the power flowing through the aircraft. Powering the 767 seems to be one of the more confusing procedures for many new users. For this section of the tutorial, follow the text on the right with the numbered diagrams on the left to power the 767.

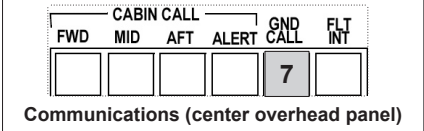
Preflight ~ Powering the 767



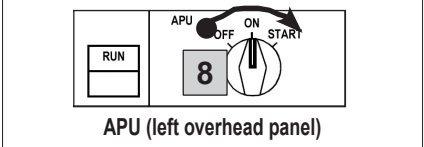
Battery & Standby (left overhead panel)



Electrical Panel (left overhead panel)



Communications (center overhead panel)



APU (left overhead panel)

- 1. Battery Switch ON
- 2. Standby Power Selector.. AUTO
- 3. APU GEN switch..... Pushed IN
- 4. Bus Tie Switches..... AUTO
- 5. Utility Bus Switches..... ON
- 6. GEN CONT Switches Pushed IN

PILOT’S DISCRETION You can OMIT this step and move directly to start the APU.

- 7. & 7a External Power . Establish Contact Ground via the Cabin Communications Panel. Press ON when AVAIL light illuminates. Ground Power is not essential.
- 8. APU.....START then ON A spring-loaded position that initiates the APU start sequence. The RUN light flashes twice to indicate the beginning of start. The APU start cycle takes approximately 60 seconds. Once the APU light illuminates RUN, the external power can be safely disconnected, if ground power is connected. OVERHEAD Panel> Cabin Communications Panel> GND CALL> Disconnect External

9. Position Light ON

Not depicted. The Position Light is located on the lighting panel above the glareshield. See the Airplane, General section of the manual. The position lights are the red, green and white lights found at the tips of the wings.

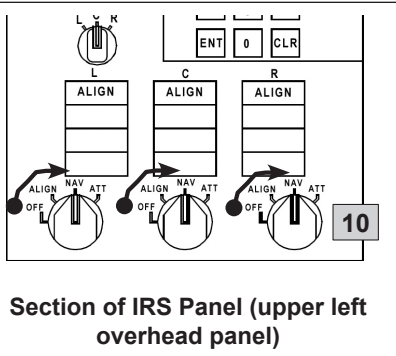
10. IRS Mode Selectors (3) NAV

Alignment time is 2 minutes. Real align time is ten minutes. For the purposes of this tutorial we have disabled the real align period. To enable the real-world 10 minute alignment duration, choose *Add-ons> B767 Specific> Realism> IRS real align duration* from the FSX menu.

FMC Initialization POSITION

This step is not necessary for this tutorial. Should you wish to enter the coordinates for the FMC, you may adjust the Level-D settings (enable *IRS needs position entry* option from the Realism menu). Consult the IRS Systems section of the manual for more information.

Section of IRS Panel (upper left overhead panel)

**Overhead Preparation**

2

The **Cockpit Preparation** flow starts with the upper left hand corner of the overhead panel <SHIFT><5> and continues in a downward pattern. Each panel is checked in a downward direction beginning at the top of every column. Some real world airlines follow a “down-up” pattern for the overhead panel. For our purposes, normal procedures are completed using the downward flow concept. After the overhead is checked, the flight instruments and AFDS panel are checked from left to right. From the AFDS panel, follow down the EICAS screens to preflight the pedestal systems.

Yaw Damper Switches ON

Check to make sure both switches are ON. These switches are always left ON.

EEC Switches ON

Check to make sure both switches are ON. These switches are always left ON

Hydraulic PanelCheck

Primary engine pumps switches ON. Primary electric and all demand pump switches OFF.

Overhead CautionsCheck

Check for normal indications (ie ENTRY DOOR, CAPT PITOT)

HF Radio OFF**Battery Switch ON****Standby Power Selector AUTO****Electrical PanelCheck**

All electrical switches should be pushed IN. Electrical switches are only turned OFF for abnormal conditions

APU As required

Start the APU (if necessary) or establish external power.

Cockpit Voice Recorder Test

Listen for test tone.

Emergency Light Switch Armed**Passenger Oxygen Switch ...Blank****Ram Air Turbine SwitchBlank****Ignition SwitchSet**

Set 1 for odd days of the week, 2 for even days of the week, and BOTH for cold weather operations.

Engine Start Selectors AUTO**Fuel Jettison Panel OFF**

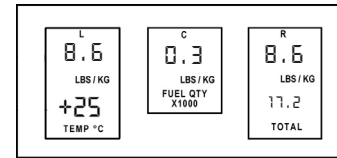
Switches blank and selector OFF.

Fuel PanelSet

Forward and Aft main fuel pumps OFF. Center fuel pumps OFF. Crossfeed switches OFF.

Fuel quantity and balance ...Check

Check the proper fuel load and balance. For the Golden Gate Run we will load 17141kg or 36238lbs.

**Engine and Wing Anti-Ice OFF****Exterior Lights As required**

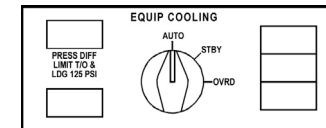
Position lights ON. All others OFF.

Cargo Heat OFF**Window Heat ON****HF Radio OFF****Passenger Signs As required.**

Suggest: No Smoking ON, Seatbelts OFF

Pressurization PanelSet

Set landing altitude. Select AUTO 1 for odd days. Select AUTO 2 for even days. Set auto rate at the detent position.

Equipment Cooling Switch . AUTO**Temperature Control KnobsAs required****Trim Air Switch ON**

This switch is always left ON.

Recirc Fan Switches ON

These switches are always left ON.

Pack Control SelectorsAs required

If the APU is in use, turn the pack switches to AUTO. If external air is in use, turn pack switches OFF.

Isolation switches ON

Left and Right switch ON. Center switch guarded ON.

Engine Bleed Switches ON

These switches are always left ON.

APU Bleed Switch ON

Standard: Switches are always left ON.
Alternate: APU should be running at least one minute, minimum, before turning the APU Bleed ON.

FMCProgram

Program the FMC with route and performance information.

Programming the FMC

3

Okay, time to get to the brains of this aircraft: let's open the FMC and let's get programming.

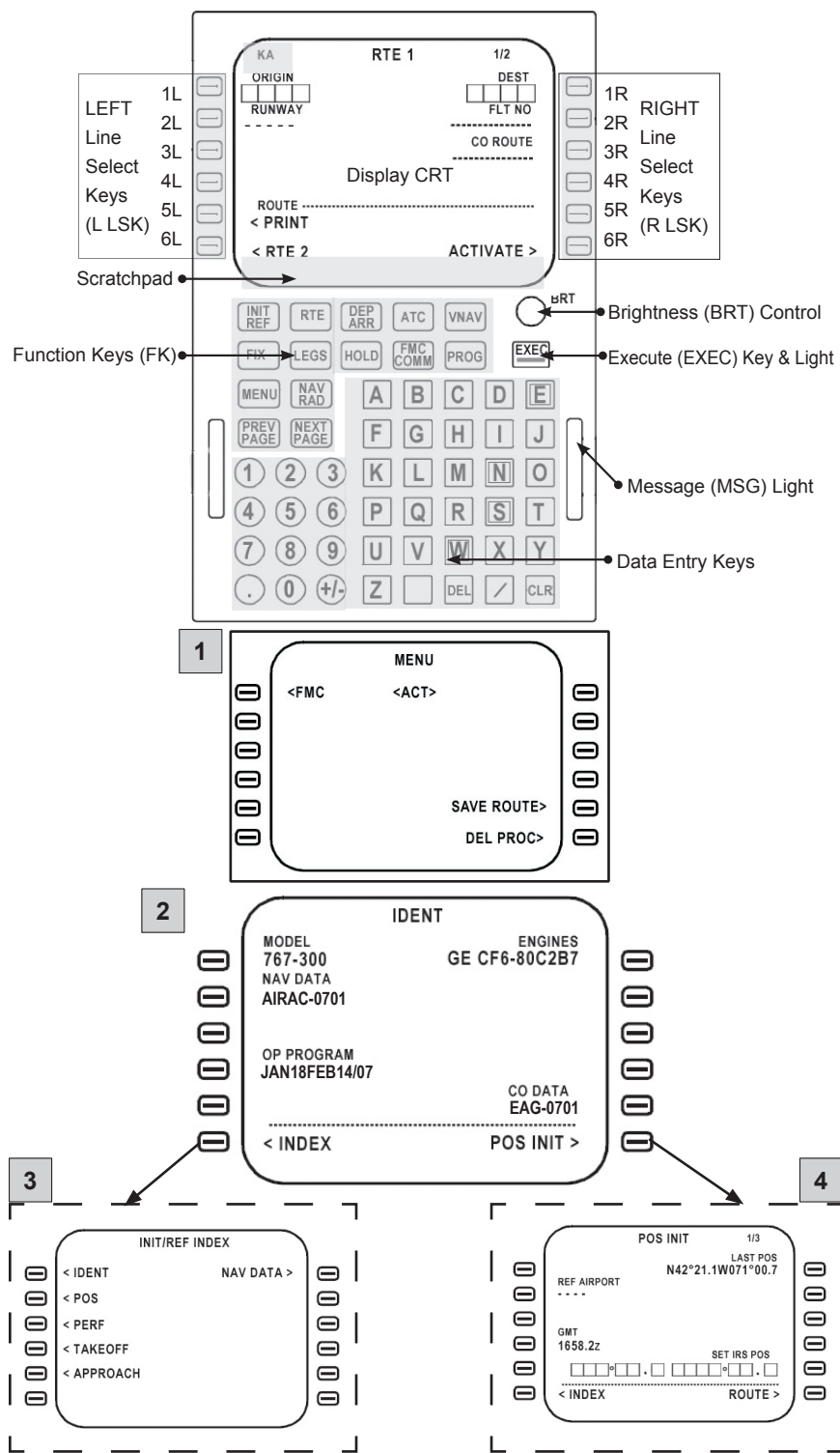
4

Every effort has been made to address every possible combination of FMC data entry. Some input errors may occur. Should any FMC advisory messages appear in the scratchpad (i.e. NOT IN DATABASE, INVALID ENTRY) simply clear the message by pressing the CLR key or the BLANK key (located between the Z and the DEL keys). Try to continue with the next step. Should that not be possible, ensure you have entered the data correctly.

When the sim loads the FMC is not displayed. Use the keyboard combination <SHIFT><7> or press the FMC button on the main panel to display the FMC's CDU. The MENU page **1** displays when the FMC is initially loaded. Press the <FMC prompt next to the 1L Line Select Key (LSK). Pressing the 1L LSK activates the FMC.

The first page to display after the FMC is activated is the IDENT page. The IDENT page **2** lists information about the software loaded into the FMC (aka Navdata). In the real aircraft, the accuracy of information displayed on this page is extremely important because incorrect FMC data can adversely effect operations. For our purposes the prompts at the 6L and 6R position are of interest. Pressing the 6L LSK abeam the <INDEX prompt displays the INIT/REF INDEX page. Pressing the 6R LSK abeam POS INIT> will display the POS INIT page.

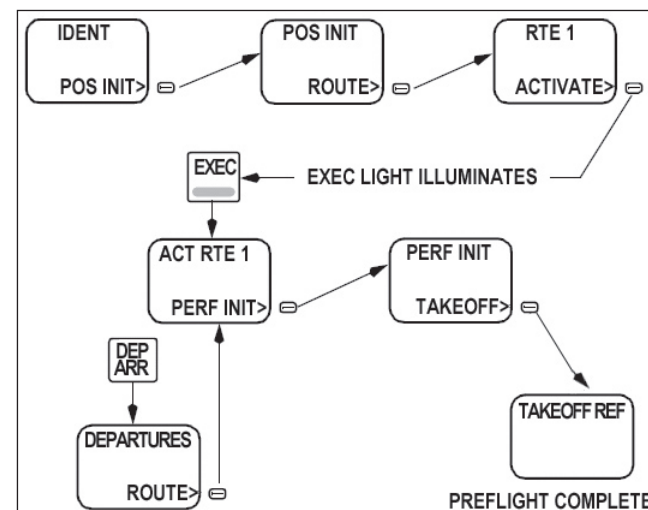
The INIT/REF INDEX **3** permits the selection of the preflight pages in the FMC. The pages listed on this page require data input to successfully set-up the FMC. But, it is not required to use the INDEX page to step through the preflight pages. The 6R position offers a quick and efficient way for pilots to complete the preflight status of the FMC.



6R LSK > The Preflight Prompt

Preflight flow continues in this sequence:

- Identification (IDENT) page
- Position Initialization (POS INIT) page
- ROUTE (RTE) page
- DEPARTURES page (no automatic prompt)
- Performance Initialization (PERF INIT) page
- Takeoff Reference (TAKEOFF REF) page.



