



# **'Space Shuttle' FLIGHT MANUAL**

## **PART I – User's Manual**

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**DO NOT USE FOR FLIGHT**

## ABOUT THIS MANUAL

VERSION: 22 DECEMBER, 2006

**WARNING: THIS MANUAL IS DESIGNED FOR MICROSOFT® FSX 'SPACE SHUTTLE' EXPANSION ONLY. DO NOT USE FOR FLIGHT.**

The 'Space Shuttle' FLIGHT MANUAL is organized into four Parts:  
Each Part is provided as a separate Acrobat® PDF document:

Click START > Programs > Captain Sim > Space Shuttle > Flight Manual >

- **Part I – User's Manual - this document.**
  - The User's Manual describes the 'Space Shuttle' product as a software title.
- **Part II – Orbiter Systems**
  - This document describes what to expect from 'Space Shuttle' product in terms of Orbiter systems functionality.
- **Part III – Normal Procedures**

The Flight Procedures Manual covers the mission phases as follows:

  - Entry interface (EI) to terminal area energy management (TAEM) interface
  - TAEM
  - Approach, Landing, and Rollout

Adobe Acrobat® Reader Required

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## GENERAL DESCRIPTION

The 'Space Shuttle' is an entertainment title designed to provide some general idea of the Space Shuttle Orbiter vehicle construction, functionality and operations.

Please do not expect all systems to be functional and programmed in strict accordance with real Space Shuttle Orbiter specifications. For obvious reasons the 'Space Shuttle' title cannot be seriously considered or used as a piece of training software.

The 'Space Shuttle' expansion features highly detailed top-notch visual models, effects and some of major systems that are normally in use during the following Space Shuttle Orbiter descent phases:

- Entry through the atmosphere
- Terminal Area Energy Management (TAEM)
- Approach, Landing and Rollout

The 'Space Shuttle' product is a pilot project to determine interest of MS FS community in the Space and orbital aviation subject. If we receive enough positive feedback from the community, the 'Space Shuttle' will turn into a first product of a new 'SPACE' series of MS FSX add-ons.

## KEY FEATURES

- All six Space Shuttle Orbiter vehicles models and textures:
  - OV-101 Enterprise
  - OV-102 Columbia (lost during STS-107)
  - OV-099 Challenger (lost during STS-51-L)
  - OV-103 Discovery
  - OV-104 Atlantis
  - OV-105 Endeavour
- High resolution Commander view 2D Panel
- HUD
- Exterior Model Animation Control Panel
- Simicons Panel
- Radio panel
- GPS panels
- **33** Custom Model Animations
- Highly detailed 3D Virtual Cockpit (VC) of the:
  - Flight Deck with Aft Crew Station
  - Mid Deck with Airlock
  - Payload Bay
- **238** Custom 3D Animations in the VC
- 3D flight instruments
- VC High resolution textures
- Systems Programming \*
- Exclusive Effects
- Realistic Flight Model
- Pre-saved Flights
- Voice Package
- Add-on scenery
- Extensive Flight Manual in three Parts
- Bonus Set of three original NASA Manuals

\* - 'Space Shuttle' is an [Express Line](#) product. If you are a 'hardcore' simmer we highly recommend to check the Free Manual Part II (Orbiter Systems) and evaluate if the systems programming depth meets your requirements.

**GAMEPLAY**

**Entry Interface**

31 min. to Touchdown  
122 km (76 miles)  
25,898 km/h (16,093 mph)



**Maximum Heating**

20 min. to Touchdown  
70 km (43.5 miles)  
24,200 km/h (15,038 mph)



2,856 km  
(1,775 miles)

**Exit Blackout**

12 min. to Touchdown  
55 km (34 miles)  
13,317 km/h (8,275 mph)

885 km  
(550 miles)



**Terminal Area**

Energy Management  
5.5 min. to Touchdown  
25,338 M (83,134 ft.)  
2,735 km/h (1,700 mph)

96 km  
(60 miles)



**Approach and Landing**

86 sec. to Touchdown  
12 km (7.5 miles) to Runway  
682 km/h (424 mph)

12 km  
(7.5 miles)



**Approach and Landing Interface**

86 sec. to Touchdown  
12 km (7.5 miles) to Runway  
682 km/h (424 mph)  
3,048 M (10,000 ft.) Altitude



**Initiate Preflare**

32 sec. to Touchdown  
3.2 km (2 miles) to Runway  
565 km/h (351 mph)  
533 M (1,749 ft.) Altitude

20° Glide/Slope



**Complete Preflare**

17 sec. to Touchdown  
1,079 M (3,540 ft.) to Runway  
496 km/h (308 mph)  
41 M (134.5 ft.) Altitude

Flare to 1.5°



**Wheels Down**

14 sec. to Touchdown  
335 M (1,099 ft.) to Runway  
430 km/h (267 mph)  
27 M (89 ft.) Altitude

1.5° Glide/Slope

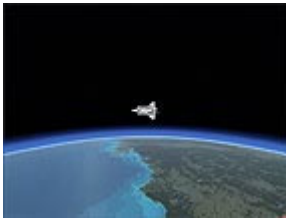


**Touchdown**

689 M (2,261 ft.)  
from End of Runway  
346 km/h (215 mph)



See Flight Manual Part III – Flight Procedures for details.