Most of these pages are also used in flight. During the preflight, a prompt at the lower right (6R LSK) allows the flight crew to step through the minimum requirements for preflight completion. Selecting the prompt key at the 6R LSK position displays the next page in the flow. The text message INCOMPLETE will display at 6R LSK until the minimum requirements are met. The text message COMPLETE will display at 6R LSK when the minimum requirements are met. The COMPLETE message will display if a departure runway has not been selected. **NOTE** that there is no preflight prompt at the 6R position to enter the departure runway.

A route must be entered and activated during the preflight flow. The minimum route data requirement is origin and destination airports, and one route waypoint.

Remember that when starting at the IDENT page of the FMC, there is always a prompt displayed at the 6R LSK position that will lead you through the preflight of the FMC. Continue entering data on each page until COMPLETE displays abeam the 6R LSK position.

Let's enter our flight plan (CYVR YYJ J589 RBG.GOLDEN4 KSFO) into the FMC. There are 2 methods to program the route into the FMC, manual or pre-programmed. Choose one of the entry methods below.

1/2

RTE 1

ORIGIN

CYVR

DEST

KSFO

Manual entry of route

Runway

FLT NO

LDS001

CO ROUTE

CYVRKSFO

Pre-programmed

ROUTE

< PRINT

< RTE 2

ACTIVATE >

Manual entry of route

Press RTE function key (FK). The RTE 1 (1/2) page will display with data entry boxes in the ORIGIN & DEST columns.

Enter CYVR into the scratchpad using the Data Entry Keys, or use the Keyboard Assist (KA) mode.

Press the 1L LSK. CYVR will transfer and will be set as the ORIGIN airport.

Enter KSFO into the scratchpad.

Press 1R LSK. KSFO will be set as the destination.

Enter LDS001 into the scratchpad and **press** the 2R LSK to transfer the text to the 2R position (FLT NO).

There is an option to enter the departure runway at the 2L position. Leave it for now. We will enter the runway from the CYVR DEPARTURES page.

Press NEXT PAGE function key to enter the flight plan. Our filed flightplan is YYJ J589 RBG.GOLDEN4.

Enter YYJ into the scratchpad.

Press 1R LSK. YYJ transfers to the 1R position (TO).

Enter J589 into the scratchpad.

Press 2L LSK. J589 transfers to the 2L position (VIA).

Enter RBG into the scratchpad.

Press 2R LSK. RBG transfers to the 2R position (TO).

Pre-programmed route

In the real world, flightplans are loaded into the FMC via the ACARS function. Though ACARS is not modelled in the Level-D 767, you can load a pre-programmed route into the FMC. The CYVRKSFO.rte file (located in the "...Default FlightSim\Level-D Simulations\navdata\Flightplans" folder) has been included with this tutorial. Here's how you can "load" a pre-programmed flightplan into the FMC.

Enter CYVRKSFO into the scratchpad.

Press the 3R LSK. CYVRKSFO will transfer to the 3R position (CO ROUTE).

Enter LDS001 into the scratchpad and **press** the 2R LSK to transfer the text to the FLT NO column.

2/2

RTE 1

VIA

TO

YYJ

J589

RBG

< RTE 2

ACTIVATE >

The pre-programmed entry method is now complete. For complicated flight plans with multiple waypoints and airways the pre-programmed option is a time-saver and should be used when possible. Once we have moved beyond the route page, manual entry is required for all succeeding steps of FMC programming.

DEP/ARR

Let's add the departure and arrival procedures to our routing. We will depart Vancouver on the YVR3 SID and arrive in San Francisco on the GOLDN4 STAR.

Press the DEP ARR function key. The DEP/ARR INDEX page will display (not depicted).

Press 1L LSK abeam <DEP CYVR. The CYVR DEPARTURES page displays.

Press the R LSK abeam 26L to select runway 26L for our departure runway.

Press the L LSK abeam YVR3.26.30 to select the SID for our departure.

1/2

CYVR DEPARTURES

SIDS

RTE 1

Runways

YVR3.08

08L

YVR3.12

08R

YVR3.26.30 <SEL>

12

<SEL>

26L

26R

< INDEX

ROUTE >

A <SEL> prompt will appear abeam the runway and SID. Several transition waypoints (not depicted in the image above) will appear below the selected SID. Do not choose a transition.

Press 6L LSK abeam the <INDEX prompt. The DEP/ARR page displays.

Press the 2R LSK abeam the KSFO ARR> prompt. The KSFO ARRIVALS (1/3) page will display.

Press the 2L LSK abeam GOLDN4. The text <SEL> will appear abeam the GOLDN4 (STARS column).

Press the R LSK abeam the RBG transition. The text <SEL> will appear abeam the RBG VOR.

Though it is a non-standard procedure to add the arrival runway during the FMC setup, for the sake of this tutorial, we will select the arrival runway now.

1/2

KSFO ARRIVALS

STARS

RTE 1

APPROACHES

GOLDN4

<SEL>

ILS19L

TRANS

<SEL>

ILS28L

ILS28R

VOR19L

Runways

< INDEX

ROUTE >

Press the L LSK abeam ILS28R.

Press the 6R LSK abeam the ROUTE> prompt to return to the RTE1 page. The RTE1 page will display with the ACTIVATE> prompt at the 6R position.

Press 6R LSK abeam the ACTIVATE> prompt. The EXEC button illuminates.

Press the EXEC function key. The route has been activated. Move to the next preflight page.

1/2

RTE 1

ORIGIN

CYVR

DEST

KSFO

Runway

FLT NO

LDS001

CO ROUTE

CYVRKSFO

ROUTE

< PRINT

< RTE 2

ACTIVATE >

1/3

ACT RTE 1

ORIGIN

CYVR

DEST

KSFO

Runway

26L

FLT NO

LDS001

CO ROUTE

CYVRKSFO

ROUTE

< PRINT

< RTE 2

ALTN >

PERF INIT >

NOTE that once the route has been executed the title of the route page will change to ACT RTE 1. The ALTN> prompt will display abeam the 5R LSK. The pre-flight prompt will change from ACTIVATE> to PERF INIT> abeam the 6R LSK position. Also, <SEL> prompts have changed to <ACT>, denoting active selections. The route line on the EHSI has changed from a dotted blue line to a solid magenta line.

PERF INIT

Let's enter the performance data available on the FSBuild flight plan included in this tutorial (KG or LBS).

The aircraft configuration is:

Pax & Cargo	27,369 kg	60,337 lbs
Zero Fuel Weight (ZFW)	116,700 kg	257,337 lbs
Fuel	17,100 kg	36,200 lbs
Gross Takeoff Weight	133,828 kg	293,537 lbs

See the tutorial appendix for more information about how this flight was setup with the Configuration Manager.

Press the 6R LSK abeam the PERF INIT> prompt. The PERF INIT (1/1) page displays. The calculated fuel <CALC> is automatically set at 17.1 (17,100 kg) or 36.2 (36,200 pounds) at the L2 position with data entry boxes below the GR WT (Gross Weight), ZFW (Zero Fuel Weight), RESERVES, CRZ ALT (Cruise altitude), & COST INDEX columns.

PERF INIT		1/1
GR WT		CRZ ALT
FUEL		COST INDEX
17.1 CALC		
ZFW		
RESERVES		
STEP SIZE		
ICAO		
< INDEX		TAKEOFF >

Enter the Zero Fuel Weight (ZFW) of **116.7** (kilograms) or 257.3 (pounds) into the scratchpad.

Press the 3L LSK (ZFW column). The scratchpad entry of **116.7** (257.3) will transfer to 3L position. A Gross Weight (GR WT) value will autofill at 1L position.

GOTCHA! Be careful not to transfer the ZFW value to the 1L (GR WT) position. Not a good thing!

Enter the Reserves fuel of 3.1 (3100kg) or 6.8 (lbs).

Press the 4L LSK (RESERVES column). The reserve fuel entry of 3.1 will transfer to 4L position.

Enter a cruise altitude (CRZ ALT) of 37,000 feet into the scratchpad (370, FL370, or 37000 formats are accepted).

Press 1R LSK (CRZ ALT column). The pad entry will transfer to the 1R position as FL370.

Enter the Cost Index of 90.

Press 2R LSK and the cost index scratchpad entry of 90 will transfer to 2R position.

Enter the step climb value of 2000 into the scratchpad.

Press 5R LSK (STEP SIZE column) and the entry of 2000 will transfer to the 5R position. The step climb will now be calculated in the new separation standard of 2000 foot increments (RVSM. Reduced Vertical Separation Minumum) rather than the ICAO standard of 4000.

PERF INIT		1/1
GR WT	133.9	CRZ ALT
FUEL		FL370
17.1 CALC		COST INDEX
ZFW	116.7	90
RESERVES	3.1	
STEP SIZE		
2000		
< INDEX		TAKEOFF >

The performance initialization data entry is complete.

Let's enter the takeoff reference data. The PERF INIT page is still displayed with TAKEOFF> at 6R position.

Press the 6R LSK abeam the TAKEOFF> prompt to move on to the next preflight page.

The TAKEOFF REF (1/2) page displays.

TAKEOFF REF		1/2
FLAPS	5°	V1
THRUST		130
°C TO		VR
CG TRIM		138
26% 2.4		V2
		146
RWY / POS	GR WT	TOGW
26L / ---- -M	133.6	----
< INDEX		PRE-FLT COMPLETE

TAKEOFF REF

Press NEXT PAGE to display the TAKEOFF REF (2/2) page. We will now program the takeoff data with the outside air temperature, winds, runway conditions, flaps settings, and CG trim. Once this data is entered, the aircraft's V-speeds are automatically calculated and displayed in the right column. But, let's program the TAKEOFF REF (2/2) page first.

TAKEOFF REF		2/2
WIND	---	ACCEL HT
---	KT	1000 FT
RWY WIND		STD LIM TOGW
		408.0
SLOPE/COND		REF OAT
UO.0 / WET		14°C
< INDEX		

If you are running a weather program, you may enter XX (two digits) for the temperature, and XXX/XX format for the wind data, and /W or /D for runway conditions. **Enter** XX for temperature into the scratchpad.

Press the 5R LSK and the pad entry of XX transfers to the REF OAT column (14°C depicted).

Enter XXX/XX for winds.

Press the 3L LSK and the entry of XXX/XX will transfer to 3L position. The value will autofill at the 4L position.

Enter /W or /D for wet or dry runway if applicable.

Press 5L LSK. The pad entry of /W or /D will transfer to the 5L position (SLOPE/COND). Slope is not modelled but you can enter the value listed on the runway chart.

TAKEOFF REF		1/2
FLAPS	5°	V1
THRUST		130
°C TO		VR
CG TRIM		138
26% 2.4		V2
		146
RWY / POS	GR WT	TOGW
26L / ---- -M	133.6	----
< INDEX		PRE-FLT COMPLETE

Press the PREV PAGE function key to return to the TAKEOFF REF (1/2) page.

We will now enter our flaps settings and CG Trim. The CG Trim values are found on the load sheet that the Configuration Manager creates.

Enter the flaps settings value of 5 into the scratchpad.

Press 1L LSK and the scratchpad entry of 5 will transfer to 1L position (FLAPS column).

Enter 26 for the %MAC setting into the scratchpad. This will tell the FMC what our center of gravity setting is.

Press the 3L LSK. The scratchpad entry of 26 will transfer to the 3L position (CG TRIM). A trim setting of 2.4 will autofill to the left of the entered data.

If the data input has been entered in its entirety, the PRE-FLT column at the 6R LSK position will display the text string COMPLETE. The FMC is set up, but some loose ends (discontinuities) were created when the departure and arrival information were added to the route. Let's close those discontinuities.

FMC Workout

Closing Discontinuities

A discontinuity most often occurs when a SID, STAR, approach or runway is added to the route. In our case, we added the departure and arrival runways and procedures for Vancouver and San Francisco. Three discontinuities were created and must be closed.

The first discontinuity was created when the SID and runway was activated. As the YVR3 SID is a "vectors" departure, the text VECTORS (with a 261° heading) was placed at the start of the RTE1 and the RTE1 LEGS page.

Let's close the first discontinuity.

Press the LEGS function key. The ACT RTE1 LEGS (1/5) page displays. To clear the discontinuity depicted below, we need to line select the YYJ waypoint at the 3L position and copy/move it to the 2L position. Here's how:

ACT RTE 1 LEGS		1/5
261° HDG	232/2202	
VECTORS	THEN	
-- ROUTE DISCONTINUITY --		
YYJ	322/FL208	
157°	29NM	
SQUIM	.808/FL298	
158°	66NM	
ELMAA	.810/FL370	
< RTE 2 LEGS	RTE DATA >	

Press the 3L LSK abeam the YYJ waypoint. The YYJ waypoint will be copied to the scratchpad.

ACT RTE 1 LEGS		1/5
261° HDG	232/2202	
VECTORS	THEN	
-- ROUTE DISCONTINUITY --		
YYJ	322/FL208	
157°	29NM	
SQUIM	.808/FL298	
158°	66NM	
ELMAA	.810/FL370	
< RTE 2 LEGS	RTE DATA >	

Press the 2L LSK abeam the data entry boxes to transfer the YYJ waypoint to the 2L position. The YYJ waypoint will replace the data entry boxes and the discontinuity between VECTORS and YYJ will be closed.

MOD RTE 1 LEGS		1/5
VECTORS	232/2202	
YYJ	322/FL208	
157°	29NM	
SQUIM	.808/FL298	
158°	66NM	
ELMAA	.810/FL370	
CVO	.810/FL370	
< ERASE	RTE DATA >	

When the disco is closed:

- The page title changes to MOD RTE1 LEGS. This denotes the page is being modified. The title will remain titled MOD until the modification has been completed and executed.
- All waypoints will move up one position. The CVO VOR will appear abeam the 5L position.
- The 6L LSK prompt will change from <RTE2 LEGS> to <ERASE>. When the 6L LSK abeam <ERASE> is pressed, the last action will be undone and the discontinuity will reappear.

Let's close the second discontinuity between the CVO and RBG waypoints.

Press the NEXT PAGE function key. The MOD RTE1 LEGS (2/5) page displays with a route discontinuity at the top of the page.

Press the 2L LSK abeam the RBG waypoint. The RBG waypoint will transfer to the scratchpad.

MOD RTE 1 LEGS		2/5
THEN		
-- ROUTE DISCONTINUITY --		
RBG	.810/FL370	
161°	248NM	
ENI	.811/FL370	
145°	61NM	
PYE	311/FL199	
124°	14NM	
LOZIT	311/14296	
< ERASE	RTE DATA >	

Press the 1L LSK abeam the data entry boxes. The RBG waypoint will transfer to the 1L position and the discontinuity will be closed.

MOD RTE 1 LEGS		2/5
THEN		
-- ROUTE DISCONTINUITY --		
RBG	.810/FL370	
161°	248NM	
ENI	.811/FL370	
145°	61NM	
PYE	311/FL199	
124°	14NM	
LOZIT	311/14296	
< ERASE	RTE DATA >	

Now, let's see if you can do this on your own?

Press the NEXT PAGE function key. The MOD RTE1 LEGS page (3/5) will display with the disco abeam the 2L position. Follow the previous examples and close the final discontinuity that was created when the arrival runway was chosen...

MOD RTE 1 LEGS		3/5
124°	6NM	240/8374
SFO		
-- ROUTE DISCONTINUITY --		
DUMBA	240/3569	
283°	4NM	
CEPIN	170/2490	
282°	5NM	
AXMUL	170/1800	
< ERASE	RTE DATA >	

The page should look like this after the disco is closed:

MOD RTE 1 LEGS		3/4
124°	6NM	240/8374
SFO		
102°	15NM	240/3569
DUMBA		
283°	4NM	170/2490
CEPIN		
282°	5NM	170/1800
AXMUL		
282°	5NM	170/0013
RW28R		
< ERASE	RTE DATA >	

When the final discontinuity was closed, the succeeding waypoints moved up one lateral position and the page number changed from 3/5 to 3/4.

How did you do? If your handiwork does not match the image above, press the <ERASE> prompt at the 6L LSK to undo the action. Try again.

(Here's the answer if you're stuck (but of course you aren't!): the DUMBA waypoint is selected and transferred to the data entry boxes to close the discontinuity.)

Press the NEXT PAGE key. The MOD RTE1 LEGS page (4/4) will display.

MOD RTE 1 LEGS		4/4
282° HDG	1NM	--- /0600A
(600)		
279° HDG	2NM	--- /3000
(INTC)		
281°	10NM	--- /3000
VIKYU		
HOLD AT		
VIKYU		--- /3000
< ERASE	RTE DATA >	

If the legs look as depicted above, we can move one.

Press EXEC to accept the changes.

Note that when the EXEC button was pressed, the LEGS page changed back to ACT from MOD and the 6L prompt reverted back to <RTE2 LEGS>. The route modification was successful.

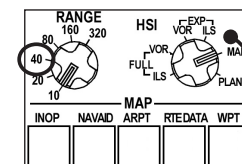
ACT RTE 1 LEGS		4/4
282° HDG	1NM	--- /0600A
(600)		
279° HDG	2NM	--- /3000
(INTC)		
281°	10NM	--- /3000
VIKYU		
HOLD AT		
VIKYU		--- /3000
< RTE 2 LEGS	RTE DATA >	

Good work. Almost done with the FMC setup.

EHSI Control & route continuity

Let's check our route with another tool, the EHSI Control panel. The EHSI - the LCD screen that displays the route - has six view modes that can be controlled via the EHSI Control panel, and, in concert with the FMC's LEGS page, can be used to view the waypoints of the planned route step by step, to verify continuity. The last thing any pilot wants to see is an error in the route, so, it's prudent to check the validity of the route.

The EHSI Control panel is located at the bottom of the main panel. By default the HSI control is set to MAP. To check the route, we need to set the control to PLAN.



Rotate the HSI knob clock-wise to PLAN. Turn the RANGE knob to 40. The EHSI will now display the route true-north orientated and the range will be 40nm.

Press the LEGS function key if the LEGS page is not open. The ACT RTE1 LEGS (1/4) page will display with the STEP> prompt at the 6R position.

Press the 6R LSK STEP> prompt to cycle through and display each waypoint of the route on the EHSI. The prompt <CTR> will appear in the center of the CDU abeam the selected waypoint.

Press the 6R LSK STEP> prompt to continue to step through every waypoint. The <CTR> prompt will step to each LEGS waypoint. Verify that there are no discontinuities or anomalies in the magenta route line. As you cycle through each waypoint, note the T/C and T/D.

Adjust the EHSI Control RANGE selector to optimize the view on the EHSI display. When viewing the waypoints near the destination, it is prudent to reduce the range to 20nm or less.

If the route displays as planned and has no discontinuities, then you are ready to close up the FMC and move on. Before closing the FMC, **rotate** the HSI display knob back to MAP mode.

Press the INIT REF function key to display the TAKEOFF REF page. We will need to edit the takeoff data just prior to departure, so it's handy to have the FMC set with the REF page ready.

Close the FMC. <SHIFT><7> keyboard combination or **press** the FMC button on the main panel.

You can save your own situation file now. Grab a cool drink. You've earned it. Two important preflight tasks are complete and we're almost ready to fly (honest). The next task is to set up the AFDS (Autopilot Flight Director System) or Mode Control Panel (MCP).

Messages from the FMC ;)

- The FMC may not include arrival or departure procedures for the chosen airport(s). SID / STAR procedures can be manually inputted and saved for later use. See the FMC section of the manual for more information.
- NOT IN DATABASE is displayed if a manually entered waypoint identifier is not in the NAVDATA database. The waypoint can still be entered as a latitude/longitude, or bearing/distance point.
- INVALID ENTRY is displayed if the entry format or range is incorrect for the selected flight or the entered airway or TO waypoint does not coincide with the navigation database.
- ENTER IRS POSITION displays if the flight crew—entered present position did not pass one of the IRS comparison checks, or the IRS is ready to change to navigate mode and has not received a present position entry. Use the CLEAR key to remove this message.

TAKEOFF REF				1/2
FLAPS	5°		V1	130
THRUST			VR	
- - °C TO				138
CG TRIM			V2	146
26% 2.4				
RWY / POS		GR WT	TOGW	
26L / - - - - M		133.6	- - - -	
< INDEX				PRE-FLT COMPLETE



A route can be created using any combination of VORs, NDBs, intersections, lat/long points, or airways. Flight plans can be found at simroutes.com, flightaware.com, and vatsim.net (to name a few).

If a 767 runs out of fuel at FL410, what do you have?

A 132 ton glider with a sink rate of over 2000 feet-per-minute and marginally enough hydraulic pressure to control the ailerons, elevator, and rudder.

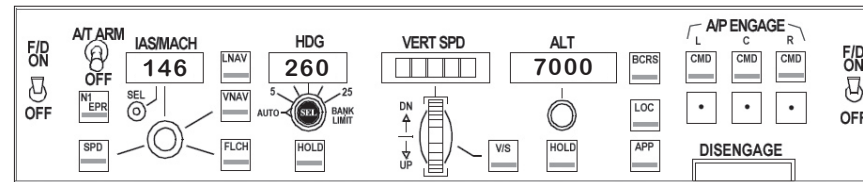
On July 29, 1983, veteran pilots Bob Pearson and Maurice Quintal were at the controls of Air Canada Flight 143 when the unbelievable happened: they ran out of fuel. The aircraft (Fin #604) landed safely at an abandoned Royal Canadian Air Force Base located in Gimli, Manitoba. The avoidance of disaster was credited to Captain Pearson's "Knowledge of gliding which he applied in an emergency situation to the landing of one of the most sophisticated aircraft ever built." Captain Pearson strongly credits Quintal for his cockpit management of "Everything but the actual flight controls," including his recommendation of Gimli as an landing spot. The aircraft went back in service (after a million dollar repair) and has been known ever since as the "Gimli Glider".

Excerpted from an article published in Soaring Magazine by Wade H. Nelson

UPDATE: The "Gimli Glider" still soars the skies for Air Canada. LDS767 beta team member, Rob Hall, flew from Toronto to Vancouver on the 767-200 on June 5, 2005. The Glider has survived two trips to the "desert", and burned 22 tons of fuel on the 4.5 hour flight (PW engines), but she is still airworthy, though the 25 year old panel looks "scratched up and worn out".

5 Setting the AFDS

The autoflight system is complex. It is recommended that the Autoflight Systems section of the manual be read in its entirety. That said, if you follow along closely, the tutorial will introduce the user to most (if not all) AFDS modes.



AFDS Panel.....Set

Nav1 Radio — Located to the LEFT of the MCP. Set manual frequency if required, otherwise set to AUTO. Select AUTO.

FD Switch — ON

A/T Switch — OFF

IAS/MACH — Set V2 from FMC (146 kts).

HDG — Set as required: runway hdg 260.

ALT — Set as required: 7000' as specified the departure YVR3 departure chart, though we will go direct YYJ.

Disengage bar — UP

Nav2 Radio — F/O Panel. Set manual frequency, otherwise set to AUTO

Flight Instruments.....Set

NOTE These checks should be done after the IRU's have aligned. Confirm NO FLAGS on main instrument panel.

Instrument Source Selectors — NORM

Airspeed - Check & set takeoff bugs.

Use the automatic bug setting mouse click area - the lower left corner of the Airspeed Indicator - for easy setting.

RDMI — Set pointer controls and verify headings

EADI — Check

EHSI — Check. Range and display mode set as required. (Set Map mode at 10 nm).

ASA — Blank

Altimeter — Set altimeter

VSI — Indicates 0

Clock — Set.

Standby Instruments — Set

Warning Annunciators.....Check

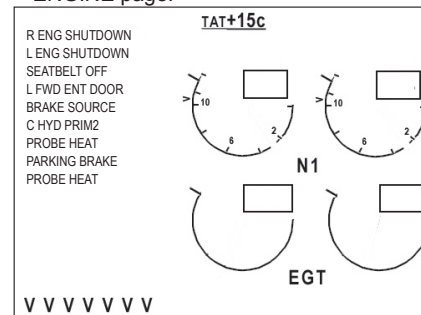
All should be off.

Standby Engine Gauges..... AUTO

Autobrakes OFF

EICASCheck

Check CAS messages for abnormal indications. Check engine gauges for normal indications. Check STATUS page and set lower EICAS screen to the ENGINE page.



TRPSet TO and derate

These are preselect derates for CLB 1 or CLB2. For this tutorial, we will not "derate" our takeoff. For more information, consult the LDS Performance Manuals available at the Level-D FAQ forum.

Flap IndicatorSet 0

Check warning lights are off and that the indicator agrees with the flap handle.

Alternate Flap Selector..... NORM

Check selector set to NORM and ALTN not displayed in the LE or TE switches.

Landing Gear.....DOWN & GREEN

Check no amber lights illuminated.