**DO NOT USE FOR FLIGHT****IN-ORBIT OPERATIONS**

Using SLEW mode controls it is possible to orbit the Earth and perform various in-orbit operations.

**Note:**

MS FS animations do not work in SLEW mode. Temporary switch SLEW mode OFF to control animated systems.

**ENTRY**

The Orbiter starts significantly entering the atmosphere at about 400,000 ft (120 km) at around Mach 25 (8.2 km/s).

The vehicle is controlled by a combination of RCS thrusters to fly at a 40 degrees nose-up attitude producing high drag, not only to slow it down to landing speed, but also to reduce reentry heating.

System is programmed to follow the descent profile and perform TAEM interface automatically.

You can correct body position and position on GPS ground track using SLEW commands if necessary.

**TERMINAL AREA ENERGY MANAGEMENT (TAEM)**

At altitude 25,338m (83,134ft) speed of 2735km/h (1,476KTAS) and 96km (51.8nm) to threshold Orbiter enters TAEM interface.

In the lower atmosphere the Orbiter flies much like a conventional glider, except for a much higher descent rate. It glides with a ratio of 4:1. At approximately Mach 3, two air data probes, located on the left and right sides of the Orbiter's forward lower fuselage, are deployed to sense air pressure related to vehicle's movement in the atmosphere.

**APPROACH AND LANDING**

When the approach and landing phase begins, the Orbiter is at 10,000 ft (3048 m) altitude, 7.5 miles (12.1 km) to the runway. The pilots apply aerodynamic braking to help slow down the vehicle. The Orbiter's speed is reduced from 424 mph (682 km/h) to approximately 215 mph (346 km/h) at touch-down. The landing gear is deployed while the Orbiter is flying at 267 mph (430 km/h). To assist the speed brakes, a 40 ft (12.2 m) drag chute is deployed once the nose gear touches down at about 213 mph (343 km/h). It is jettisoned as the Orbiter slows through 69 mph (111 km/h).

After landing, the vehicle stands on the runway for several minutes to permit the fumes from poisonous hydrazine, used as propellant for attitude control, to dissipate, and for the shuttle fuselage to cool before the astronauts disembark.

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**DO NOT USE FOR FLIGHT**

Conditions permitting, the Space Shuttle will always land at Kennedy Space Center. However, if the conditions make landing there unfavorable, the Shuttle can touch down at Edwards Airforce Base in California or at other sites. A landing at Edwards means that the shuttle must be mated to the Shuttle Carrier Aircraft\* and returned to Cape Canaveral, costing NASA roughly an additional million dollars.

\* - Not included in the 'Space Shuttle' package.

\*\* - See Flight Manual Part III – Flight Procedures for details.

## PRODUCT DESCRIPTION

## SPECIFICATION

The 'Space Shuttle' expansion for MS FSX is available at [www.captainsim.com](http://www.captainsim.com) as 'one-click' installation file.

File Name: css000\_XX00.exe

Size: ~70 MB

## INSTALLATION

1. Right after a purchase you will receive an automated email message from Captain Sim Sales with your Order Number and download links.

**Note:**

- Please keep the ORDER NUMBER safe. You will need it for future reinstallations, updates etc.
- **If you do not receive the email within one hour please use [Customer Support System](#).**

2. Download the css000\_XX00.exe file to any folder.
3. Double click on the css000\_XX00.exe file and follow the installer's instructions.

**Note:**

- YOUR PC MUST BE CONNECTED TO THE INTERNET FOR THE INSTALLATION.
- ORDER NUMBER IS REQUIRED FOR THE INSTALLATION.
- The installation software will automatically add the 'Space Shuttle' to your FSX.
- Upon installing the models will appear under 'Captain Sim' manufacturer in the FSX aircraft selection menu.
- **Links to the Product User's Manual and Uninstall will be available via:**  
Click START > Programs > Captain Sim >Space Shuttle>

## UNINSTALLATION

Click START > Programs > Captain Sim > Space Shuttle > Space Shuttle Uninstall



**DO NOT USE FOR FLIGHT**

## EXTERIOR MODELS

Detailed exterior models and accurate textures of all six Space Shuttle Orbiter vehicles are included in the package:



OV-101 Enterprise



OV-102 Columbia



OV-099 Challenger



OV-103 Discovery



OV-104 Atlantis



OV-105 Endeavour

All models feature Payload Bay and Virtual Cockpit.