Alternate Gear SwitchGuarded OFF

GND PROX Override Switches (F/O PANEL)..... OFF

PEDESTAL (SHIFT+5)

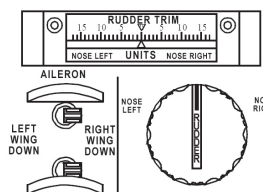
Parking Brake..... SET

Stab Trim Cutout Switches NORM

Spoilers..... DOWN

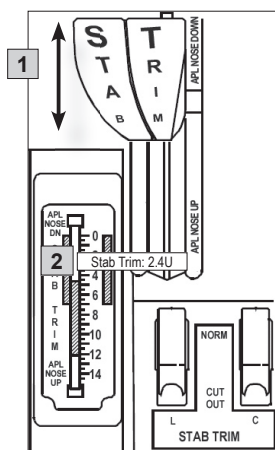
Throttles..... Closed

Aileron and Rudder Trim Set 0



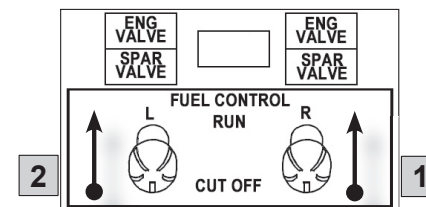
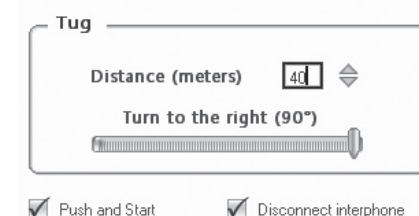
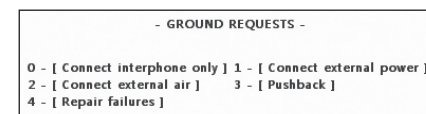
Primary electric pumps ON & demand pumps to AUTO.

2. To view a digital return of the stab trim, place your mouse icon over the Stabilizer Trim Gauge. **NOTE** Flight Simulator “Tool tips” option must be enabled to view the digital return.



BING BONG! Time to go!

IMPORTANT Repeat procedure for remaining engine.



After Starting Engines

8

Generator Lights Confirm OFF

APU Switch OFF

Engine Anti-Ice As required

Use if temp below 10°C and visible moisture is observed.

Isolation Switch (L& R) ... CLOSED

Pack Switches AUTO

Autobrake Selector RTO

EICAS RECALL & CHECK

Check for appropriate CAS messages and engine indications. There should be no messages displayed in normal operations.

Ground Equipment Disconnect

Ensure ground connections are clear.

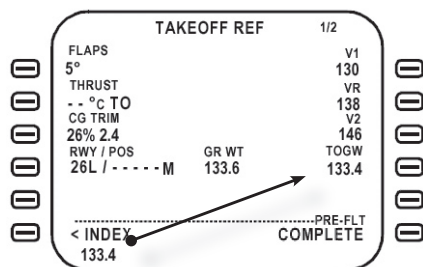
Runway Turn-off Lights ON

Nose Wheel Landing Lights ON

Okay, release the brakes and taxi the aircraft via JA, J, H, D, to the D5 hold point for 26L. Charts are available on the internet at <http://chartfinder.vatsim.net>. Keep the taxi speed below 20 knots. During the taxi to the active runway - watch where you're going - let's open the FMC and set the final TOGW (which will effect our V-speeds).

Open the FMC. If the TAKEOFF REF page (1/2) does not display, **press** the INIT REF function key to open it.

Note the GR WT value and **enter** a lesser TOGW value (by 2000 kg (.2)) to the scratchpad.



Press the 5R LSK. The entry will now transfer to the 5R position (TOGW column). The V-speeds will be recalculated and the scratchpad message TAKEOFF SPEEDS DELETED will be displayed

In the example, 133.4 has been entered and line selected to the 5R position (TOGW column). By the time the aircraft has reached 26L, the displayed GR WT value of 133.6 will be reduced by taxi fuel consumption and will most likely be closer to the TOGW of 133.4.

The FMC message TAKEOFF SPEEDS DELETED will display in the scratchpad.

Press the CLR function key to clear the TAKEOFF SPEEDS DELETED scratchpad message and reset the airspeed speed bugs on the airspeed indicator. Use the automatic bug setting mouse click area - the lower left corner of the Airspeed Indicator - to reset v-speed bugs.

Before Takeoff

Flaps Set for Takeoff

Set 5 or 15. For the purposes of this tutorial set flaps 5.

Flight Attendants Notify

Press the ALERT button on the Communications panel.

Takeoff

Once the aircraft arrives at the hold point for runway 26L, imagine that the Vancouver Tower controller clears LDS001 to "position and hold".

The takeoff - like the landing phase - is the most intense part of the pilot's job. Please take the time to read the entire takeoff section before actually trying to take to the air with the 767 simulator.

Okay... you've read the entire section, right? *Right?!*

A/T Arm

Exterior Lights Set

Turn on landing and anti-collision lights.

When lining up do not waste runway length. Don't worry about not being properly lined up on the runway centreline. Correct this during the takeoff roll.

Vancouver Tower clears LDS001 for takeoff, runway 26L.

Transponder AUTO or ON

TCAS Set TA/RA

Note: To toggle traffic on the EHSI, press the top of the EHSI Range Selector knob. A TCAS OFF message is shown on the EHSI if the TCAS display is toggled OFF.

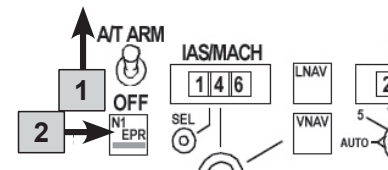
Clock ETE RUN

Throttles Advance to 70% N1

Smoothly advance the throttles to approximately 60-70% N1, and allow the engines to stabilize.

A/T 1 Arm & 2 engage N1 mode

Switch on the autothrottle and press the N1 button on the AFDS (MCP). Verify proper thrust is set prior to 80 knots. Observe the takeoff thrust being set (N1 gauge), and eventually agree with the visible TO limit, then, advance the throttles fully to the forward position. Keep a slight forward pressure on the yoke to enhance nosewheel contact to the asphalt, and slowly release the pressure when you pass 80 knots.



Verify 80 knots

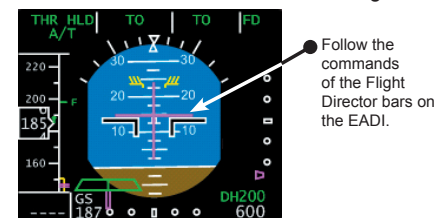
Verify that THR HOLD mode is displayed in the top left corner of the EADI. Observe the FMA annunciating the release of the A/T servos with THR HOLD, and make a mental note of moving from the low-speed abort to the high-speed abort stage.

At 5 kts before V1 (in our case, 125 knots) move your hand from the throttle lever to the yoke and mentally prepare to take ANY problem into the air, excluding situations where the aircraft controllability is severely impaired or if the aircraft otherwise becomes unflyable

Monitor airspeed for V1 and Vr

At Vr, rotate smoothly until airborne and then establish an approximate 15° pitch up attitude. Then follow the magenta colored Flight Director pitch commands on the EADI.

At Vr begin a steady pull (2-3° of rotation per second) on the yoke to establish a gentle but firm rotation and liftoff.



Once in the air, point the nose of the aircraft to an attitude that will result in a speed of v2+15 to v2+25, but do not exceed 25° of pitch.

After liftoff, once a positive rate of climb (VSI shows climb and altimeter is showing increase in altitude) is established, you can then raise the landing gear.

Positive rate of climb Gear Up

Gear handle UP, then OFF when retracted.

Try to keep the V2+15 (to 25) pitch profile. If the aircraft accelerates past the target speed, do not increase the pitch to slow down, just settle with what you end up with.

At 400'

Select LNAV or HDG SEL on the AFDS (MCP) as required. For LNAV, use the DIRECT TO procedure or intercept the route course using HDG SEL.

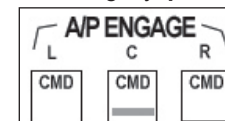
If the departure is complicated - which is not the case here - you could assist the aircraft by flying the first turns in HDG SEL, and engaging LNAV once you're past the shorter legs.

At 1000'

Engage VNAV. Follow Flight Director commands. Alternately, select FLCH and set the MCP speed to 240 knots.

At 1000' AGL select a VERTICAL mode from the MCP. Choose VNAV, FLCH or V/S. V/S is used primarily in an engine out situation.

Through 1500' AGL pitch the nose down slightly, **press** C CMD on the



MCP. The aircraft should continue on runway heading.

After Takeoff

Landing Gear OFF
Flaps ... Retract upon acceleration

Flap retraction schedule

When passing	Set flaps
Vref30+20	5
Vref30+40	1
Vref30+60	UP

When flaps are UP, maintain a minimum airspeed of Vref30+80. Normally climb out at 250 knots until reaching 10,000'. Then accelerate to 300 knots or FMC ECON speed. Once flaps are UP, move the gear lever to the OFF position to depressurize the landing gear hydraulics.

Confirm Climb thrust

Verify thrust set to CLB, CLB1 or CLB2 as desired (Upper EICAS between the N1 displays).

Open the FMC.

We want the aircraft to turn direct-to the YYJ VOR.

The easiest way for LNAV to join a route is to fly directly to a waypoint in the LEGS page. This is done by line selecting a waypoint into the active waypoint position (1L LSK of LEGS page 1). The FMC calculates a direct course to the waypoint and displays the modification on the EHSI with blue dashes. Pressing the EXEC function key and the LNAV button on the MCP causes the AFDS to fly directly to the waypoint.

Press the LEGS function key. The ACT RTE1 LEGS (1/4) page will display.

Press the L LSK abeam the YYJ waypoint to transfer it to the scratchpad.

ACT RTE 1 LEGS 1/4

VECTORS 184° 232/2202

YYJ 157° 29NM 322/FL208

SQUIM 158° 66NM .808/FL298

ELMAA 158° 159NM .810/FL370

CVO .810/FL370

<RTE 2 LEGS RTE DATA >

Press the 1L LSK abeam the VECTORS text and the YYJ scratchpad entry transfers to the 1L position. A curved blue dashed line will overlay on the EHSI. This denotes a route modification is selected.

Press the EXEC (FK). The dashed blue line on the EHSI is activated and becomes a solid magenta route line connected to the first waypoint (YYJ) of our filed route.

If LNAV, VNAV, and C CMD on the MCP are engaged, the aircraft should start a left turn direct to the YYJ VOR. If they are not engaged, engage LNAV and VNAV modes and connect the autopilot (C CMD) and the aircraft will turn direct to the YYJ VOR.

Select 37000 in the ALT window on the MCP (if you haven't already done so). The aircraft is now controlled by the AFDS in lateral (LNAV) and vertical (VNAV) modes (with the A/P engaged) to follow the FMC's lateral flight plan of YYJ to SFO and the vertical flight level of 370.

Rotate the HSI RANGE button on the main panel from 10nm to 160nm to view more of the route on the EHSI. The magenta line should display as a contiguous line extended from the aircraft position through each waypoint on the route.

After cleaning up the aircraft, and beginning our climb to 37000 feet, there are some procedural things that you need to attend to. On this tutorial flight climb derates are not used, so the climb will be rather brisk. If conditions permit, select the Seat Belt sign to AUTO to release the cabin and turn the landing lights OFF through 10000 feet. After passing the transition altitude at 18000 feet, set the altimeter to standard setting (29.92 Hg / 1013mb).

Be prepared to operate the FMC during the early phases of the climb to go DIRECT-TO to a new waypoint or to manipulate the flight plan in some other way if ATC instructions require you to do so. Don't be overwhelmed by the many tasks you are facing at this time. Complete one task at a time in a systematic manner. Don't concern yourself with errors you may make during this phase of the flight. Concentrate on getting the aircraft

safely on its way within the published boundaries of the departure.

Above all: FLY THE AIRCRAFT.

Climb and Cruise

Above 10,000 feet

Landing lights OFF

Above 18,000 feet (or transition altitude)

Set altimeters29.92"

The cruise phase on a modern jetliner aircraft is probably the most neglected phase when it comes to simulated flying. Many simmers (even experienced ones) tend to think that during the cruise there's really nothing left for the pilot to do than to just read the newspapers and enjoy the view! While this is partly true (only partly), the cruise phase is just as important as the more hectic departure & arrival phases of flight. During the cruise it is important to prepare for possible trouble and otherwise monitor the aircraft systems, AFDS, FMC, fuel, and routing (as well as reading the paper). Remember, you have to be ahead of the aircraft at ALL TIMES.

Some important activities during the cruise phase are:

Make periodic observations on the fuel consumption of the aircraft, and compare the figures you see to the numbers on your flight plan log. This is not done just to see if unpredicted winds are eating your valuable reserve fuel, but to also be on the lookout for possible fuel leak. Yes, the aircraft can, in theory, experience a fuel leak that might go unnoticed, unless a strict fuel amount monitoring policy is implemented.

Always be prepared to change the planned course of your flight, in case something goes wrong. There can be many kinds of unexpected events that will force you to change your route towards an enroute alternate.

Some events include a medical emergency, technical issues, or unexpected requests by ATC. Whatever the reason, you should be able to make

a logical and quick decision to ensure the safety of your aircraft and passengers.