## EXTERIOR MODEL ANIMATIONS

**All models feature the following animations (33 in total) of the Exterior Models:**

- Payload Bay Doors (2)
- SRMS (Shuttle Remote Manipulator System)
- Drag Chute
- Radiators (2)
- Side Hatch
- Air Probes (2)
- Antenna
- Vent Doors (8)
- Elevons (4)
- Rudder
- Speed Brake (2)
- Body Flap
- Landing Gears (extension/retraction, wheel rotation, shocks animation etc) (3)
- Landing Gear Doors (4)

## EXTERIOR MODEL SYSTEMS PROGRAMMING

All listed above systems are programmed into the models.

Use MODEL ANIMATION CONTROL PANEL and default MSFS keys to control the systems.

**Note:**

Cockpit controls are described in details in the 'Space Shuttle' FLIGHT MANUAL Part II – Orbiter Systems.

**DO NOT USE FOR FLIGHT**

## AIRCRAFT VIEWS

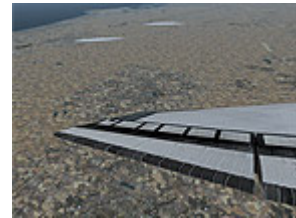
The following aircraft views are available. Use MS FSX menu VIEWS > VIEW MODE > AIRCRAFT > to select any of the following views:



Right Wing



Tail



Left Wing



FWD Wheel



Landing Gear



Nose

**DO NOT USE FOR FLIGHT****VIRTUAL COCKPIT**

'Space Shuttle' features Highly detailed 3D Virtual Cockpit (VC) of the:

- Flight Deck with Aft Crew Station
- Mid Deck with Airlock
- Payload Bay

**VC ANIMATIONS**

**All models feature the following 3D VC animations and 3D instruments (238 in total!):**

**FLIGHT DECK:**

- ADI (3)
- Altitude/Vertical Velocity Indicator (2)
- Alpha/Mach Indicator (2)
- Accelerometer
- Surface Position Indicator
- Control Stick (2)
- Pedals (4)
- Pedals Adjustment Crank (2) L-R \*
- Speedbrake Control Lever (2)
- Switches, Buttons, Knobs, Selectors \*\* (213)

**MIDDLE DECK**

- MD Side Hatch
- Airlock Hatch (2)

**PAYLOAD BAY**

- Antenna
- Payload Bay Door (2)

\* - L-R = you can control left-right side items independently

\*\* - including dummy ones

## 2D PANELS

### HIGH RESOLUTION COMMANDER VIEW 2D PANEL

Day and Night version of the 1600x1200 High Resolution Commander View 2D Panel is included:



Day



Night

Check the 'Space Shuttle' FLIGHT MANUAL Part II – Orbiter Systems, for details.

### SIMICONS PANEL

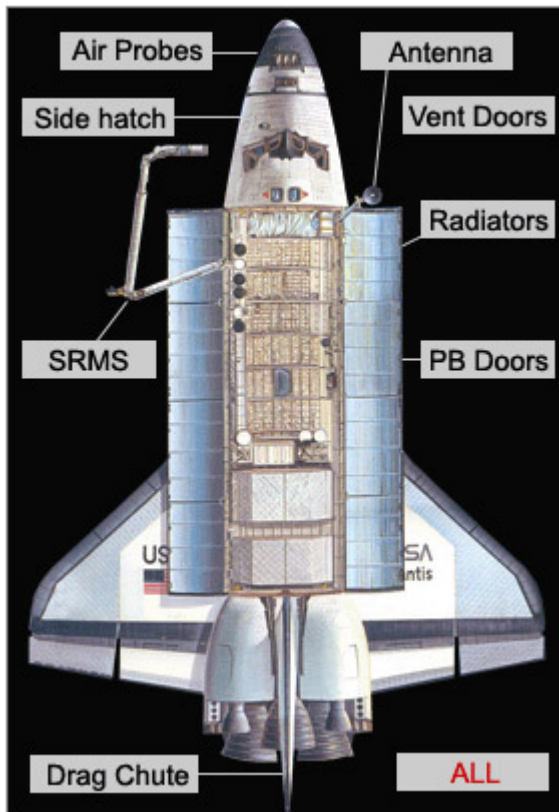
Press Shift+2 to show/hide the SIMICONS PANEL.