Even though the LDS767 has a fully operational TCAS, it doesn't relieve you from keeping a constant traffic lookout during the cruise phase. The TCAS is not an all-encompassing or all-knowing device. While enjoying the view, scan the outside of the aircraft for air traffic.

Prepare for the arrival. Get charts ready, adjust the minimum altitudes on your gauges, and consider the many possible obstacles that you could see during your approach into destination. Review the arrival and approach plates; review and program the missed approach procedure; review the predicted weather and its effect on your arrival. Always remember to keep the FMC in the loop for a better situational awareness. This means that you should make the FMC route look like your planned arrival. Of course you also have to make sure you can transition to raw data if needed (i.e. Fly on the basic navigational instruments). In short: PREPARE.

Fuel Panel

Monitor balance and turn off Center Fuel Pumps when center tank is empty.

In real operations of the 767, the cruise phase would be the time when the flight crew would program the arrival approach/runway. For the purposes of this tutorial we programmed the arrival runway during the FMC setup while we were on the ground in Vancouver. We chose to land on runway 28R at San Francisco (the preferred arrival runway). In the real world, the winds (weather) and air traffic control would dictate which runway we would land on. If you are using an active weather program and the winds are above 08kts, 28R may not be appropriate. If you're comfortable planning a different arrival runway, go right ahead: for the purposes of this tutorial, we will stick with runway 28R.

If we were connected to an online network, there is a very good likelihood

that our arrival would be altered (ATC may dictate crossing & speed restrictions, or provide vectors off our planned arrival route altogether). In such circumstances, it is best to have a pen & paper handy to write down all clearances.

Continue to the monitor the aircraft systems, fuel burn, wind data, etc. During the cruise phase of flight, with VNAV, LNAV and C CMD engaged, the EADI will display:

SPD | VNAV PTH | LNAV | CMD

The "✓ EADI Displays A/T flag" option is enabled. Therefore, the A/T flag will be displayed below the first column at the top of the EADI if the A/T is engaged.

Fun with the Flight Crew

I'm almost positive that our LDS767 Technical Advisors don't get a lot of time to kick back and read the newspaper on a short hop like this flight, but, those eight to 11 hour flights provide the time to enjoy a few cups of java, perhaps ponder the imponderables, complete a few crosswords, and try not to fall asleep!

Want to have some harmless and childish fun?

Always wondered how long it takes to cool or warm the passenger cabin compartments?

Turn your attention to the Air Conditioning Controls panel in the upper right corner of the Overhead. The default setting for COMP TEMP are 24°C or 68°F. Let's cool things off.

Rotate the temperature control knobs from the default Auto setting to full C (Cold).

Wait. A F/A is bound to request more heat in the FWD, MID or AFT cabin.

Repeat with full W (Warm)!

On a long haul flight, this game provides the flight crew with hours of enjoyment. And, if you want to catch a short nap, can also be used as a fool-proof alarm clock!

Since "Otto" seems to have things under control, let's examine some of the other pages available on the FMC.

PROGRESS Page

Press PROG (FK). The PROGRESS page (1/2) will be displayed. Note the estimated fuel for each waypoint and the destination. Compare the progress data with the included flight plan. Record the fuel burn data into the flightplan fuel columns.

LDS001 PROGRESS 1/2				
TO	DTG	ETA	FUEL	
CVO	149	2109 z	11.8	
NEXT				
RBG	227	2119 z	11.1	
DEST				
KFSO	601	2216 z	8.1	
ECON SPD			TO T/C	NONE
.809				
< POS REPORT		POS REF >		

LDS001 PROGRESS 2/2				
H/WIND	WIND	X/WIND		
17 KT	241°/36	R 32 KT		
XTK ERROR		VTK ERROR		
L 0.0 NM				
TAS		SAT		
454 KT		-56°C		
LEFT	FUEL USED	RIGHT		
L 2.1	TOT 4.3	R 2.1		
	FUEL QTY			
TOTALIZER		CALCULATED		
13.1		13.1		

Press NEXT PAGE (FK). The PROGRESS (2/2) page will be displayed. Note the information displayed on PROGRESS page and compare them to the flight plan. Make notes on your flight plan for fuel burn, winds aloft, and check to make sure the aircraft will arrive with fuel to spare: nothing worse than heading to an alternate due to weather and not having the requisite fuel to get there. That's a big "Oooops". Just ask the crew of the Gimli Glider how much fun that is.

VNAV Page

Let's look at the VNAV pages...

Press VNAV function key. The ACT ECON CRZ (2/3) page will be displayed. On this page, you can view the flight level, cruise speed, step climb format (in this instance RVSM (2000)), step climb information, destination estimated time of arrival and fuel, and the optimum and maximum calculated flight levels. You can manually change your flight level, cruise speed, and step climb format, as well as access FMC sub pages.

ACT ECON CRZ			2/3
CRZ ALT	STEP TO		
FL370	FL410		
ECON SPD			
.809			
	KSFO ETA/FUEL		
	2216z/ 8.1		
STEP	OPT	MAX	
2000	FL371	FL422	
.....			
< ECON		ENG OUT >	
		LRC >	

ECON DES		3/3
E / D AT	AT LOZIT	
RW28R	11000	
ECON SPD		
.809/311		
SPD TRANS		
--- / ---		
SPD RESTR		
240/10000		
.....		
DES NOW >		

Press NEXT PAGE function key. The ECON DES (3/3) page will be displayed. On this page, you can view your destination runway, the runway altitude, the speed for the descent, the speed transition altitude. You can manually input a speed restriction.

Enter 240/10000 into the scratchpad, and press 4L LSK to set the Speed Restriction. The SPD TRANS will be removed. The SPD RESTRC will be set.

The DES NOW> at 6R position will enable an immediate descent to the commanded MCP altitude.

The aircraft be should nearing the T/D... so without further adieu, let's get serious and drop this aircraft into San

Francisco where we can enjoy some of the sights and sounds of the Bay area.

Unfortunately, your return leg has arrived via the ACARS (CUIT2.RBL J1 SEA PAE.PAINE1). So, enjoy 'frisco, baby: you have one hour to turn the aircraft around as Flight 003, San Francisco to Vancouver.

Descent

When the aircraft is approximately 30nm back of the T/D **Dial** 11000 in the MCP ALT Window.

Choose a descent option below. For this tutorial we will use the first option, the VNAV descent. But, if you want to try the tutorial again, try a different descent option.

Descent Options

1. VNAV descent.

Don't touch anything! When the aircraft reaches T/D it will automatically descend to the targeted MCP altitude (11000') at LOZIT.

2. DES NOW > to descend *before* the calculated T/D.

Press VNAV (FK). ACT ECON CRZ page displays.

Press NEXT PAGE until DES NOW> appears at the CDU's 6R LSK.

Press 6R LSK.

Press EXEC. The aircraft will descend to 11000'.

3. FLCH (Flight Level Change).

Enter 11000' in the Altitude Target Window on the MCP.

Press FLCH (MCP).

Enter the appropriate descent (300 knots) airspeed (IAS/MACH on MCP).

4. Change the Cruise Altitude.

Press VNAV (FK). ACT ECON CRZ page will display.

Enter 11000 in the scratchpad.

Press 1L LSK 10000 to 1L (CRZ ALT).

Press EXEC. The aircraft will descend to 11000'.

Airspeed Bugs.....Set

Autobrakes As required

Approach briefing Complete

Review, discuss, evaluate, and confirm all aspects of the impending arrival. That means planning the procedure for go-around and/or missed approach; final speed & flaps/setting; other pertinent information that you and your crew will need to make a safe landing.

Below 10,000 feet

Landing Wing Lights..... ON

Verify FMC arrival and approach.

Program arrival & approach fixes.

We've already done this, but if you are flying online, and ATC wants you on Runway 28L, make the changes, or request the right side (28R).

Flight Instruments and Radios Set

Set, tune and identify instruments and radios required for an instrument approach.

Approach Briefing

During the initial descent, take the time to reexamine the charts and brief the flight crew on the planned approach.

Consult the charts on following pages.

This is the plan:

- Cross LOZIT at 11000.
- Depart SFO heading of 070°, HDG SEL mode.
- Outbound SFO 1 to 1.5 minutes (depending on the aircraft speed), on a heading of 070°.
 - Right turn 103°, downwind leg. Descend to 3000, FLCH mode, 220 knots.
 - When G/S Deviation Scale (EADI) above the center mark, right turn base leg to 230° or direct the DUMBA waypoint.
 - Intercept the 28R LOC (111.7 & 283°).
 - Go around: 281°, climb to 3000' direct to VIKYU INT and hold.
 - Don't forget to ALERT the F/A's BEFORE you begin the descent phase. No need to have the coffee carts rolling down the aisles!
 - The RESET MCP ALT message (FMC scratchpad) displays 20nm back of T/D as a reminder to reset the MCP altitude to a lower value. Use the reminder to ALERT the F/A's of the descent.
 - Verify that the FMC data is correct.
 - If you are running an active weather program, reset the altimeter to the KSFO local barometric setting once the aircraft has passed 18000 feet.
 - Though not SOP, I prefer to start the APU on the downwind leg (just in case).



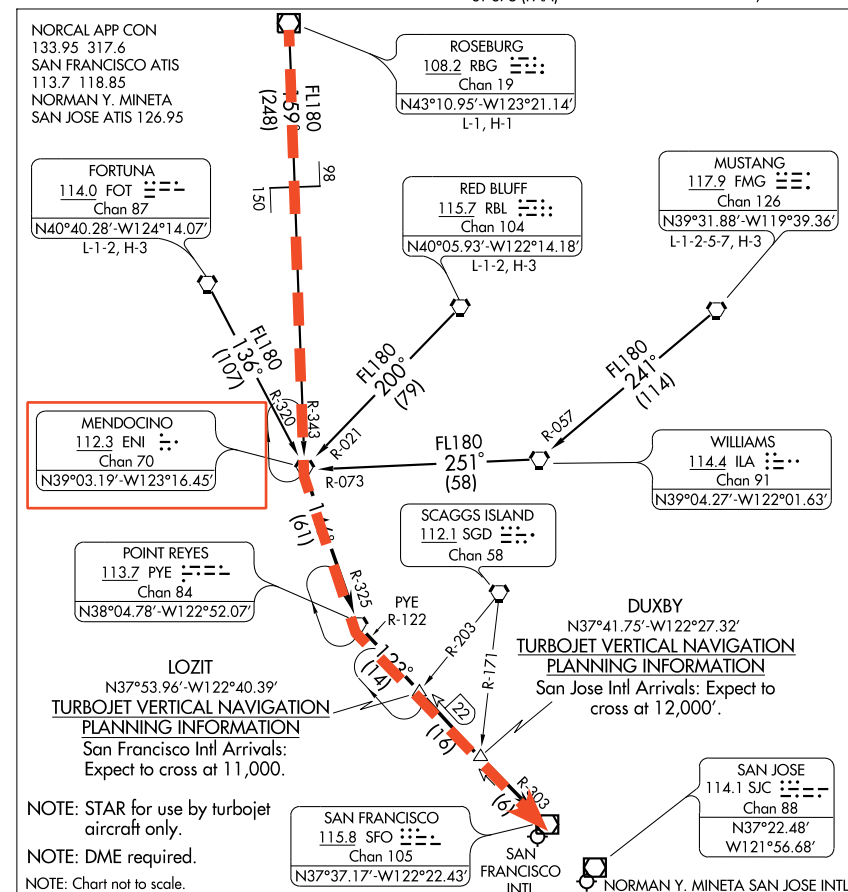
NOTE The procedure outbound the SFO VOR is a nonstandard vector approach (based on the old “Down the Bay” visual approach).

(ENI.GOLDN4) 06159

GOLDEN GATE FOUR ARRIVAL

ST-375 (FAA)

SAN FRANCISCO, CALIFORNIA



FORTUNA TRANSITION (FOT.GOLDN4): From over FOT VORTAC via FOT R-136 and ENI R-320 to ENI VORTAC. Thence....

MUSTANG TRANSITION (FMG.GOLDN4): From over FMG VORTAC via FMG R-241 and ILA R-057 to ILA VORTAC, then via ILA R-251 and ENI R-073 to ENI VORTAC. Thence....

RED BLUFF TRANSITION (RBL.GOLDN4): From over RBL VORTAC via RBL R-200 and ENJ R-021 to ENJ VORTAC. Thence....

ROSEBURG TRANSITION (RBG.GOLDN4): From over RBG VOR/DME via RBG R-159 and ENI R-343 to ENI VORTAC. Thence....

....From over ENI VORTAC via ENI R-146 and PYE R-325 to PYE VORTAC, then via SFO R-303 to SFO VOR/DME. Expect vector to final approach course.

LOST COMMUNICATIONS: San Jose Intl: After SFO VOR/DME proceed direct SJC VOR/DME.

GOLDEN GATE FOUR ARRIVAL

SAN FRANCISCO, CALIFORNIA

(ENI.GOLDN4) 06159

QUIET BRIDGE VISUAL RWYS 28L/R

Amddt 8 03303 AL-375 (FAA)

SAN FRANCISCO INTL (SF/O)
SAN FRANCISCO, CALIFORNIA

ATIS
113.7 115.8
118.85 135.45
NORCAL APP CON
134.5 338.2
SAN FRANCISCO TOWER
120.5 269.1
GND CON
121.8
CLNC DEL
118.2
AWOS-1 118.05

OAKLAND
116.8 OAK ---
Chan 115

LOCALIZER 111.7
I-GWQ ---
Chan 54

LOCALIZER 109.55
I-SFO ---
Chan 32(Y)

SAN FRANCISCO
115.8 SFO ---
Chan 105

LOM BRUJ
379 SF ---

CAUTION: AIRCRAFT OPERATING WITHIN 500' TO PARALLEL RWY- POSSIBLE WAKE TURBULENCE.

RADAR REQUIRED

Weather Minimums: SFO 2100'/5 or SFO 1000'/3 with 5 mile visibility in eastern quadrant (030°)
Clockwise to 120° and San Mateo AWOS 2500'/5 (If AWOS inoperative, SQL 2400'/5)

QUIET BRIDGE VISUAL APPROACH RWYS 28L/R

When visual approaches to Runways 28L/R are in progress, arriving aircraft may be vectored into a position for a straight-in visual approach to Runways 28L/R via the SFO VOR R-095.
SFO VOR and DME must be operating.
Aircraft should remain on the SFO R-095 until passing the San Mateo Bridge.
NOTE: Closely spaced parallel visual approaches may be in progress to Runway 28L utilizing I-SFO. In the event of a go-around on Runway 28L, turn left heading 265°, or on Runway 28R, turn right heading 310°, climb and maintain 3000, or as directed by Air Traffic Control.

SAN FRANCISCO INTL (SF/O)
SAN FRANCISCO, CALIFORNIA

1 NM	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
------	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----

APPROACH REF

We need to set our flaps and VREF for the approach into San Francisco.

Press the INIT REF function key. The APPROACH REF page (1/1) displays.

Press the 2R LSK abeam the flaps 25° and VREF 137KT text. The flap/speed setting of 25/137 will be entered in the scratchpad.

APPROACH REF 1/1

GROSS WT	FLAPS	VREF
124.7	20°	142KT
	25°	137KT
	30°	133KT
KFSO	FLAPSPEED	
11870FT3818M	25°/137KT	
ILS28R	FRONT COURSE	
111.70	283°	

< INDEX

Press the 4R LSK (---/---) in the FLAP/SPEED column. The scratchpad entry of 25/137 will be transferred to the 4R position.

Reset the airspeed speed bugs for the arrival - the airspeed invisible click spot - and get ready to get busy!

As we get closer to the LOZIT waypoint, watch the airspeed. If it looks like the aircraft may miss 240 knots at LOZIT, stick out the Speedbrakes <SHIFT></> to slow the 767 down. The FMC message DRAG REQUIRED will display in the scratchpad if the vertical path restriction cannot be met. Get those speedbrakes out!

The aircraft should be nearing the LOZIT waypoint. Once the aircraft is level at LOZIT at 11000'...

Dial 6000 into the MCP ALT (Altitude) target window

Press the MCP FLCH button. The FLCH button will illuminate. The MCP's IAS/MACH window will display the current airspeed.

Dial 240 in the MCP's IAS/MACH window to command the aircraft to descend at 240 knots. The aircraft will adjust the nose attitude to meet the commanded speed.

EADI displays

THR HOLD | SPD | LNAV | CMD

The "✓ EADI Displays A/T flag" option is enabled. Therefore, the A/T flag will be displayed below the first column at the top of the EADI if the A/T is engaged.

The aircraft should be nearing the SFO VOR.

Press the MCP HDG HOLD button to command the A/P to HOLD the current heading (124°). Allow the aircraft to settle at 240 kts and 6000'.

Dial the MCP target heading to 070° to prepare for the left turn at the SFO VOR. Do not press the HDG SEL button just yet. We want the aircraft to continue on the heading of 124°, direct SFO.

When the aircraft crosses the SFO
VOR...

Press the HDG **SEL** button. The aircraft will turn to the assigned MCP heading of 070°. We need to time the outbound leg.

Press the CHR button (Chronometer) on the Clock Display (upper left corner button on the clock) to start the timer. The elapsed time will now display on the ET/CHR digital display.

EADI displays...

THR HOLD | SPD | HDG SEL | CMD

Fly outbound from the SFO VOR for 1 to 1.5 minutes.

Press the MCP HDG **HOLD** button, to command the A/P to HOLD the current heading (070°).

Dial the MCP target heading to 103° to prepare for the right turn for the downwind leg. Do not press the HDG SEL button. We want the aircraft to continue on the heading of 070°, until 1 to 1.5 minutes has elapsed.

Once the time has elapsed on the CHRONO...

Press the HDG **SEL** button. The aircraft will turn to the assigned MCP heading of 103° and head south above the San Francisco Bay. Time to lower the altitude and speed.

Dial 3000 into the MCP **ALT** target window.

Press the MCP **FLCH** button.

Dial 200 into the MCP **SPD** window.

The aircraft will descend to 3000' at 200 knots.



ACT RTE 1 LEGS 1/2		
DUMBA	103° 4NM	170/3000
CEPIN	283° 4NM	170/2427
AXMUL	282° 5NM	170/1800
RW28R	282° 5NM	170/0013
282° HDG (600)	1NM	---/0600A

We've got great weather on a visual approach, but you can set the Decision Height (DH) on the PEDESTAL and a reference bug on the altimeter. By default the DH is set to 200.

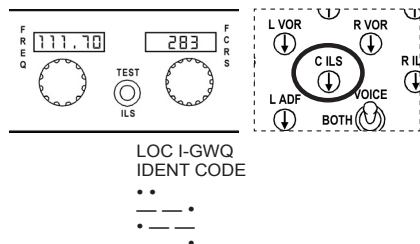
Dial to 220 to set DH.

Decision Altitude/Height

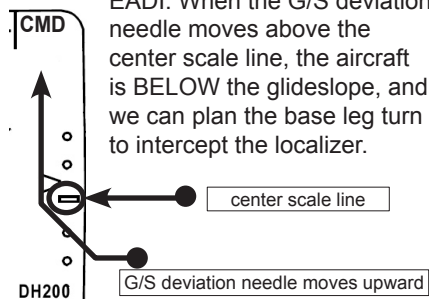
Once established on an approach, the (auto)pilot will follow the ILS and descend along the glideslope, until the Decision Altitude is reached (for a typical Category I ILS, this altitude is 200 feet above the runway). At this point, the pilot must have the runway or its approach lights in sight to continue the approach. If neither can be seen, the approach must be aborted and a Missed Approach procedure will be initiated, where the aircraft will climb back to a predetermined altitude. From there the pilot will either try the same approach again or divert to another airport.

http://en.wikipedia.org/wiki/Instrument_Landing_System

As the aircraft continues downwind and slows to 200 knots and descends to 3000 feet, confirm that the 28R ILS frequency and front course is tuned to 111.70 and 283° on the ILS Radio. Press the C ILS key on the Audio Control Panel to identify the ILS frequency.



When the aircraft is almost abeam the DUMBA waypoint, keep an eye on the Glideslope Deviation Scale on the EADI. When the G/S deviation needle moves above the center scale line, the aircraft is BELOW the glideslope, and we can plan the base leg turn to intercept the localizer.



Press the MCP **HDG HOLD** button mode to maintain the current heading of 103°.

Dial the MCP heading select to 230° or adjust the heading bug until the heading pointer intersects the DUMBA waypoint on the EHSI.

Press the MCP **HDG SEL** button. The aircraft will turn to the commanded heading of 230° (or as set). Adjust the aircraft's heading select to intersect the DUMBA waypoint.

Press the MCP **LOC** button.

EADI displays

SPD | ALT HLD | **LOC** | CMD

Continue on a 250° heading to intercept the localizer. In general terms, try to intercept the localizer on a heading of no more than 30° to the final approach course.

Dial 170 in the MCP **SPD** window.

When the aircraft nears the localizer intercept point (DUMBA 170/3000'), it will turn to 283° and follow the localizer's lateral path inbound to runway 28R.

EADI displays

SPD | ALT HLD | **LOC** | CMD

Press the MCP **APP** button. CMD (3) buttons will illuminate. The AFDS is configured to follow the ILS on its glideslope path. Monitor your airspeed. Extend the flaps (if the F/O option is disabled) per the Flaps schedule.

Once fully established on the glideslope (and the aircraft has descended below 3000'), **reset** the MCP **ALT** Window to 3000' for the Missed Approach Procedure.

EADI displays

SPD | G/S | **APP** | CMD

Flap extension schedule

When passing	Set flaps
Vref30+80	Flaps 1
Vref30+60	Flaps 5
Vref30+40	Flaps 15/20
Vref30+20	Flaps 25/30

When flaps are 25/30, the minimum speed is Vapproach.

Vapproach = Vref30 + wind factor.

Wind factor = ½ steady headwind + gust factor.

Gust factor = gust reported – steady wind.

Landing

Flaps . Extend during deceleration

On downwind

Set flaps 5 & speed 180 (Vref30+60). We're keeping the speed up until intercept.

Glideslope alive or 1500' RA

Gear DOWN and Flaps 20.

Speed brakes..... ARMED

Glideslope capture or 1000' RA

Set flaps for landing (25 or 30). Landing flaps 30 is normal. Set speed to Vapproach. We're going with flaps 25.

Set Missed Approach altitude

Dial 3000' altitude into MCP ALT window.

Monitor approach progress

At DA (instrument approach) or 500 feet, announce LANDING. If unable to land, execute a go-around (Go-around Procedure is outlined on the next page).

Touchdown

Verify spoiler deployment and decelerate using reversers and brakes (F2 key). Disconnect autopilot and autobrakes prior to turning off the runway.

The Autoland Status of the aircraft is annunciated on the ASA at 1500 feet radio height as the multiple autopilot operation engages. FLARE and ROLLOUT are annunciated in white on the EADI when multiple autopilots are engaged.

Sure, you could let the aircraft land itself, but why not disconnect the autopilot and hand fly her home?

Final approach airspeed is maintained until crossing runway threshold. Speed is then reduced so as to touch down at the double white bug speed plus gust additive. Flare is initiated when the main gear is approximately 30 ft above the runway. Increase pitch attitude by approximately 2°, then smoothly reduce thrust levers to idle. Maintain this pitch attitude until touchdown.

Do not allow the airplane to float, but fly the aircraft onto the runway and accomplish the landing roll procedure. On touchdown, PNF calls "SPEEDBRAKES UP", or if the speedbrakes do not extend

automatically the PNF calls “NO SPEEDBRAKES”. The Captain will extend the speedbrakes manually.

When the main gear is firmly on the runway and speedbrakes have deployed, the PF selects the reverse thrust levers to the interlock position and lowers the nose wheel onto the runway. When the interlocks release the PF selects the pre-determined level of reverse thrust. The PNF monitors reverse thrust and autobrakes. If one or both reversers do not operate, the PNF advises the PF of the condition, e.g., “NO LEFT REVERSE”. The PF controls reverse thrust and wheel braking as necessary.

After Landing

Reduce reverse thrust at 80 knots. Thrust should be at idle by 60 knots.

Exterior Lights As required
Landing lights OFF. Nosegear can stay ON. White anti-collision lights OFF. Runway turn-off lights ON.

Flight Director Switches OFF
Autobrakes OFF
Speed brakes DOWN
Stab Trim 4 units
Flaps UP
Transponder OFF
APU As required

Start APU prior to arrival if external power is not available.

All right, you’ve made it. Nice job, Captain. You are cleared to taxi to the gate... during the taxi, it’s a good idea to get the APU back up and running (you may want to start the APU even before landing).

We’re not planning on staying long at KSFO... just enough time to unload and reload, so there’s no need to do a complete shutdown. The Complete Shutdown checklist has been included for future reference.

Shutdown

Parking Brake SET
APU or External Power.. Establish
Verify APU is running or request/select external power.

Engine Anti-Ice Switches OFF
Isolation Switches (L and R) ON
This permits the APU to supply air to both packs.

Fuel Control Switches CUT OFF
Seat Belt Sign OFF
Hydraulic Panel Set
Turn OFF Primary electric pumps and all demand pumps. Primary engine pumps are left ON.

Fuel Pump Switches OFF
Red Anti-Collision lights OFF

Complete Shutdown

IRS Mode Selectors OFF
Emergency Light Switch OFF
Window Heat Switches OFF
Cargo Heat Switches OFF
Pack Switches OFF
APU or External Power....Deselect
Deselect external power or turn off the APU.
Standby Power Selector OFF
Battery Switch OFF

Thanks for flying with us...