	A	B	The icons legend:	Keys
1			1A – Model Animation Control Panel 1B – HUD Display	Shift+3 Shift+4
2			2A -- MSFS GPS panel 2B -- Radio Control panel	Shift+6 Shift+5
3			3A -- MSFS ATC window 3B -- MSFS Notepad window	- F10
4			4A -- MSFS Map window 4B -- reserved	Menu>World>Map -
5			5A -- Exit the Control panel 5B -- Panel Drag-n-Drop area	- -

Cockpit controls are described in details in the 'Space Shuttle' FLIGHT MANUAL Part II – Orbiter Systems.

**DO NOT USE FOR FLIGHT****MODEL ANIMATION CONTROL PANEL**

Press Shift+3 or its icon to show/hide the panel.



Press any white label/button to initiate the corresponding animation of the Exterior Model.

**Notes:**

- You cannot extend SRMS and ANTENNA if PB DOORS are closed.
- You cannot close the DOORS if SRMS and ANTENNA are extended.
- You can deploy the DRAG CHUTE on the ground only, the speed should be 50-400 KIAS
- The ALL button overrides all other buttons and initiate all animations simultaneously.

**HUD**

Press Shift+4 or HUD icon to show/hide the panel.



Check the 'Space Shuttle' FLIGHT MANUAL Part II – Orbiter Systems, for details.

**DO NOT USE FOR FLIGHT****RADIO PANEL**

Press Shift+5 or simicon to show/hide the panel.

Functionality is identical to FSX radio panels.

**GPS PANEL**

Press Shift+6 or simicon to show/hide the panel.

Functionality is identical to FSX GPS500.

**DO NOT USE FOR FLIGHT****G1000 PANEL**

FSX G1000 panels are available to FSX Deluxe users only.



Press Shift+7 to show/hide MFD panel.



Press Shift+8 to show/hide PFD panel.

**SYSTEMS PROGRAMING**

Check the 'Space Shuttle' FLIGHT MANUAL Part II – Orbiter Systems, for details.

**ADD-ON SCENERY**

The 'Space Shuttle' package includes scenery that adds the following features to NASA Shuttle Landing Facility (X68):

**RW 15**

GlideSlope15Low (I15L)  
 Type: ILS  
 Frequency: 111.00 MHz  
 Heading: 157

GlideSlope15High (I15H)  
 Type: ILS  
 Frequency: 110.00 MHz  
 Heading: 157

**RW 33**

GlideSlope33High (I33H)  
 Type: ILS  
 Frequency: 110.20 MHz  
 Heading: 337

GlideSlope33Low (I33L)  
 Type: ILS  
 Frequency: 111.20 MHz  
 Heading: 337

**Note:**

No additional 3D objects such as buildings or aircraft are included into the add-on scenery.

**DO NOT USE FOR FLIGHT**

## **PRE-MAVED FLIGHTS**

Three flights are included in the 'Space Shuttle' package:

1. Entry (starts at altitude 400,000 feet, M=26)
2. TAEM (starts at altitude 82,000 feet, M=2.6)
3. Approach (starts at altitude 15,000 feet, 380KEAS)

We do not recommend re-saving of provided flights because you might lose some custom programmed features.

## **VOICE PACKAGE**

The 'Space Shuttle' title includes a Voice Package (19 cues).

The Voice Package is based on field recordings of actual Crew and Mission Control Center communications. It works in real time according to current flight situation.

## **MS FS COMPATIBILITY**

The 'Space Shuttle' package is *FSX only* product.



## **CUSTOMER SUPPORT**

### **TECHNICAL SUPPORT**

Trouble with your game? Welcome to Technical Support Section:  
<http://www.captainsim.com/cgi-bin/kb.pl>

### **ACCOUNT SUPPORT**

Can't buy? Lost links, keys? Welcome to Account Support Section:  
<http://www.captainsim.com/support/acss/>

### **DOWNLOADS**

Looking for Free liveries, banners, etc... Welcome to Downloads Section:  
<http://www.captainsim.com/support/dl/>

### **CONTACT US**

For Press, Business and General Inquires please use Contact Us Section:  
<http://www.captainsim.com/company/contact.html>

### **BUSINESS HOURS**

Please use the online services or contact our team using the web forms that are available 24/7.

All inquires are processed by Captain Sim team in our European office. Please note, the office business hours are: Monday-Friday 7:00-16:00 GMT. Usually we respond within 24 business hours.

Thank you,

Enjoy your flight!

Captain Sim Customer Support Team  
[www.captainsim.com](http://www.captainsim.com)