You’ve got just enough time to reset the aircraft’s systems for the return leg to Vancouver: CUIT2.RBL J1 SEA PAE.PAINE1. The techniques and procedures described in this tutorial flight can be utilized for every route you fly. To fully understand the Level-D Simulations 767, refer to the operating manual.

We’ve included some tutorial extras on the following pages: a condensed checklist, flightplans, setup stuff, resources, fuel planning tips from “Willy Wonka” and some observations from real-world 767 drivers (and forum regs), Mr.X & Y.

Normal Checklist

PREFLIGHT	
PASSENGER SIGNS	SET
FLIGHT INSTRUMENTS	SET
PARKING BRAKE	SET
FUEL CONTROL	SWITCHES CUT OFF
BEFORE START	
AFDS MCP	SET
AIRSPEED BUGS.....	SET
FMC CDU	SET
TRIM	UNITS
FLIGHT CONTROLS	CHECK
AFTER START	
ENGINE ANTI-ICE	AS REQ
ISOLATION SWITCHES (L AND R)	OFF
EICAS RECALL	CHECK
AUTO BRAKES	RTO
GROUND EQUIPMENT.....	CLEAR
BEFORE TAKEOFF	
FLAPS.....	SET__
AFTER TAKEOFF	
LANDING GEAR SELECTOR	OFF
FLAPS.....	UP
APPROACH	
PRESSURIZATION.....	SET LANDING ALT
AIRSPEED BUGS.....	SET
ALTIMETERS.....	SET
EICAS RECALL	CHECK
LANDING	
SPEEDBRAKES	ARMED
LANDING GEAR.....	DOWN
FLAPS.....	SET__
SHUTDOWN	
HYDRAULIC PANEL.....	SET
FUEL PUMP SWITCHES.....	OFF
FLAPS.....	UP
SPEEDBRAKE LEVER.....	DOWN
PARKING BRAKE.....	SET
FUEL CONTROL SWITCHES	CUT OFF
COMPLETE SHUTDOWN	
IRS SELECTORS	OFF
EMERGENCY LIGHTS SWITCH.....	OFF
WINDOW HEAT SWITCHES	OFF
PACK SWITCHES	OFF
APU / EXTERNAL POWER.....	OFF
STANDBY POWER SELECTOR	OFF
BATTERY SWITCH.....	OFF

Flight Plan KILOGRAMS



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FSBUILD FLIGHT PLAN
CYVR-26L/KSFO-28R MACH 80 A/C B767-300 LEVEL-D
FLT REL IFR LDS0001
FUEL TIME CORR TOGWT LDGWT AVG W/C
TAXI 000000 0000 ~~133173~~ 123336 M002
DEST KSFO 009837 0141 ELEV 10 FT
RESV 003120 0045 133800
ALTN 001091 0015 ALTN KOAK DIST 9
HOLD 001040 0015
EXTRA 001387 0020 ZFW ~~116698~~ PAYLOAD ~~024698~~ 27369
TTL AT TO 016475 0316 116728 DIST 0709
REQD 016475 0316 .17100 ETD
CLB BIAS 0.0% CRZ BIAS 2.4% DSC BIAS 0.0%
DEP BIAS 0 MIN 0 DIST 0 FUEL, ARR BIAS 0 MIN 1200 FUEL
YYJ J589 RBG.GOLDN4/0141
CG/TRIM
26% / 2.4
YVR3 26L 7000

TO	NM	AWY	M/H FL M/C TAS G/S	ZT	ACTME	WIND ETA ATA	ATC ACBO ABO REM AREM
N4843.6/W12329.0			183 CLB			155018	CZVR
YYJ 113.70	031	DCT	185 331 308 00/06 00/06		...	0019/...	0145/...
N4814.6/W12327.5			169 CLB			260069	SEA
SQUIM	029	J589	159 406 398 00/04 00/11		...	0028/...	0136/...
N4759.5/W12319.5			168 CLB			261066	SEA
TOC	016	J589	160 469 461 00/02 00/13		...	0030/...	0133/...
N4708.8/W12324.5			171 370			273084	SEA
ELMAA	050	J589	160 457 461 00/06 00/19		...	0035/...	0129/...
N4429.9/W12317.6			169 370			273072	SEA
CVO 115.40	159	J589	160 460 462 00/20 00/40		...	0050/...	0114/...
N4310.9/W12321.1			169 370			272039	SEA
RBG 108.20	079	J589	165 459 459 00/10 00/50		...	0058/...	0106/...
N3921.1/W12314.9			166 370			272037	OAK
TOD	230	GOLDN4	161 459 456 00/30 01/20		...	0079/...	0085/...
N3903.1/W12316.4			164 DSC			247021	OAK
ENI 112.30	017	GOLDN4	161 458 455 00/02 01/23		...	0080/...	0084/...
N3804.7/W12252.0			146 DSC			315001	OAK
PYE 113.70	062	GOLDN4	145 367 359 00/10 01/33		...	0083/...	0081/...
N3753.9/W12240.3			125 DSC			166016	OAK
LOZIT	015	GOLDN4	124 290 276 00/03 01/36		...	0084/...	0080/...
N3741.7/W12227.3			125 DSC			174009	OAK
DUXBY	016	GOLDN4	124 250 243 00/03 01/40		...	0085/...	0078/...
N3737.1/W12222.4			117 DSC			358017	OAK
SFO 115.80	006	GOLDN4	120 210 222 00/01 01/41		...	0086/...	0078/...
N3737.1/W12222.4			344			358017	OAK
KSFO	000	GOLDN4	345 210 194 00/00 01/41		...	0098/...	0066/...

Flight Plan POUNDS



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FSBUILD FLIGHT PLAN
CYVR-26L/KSFO-28R MACH 80 A/C B767-300 LEVEL-D
FLT REL IFR LDS001
FUEL TIME CORR TOGWT LDGWT AVG W/C
TAXI 000000 0000 ~~291515~~ 271371 M002
DEST KSFO 020144 0141 ELEV 10 FT
RESV 006878 0045 293500
ALTN 002407 0015 ALTN KOAK DIST 9
HOLD 002293 0015
EXTRA 003057 0020 ZFW ~~256736~~ PAYLOAD ~~054336~~ YVR3
TTL AT TO 034779 0316 257337 DIST 0709
REQD 034779 0316 36200 ETD 60337 26L
CLB BIAS 0.0% CRZ BIAS 2.4% DSC BIAS 0.0%
DEP BIAS 0 MIN 0 DIST 0 FUEL, ARR BIAS 0 MIN 1200 FUEL
YYJ J589 RBG.GOLDN4/0141
CG/TRIM
26% / 2.4
7000

TO	NM	AWY	M/H FL M/C TAS G/S	ZT	ACTME	WIND ETA ATA	ATC ACBO ABO REM AREM
N4843.6/W12329.0			183 CLB			155018	CZVR
YYJ 113.70	031	DCT	185 331 308 00/06 00/06		...	0043/...	0304/...
N4814.6/W12327.5			169 CLB			260069	SEA
SQUIM	029	J589	159 406 398 00/04 00/11		...	0061/...	0286/...
N4759.5/W12319.5			168 CLB			261066	SEA
TOC	016	J589	160 469 461 00/02 00/13		...	0068/...	0279/...
N4708.8/W12324.5			171 370			273084	SEA
ELMAA	050	J589	160 457 461 00/06 00/19		...	0078/...	0269/...
N4429.9/W12317.6			169 370			273072	SEA
CVO 115.40	159	J589	160 460 462 00/20 00/40		...	0111/...	0236/...
N4310.9/W12321.1			169 370			272039	SEA
RBG 108.20	079	J589	165 459 459 00/10 00/50		...	0128/...	0219/...
N3921.1/W12314.9			166 370			272037	OAK
TOD	230	GOLDN4	161 459 456 00/30 01/20		...	0174/...	0173/...
N3903.1/W12316.4			164 DSC			247021	OAK
ENI 112.30	017	GOLDN4	161 458 455 00/02 01/23		...	0175/...	0172/...
N3804.7/W12252.0			146 DSC			315001	OAK
PYE 113.70	062	GOLDN4	145 367 359 00/10 01/33		...	0182/...	0164/...
N3753.9/W12240.3			125 DSC			166016	OAK
LOZIT	015	GOLDN4	124 290 276 00/03 01/36		...	0185/...	0162/...
N3741.7/W12227.3			125 DSC			174009	OAK
DUXBY	016	GOLDN4	124 250 243 00/03 01/40		...	0188/...	0159/...
N3737.1/W12222.4			117 DSC			358017	OAK
SFO 115.80	006	GOLDN4	120 210 222 00/01 01/41		...	0189/...	0158/...
N3737.1/W12222.4			344			358017	OAK
KSFO	000	GOLDN4	345 210 194 00/00 01/41		...	0201/...	0146/...

FSBuild NavLog Glossary

Navlog Fuel Plan Headers and Explanations

FLT REL IFR LDS001[1] CYVR-26L/KSFO-28R[2] MACH 80 [3] A/C B767-300 LEVEL-D[4]
FUEL TIME CORR TOGWT LDGWT AVG W/C
[5] TAXI 000000 0000 [13]280406 [14]259835 [15]M011
[6] DEST KSFO 020570 0148 ELEV. 10 FT
[7] RESV 006878 0045
[8] ALTN 002407 0015 [16] ALTN KOAK DIST 9
[9] HOLD 002293 0015
[10] EXTRA 003057 0020 [17] ZFW 245200 PAYLOAD 048200
[11] TTL AT TO 035206 0323 [18] DIST 0737
[12] REQD 035206 0323 ETD

[19] CLB BIAS 0.0% CRZ BIAS 2.4% DSC BIAS 0.0%
DEP BIAS 0 MIN 0 DIST 0 FUEL, ARR BIAS 0 MIN 1200 FUEL
[20] CYVR YVR J126 EUG J143 ENI.PYE1 KSFO/0148

1. ATC Callsign or Flight Number

2. ICAO code Departure / Destination w Runway ID

3. Cruise Mach Number

4. Aircraft Type

5. Taxi fuel and time

6. Destination Fuel burn and time

7. Reserve Fuel and endurance time

8. Alternate Fuel and time

9. Hold fuel and time

10. Extra fuel and time

11. Total fuel planned at T/O (= Required Fuel - taxi fuel)
12. Required Fuel, sum of all above fuel amounts

13. Planned Takeoff Gross Weight (LBS or KGS)

14. Planned Landing Gross Weight

15. Avg. enroute wind (+ for Tailwind, - for Headwind)

16. ICAO airport code for Alternate & Distance from Destination to Alternate (if listed)

17. Aircraft Zero Fuel Weight (empty weight + payload)

18. Total planned route distance from Dep to Dest.

19. Climb, Cruise, Descent performance factors. Adjust individual aircraft burn performance to accurately reflect changes in performance based on aging engines and more drag.

20. ATC and Flight Plan Route.

Navlog Main Flight Plan Legs Data

			M/H FL			WIND			ATC		
TO	NM	AWY	M/C	TAS	G/S	ZT	ACTME	ETA	ATA	ACBO	ABO REM AREM
N4904.6/W12308.9			148	CLB				110010	CZVR		
YVR 115.90	007	DCT	150	268	263	00/01	00/01	.../...	0010/...	0341/...	
N4859.6/W12308.2			158	CLB				100012	SEA		
YVR2	004	J126	160	268	266	00/00	00/02	.../...	0016/...	0335/...	
N4853.6/W12307.4			153	CLB				150018	SEA		
YVR11	006	J126	154	276	260	00/01	00/03	.../...	0024/...	0327/...	

1. TO – data from last waypoint to current waypoint row. Three or five letter waypoint ID (TOC/TOD = Top of Climb or Descent)

2. NXXX/WXXX - Latitude/Longitude of current waypoint.

3. ID for current waypoint (Navaid or Fix) & Navaid Freq.

4. NM – nautical miles from previous to current waypoint.

5. AWY – Airway ID from previous waypoint to current waypoint (SID, STAR, Airway).

6. M/H – Magnetic Heading from previous to current wpt.

7. M/C – Magnetic Course from previous to current wpt.

8. FL – Flight Level or CLB/DSC (climb/descent).

9. TAS and G/S – True Airspeed & Ground Speed.
10. ZT – Segment time from previous to current wpt.

11. ACTME – Accumulated time from DEP airport to current waypoint.

12. WIND – Direction of Wind/Speed.

13. ETA/ATA – Field to manually fill out Estimated Time of Arrival and Actual Time.

14. ATC – Online ATC sector.

15. ACBO – Accumulated fuel burn from DEP airport to current waypoint.

16. ABO – Actual fuel burn, for manual tracking of fuel score.

17. REM – Remaining Estimated Fuel on board at wpt.

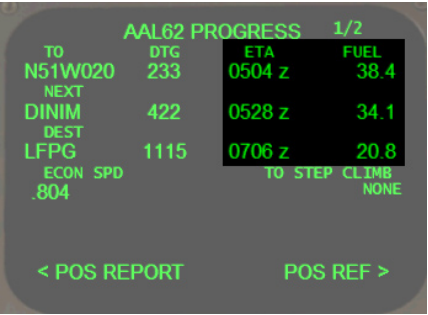
18. AREM – Actual Remaining Fuel on board at wpt.

Getting more accurate Fuel/ETA predictions

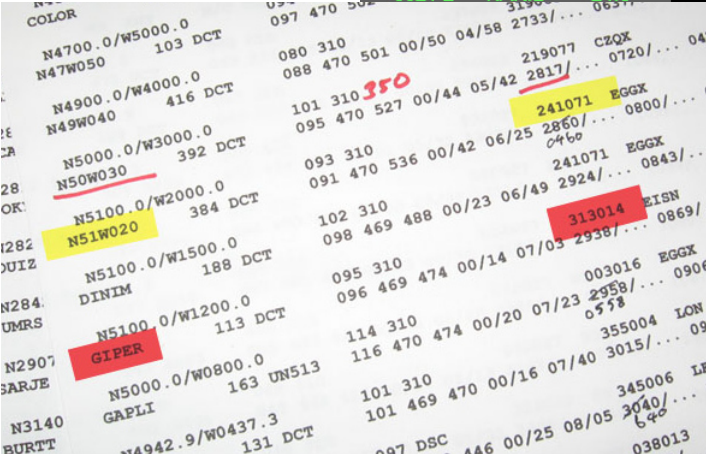
Next time you're stuck in an 8-hour cruise and looking for something else to do other than watching DTG to DEST tick away on PROG page, try keeping yourself busy for a few minutes by entering the winds into FMC.

The WIND page isn't intentionally hidden, but many users may not know about it because it's "hidden" under the LEGS page. In any case, entering the wind aloft data may help you get more accurate fuel and eta prediction; of course, it depends on how accurate your wind data is.

Here's my PROG page:



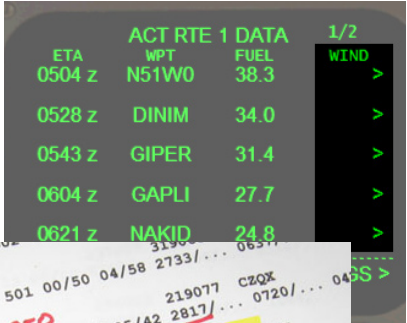
Looks like I'm due to arrive at 0706Z with 20.8 remaining. Let's see if adding tail winds will help. I go to my flight plan and look at my wind aloft data for the upcoming fix, in this case N51W020, highlighted in yellow.



Ok, I see that at fix N51W020 I have wind of 241071 AT FL310. Let's put this into the FMC LEGS page, and then go to the RTE DATA page.



Here the FIX names are displayed again, but instead of SPEED/ALT and distant to, I can see the ETA and FUEL associated with each fix--pretty useful; but right now I'm interested in the WIND column, which is currently blank.



Since I want to enter wind data for N51W020, the first fix on the page, I click on the RSK associated to the FIX, and then I've found the wind aloft page for the fix! But it is, of course, blank right now!

Although I've stepped up to FL350, the wind I have is for FL310--it should be close enough for prediction, so we'll use it anyway. So I put in 350 into the ALT box, as seen in previous picture. Now the FMC generated the aloft entry for FL350, for which I put in my wind: 241/71, into the associated RSK.



Great! That's all there is to it, now this FIX and every FIX after N51W020 with have wind 241/71, but not every FIX is going to have the same wind. Let's look at our flight plan again...

Next FIX, DINIM, has the same wind, and the FMC has already automatically entered the wind data into all remaining FIXes after N51W020, we DON'T need to redundantly enter it again. However, at GIPER, highlighted in red, has different wind data: 313/14, so we'll enter this in.



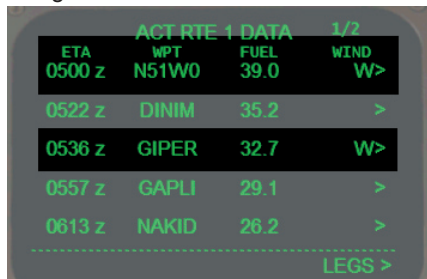
Using the NEXT key from the wind aloft page, I scroll to the page for GIPER, and I see that the FMC has put the previous entry, "241/71", into all the remaining fixes (in small font). We're

Level-D Simulation 767 Print Edition Update

going to override this entry with our own by entering "313/14":

Now, every FIX **after GIPER** will be entered with wind "313/14" by the FMC; every FIX **before GIPER and after N51W020** will be "241/71". Understand? What you enter is copied to all the remaining FIXes until you enter a new wind, and that wind is then copied..etc.

Let's go back to RTE DATA page using the RSK:



Here I see a "W" for WIND entered in the 2 way points, N51W020 and GIPER, the blank FIXes use the wind from the above "W".

Now, back to PROG:



Entering the tail winds help a bit: my ETA is now down to 0658Z, 8 minutes earlier than without wind, and I'm saving extra 1.4x1000 lbs of fuel!

Remember, just because you have 40 FIXes in your transpacific route doesn't mean you need to enter data for all of them--NO! You only need to enter the FIXes where the wind changes. But hey, if you have 10 hours until TOD... maybe it's not a bad idea.

Preston

> KLAX



Quotable Quotes from Mr.X & Mr. Y

LDS767 forum contributors that fly the REAL 767.

Q. What do you pilots do on flights that last over 3-4 hours in cruise?

Mr. X: I spend my time coming up with new games to play using the FMC, so far I have come up with FIX page darts (enter a fix, draw circles around it and bearing lines, using RTE2 enter a waypoint and if it hits the "dartboard" then score appropriately). Then there is RTE2 Battleships. Draw a secret grid on paper and mark your battleships, using RTE2 enter a grid pattern of waypoints (takes a long time) and then enter coordinates to try to hit the squares. Not actually managed to play any of these but the concepts are there.

Q. My question is, does setting, say 2 failures a month, account for the livery you're flying or the sim in general.

Mr. X: Nearly 4 years flying the 767 now and I've seen 2 EICAS messages in-flight - TE Flap Disagree (caused by the captain not engaging the flap lever in the detent) and spoilers (um, who knows, the engineer didn't). On the ground I've only had 1 failure of QRH note, ignitor failed, but several more to do with miscellaneous things happening in the cabin or in the EE bay that don't show up. If I fly the LDS I keep the failures turned off to simulate reality!

Mr. Y's How to make Virtual Airline Flying more realistic

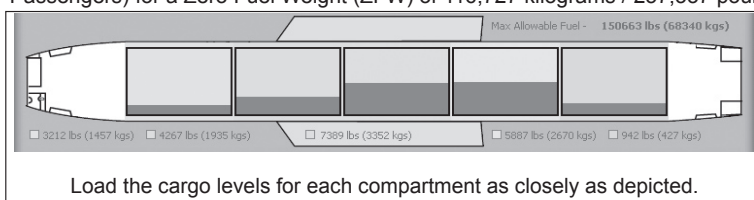
- Show up one hour prior to take-off for a thirty minute flight.
- Empty all your pockets of metal as you go through the door to your PC. For extra credit, have your teenage offspring search your flightcase, shoes, wallet.
- Take the one-page flightplan you generated for your flight, get all 8.5 x 11 inch papers from your waste-basket, mix them up and spend ten minutes looking for the critical page, then spill coffee on it.
- Put seatbelt/shoulder harness on your office chair. For that extra GOOD MORNING feeling sit on the buckle.
- If you're flying out of Grand Forks, ND in January, turn your house air conditioning full till it is about 10 degrees F. Then, when (if) you get the APU running turn the heat on.
- Once you get ready to fly, get up, go outside and do a complete walk-around of your house, rain, snow or shine, in a \$300 suit.
- Wear a white shirt with a fresh coffee stain. A tie is a must (no clip-on)
- Eat a half-cooked TV dinner while flying.
- Try explaining the concept of "sterile cockpit" to your SO (significant other).
- If your pet comes to visit, explain the instruments to it. Ask it if it likes 'Gladiator' Movies
- Never accelerate the sim clock no matter how boring the ocean or Nebraska is.
- When flying at night, turn off the lights. If flying into a dawn or sunset, shine a 120 watt bulb into your face.
- If your SO complains, do informational picketing, then "walk" if that doesn't work.
- If you fly with a co-pilot, determine who's senior and dump the radios, walk-around and second meal choice on the junior crewmember.
- If your co-pilot leaves the flightdeck and you're above FL350, place a mask over your nose/mouth till they return.
- If your flying a new Boeing, throw a blanket with fuzzy surface on your chair. This should leave lint on your clothes like real Boeing flight deck seatcovers do.
- If you fly a "Glass cockpit" a/c, type at least 40 wpm. (old steam gauge pilot's joke).
- Find the lumpiest bed in your house, pretend it is a hotel and sleep for EXACTLY eight hours before the alarm.

Enjoy your Sim Session

Appendix

The construction of this tutorial & mission are based on the settings contained on this page.

- 1. Saved Files** Create your own start-up file (see Creating a Situation file), or load the "Golden Gate Run 1" from the *Add-on> B767 Specific > Import panel data from a flight..* menu.
- 2. Aircraft Livery** Go ahead and use the default Level-D 767. It's retro cool! If you'd prefer another airline livery, many user-created "repaints" are available on the internet as well as <http://www.leveldsim.com>. Use the Repaint Manager (default installed to Start>Programs>Flight One Software) to install the livery to FSX.
- 3. Flight Planning** Open your internet browser and navigate to <http://www.simroutes.com>.
 - Enter CYVR as the departure airport and KSFO as the arrival airport.
 - Choose the YYJ J589 RBG.GOLDN4 flightplan.
 - Choose the Level-D 767 in the dropdown menu and click the "Download File" button.
 - Save the file (CYVRKSFO.rte) to the default "rte" file location: ...\\Microsoft Flight Simulator X\\Level-D Simulations\\navdata\\Flightplans.
- 4. Configuration** The Configuration Manager is installed to your Desktop by default. Choose from these options:
 - Basic Aircraft Configuration, **select** Long Haul Flight
 - Load Type, **select** Random.
 - Click on Cargo Load button. A new screen will display the Cargo subscreen.
 - The aircraft is loaded with approximately 60,337 lbs (27,369 kg) (Cargo & Passengers) for a Zero Fuel Weight (ZFW) of 116,727 kilograms / 257,337 pounds.



- Click on Passenger Load button to return to the main screen.
- Click on the Proposed Fuel minus button to load 35,000 lbs (15,876 kg) of fuel for the flight. Remember, you must manually adjust the fuel load in the aircraft later, but 15,876 kg is close enough to get the trim setting.
- Press Save Settings to save the configuration file.
- Press Exit to close the Configuration Manager.
- Print the 767LoadSheet.txt "...\\Flight Simulator X\\SimObjects\\Airplanes\\LVLD_B763" folder.

Dry Operating Weight	197000 lbs (89359 kgs)
Passenger Zone A	2184 lbs (991 kgs)
Passenger Zone B	12768 lbs (5792 kgs)
Passenger Zone C	11592 lbs (5258 kgs)
Passenger Zone D	12096 lbs (5487 kgs)
Cargo Hold 1	3212 lbs (1457 kgs)
Cargo Hold 2	4267 lbs (1935 kgs)
Cargo Hold 3	7389 lbs (3352 kgs)
Cargo Hold 4	5887 lbs (2670 kgs)
Cargo Hold 5	942 lbs (427 kgs)
Zero Fuel Weight	257337 lbs (116727 kgs)
Proposed Takeoff Fuel	35000 lbs (15876 kgs)
Takeoff Weight	293500 lbs (133700 kgs)
Takeoff %MAC	26%
Takeoff Trim	2.4

Resources

Level-D 767 Support and Information

Level-D Simulations

<http://www.leveldsim.com>

<http://www.leveldsim.com/forums>

Flight1

<http://www.flight1.com>

Pilot Tools

NavData

<http://www.navigraph.com>

Charts

<http://chartfinder.vatsim.net>

Route Planning: SimRoutes

<http://www.simroutes.com>

Programs

Microsoft FSX

<http://www.fsinsider.com>

FSBuild

<http://www.fsbuild.com>

FSUIPC

<http://www.schiratti.com/dowson.html>

Books

Level-D Simulations 767 Print Edition Manual

<http://flightlevelpub.com>

Angle of Attack Level-D 767 DVD Training

<http://www.flyaoamedia.com/>

Mike Ray's 757/767 Simulator & Checkride

<http://www.utem.com>

Big Boeing FMC Guide

<http://www.fmcguide.com>

Thanks

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