

AVSIM Commercial Simulator Review

Space Shuttle Mission 2007

V1.25



Product Information

Publisher: [Exciting Simulations](#)

Description: Space Shuttle Simulator.

Download Size:
130 MB

Format:
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Simulation Type:
Standalone

Reviewed by: [Alexis Esguerra](#) Contributing Senior Reviewer - April 1, 2008

Introduction

It may not be the biggest, nor would it be considered the most powerful. However, the Space Shuttle is certainly unique. It was the first spacecraft designed from the beginning to possess a degree of reusability, a big deal back when every space faring machine before it saw one and only one use, and remains the only winged manned spaceship to achieve orbit and land. It goes up like a traditional rocket, returns back to Earth as a glider, is refurbished, then sent back up when called upon. And in that cycle of reusability, it has made invaluable contributions to further scientific research. Making our lives a little more interesting through deployment of technology, and the exploration of space as a whole.

For over a quarter of a decade, the Space Shuttle has been the workhorse of NASA, with the five completed space worthy examples logging well over a hundred flights into space. In that time, they have lent their muscle for such missions as transporting heavy satellites and components for the International Space Station into orbit, providing repair and servicing for the same, and serving as a platform for countless scientific experiments. Sadly, this success has come at a cost; there have been accidents that resulted in the loss of two of the orbiters along with their crews. Still, the Space Shuttle soldiers on, and is planned to continue providing its unique capabilities until its scheduled retirement in 2010.

Exciting Simulations has come into the world with Space Shuttle Mission 2007, a product that promises to *"provide the experience and excitement of the NASA Space Shuttle missions in extreme detail."* It's a bold statement to be sure, and one that requires a little looking into. Let us see what they have to offer in their recent recreation of this unique spacecraft.

Installation and Documentation

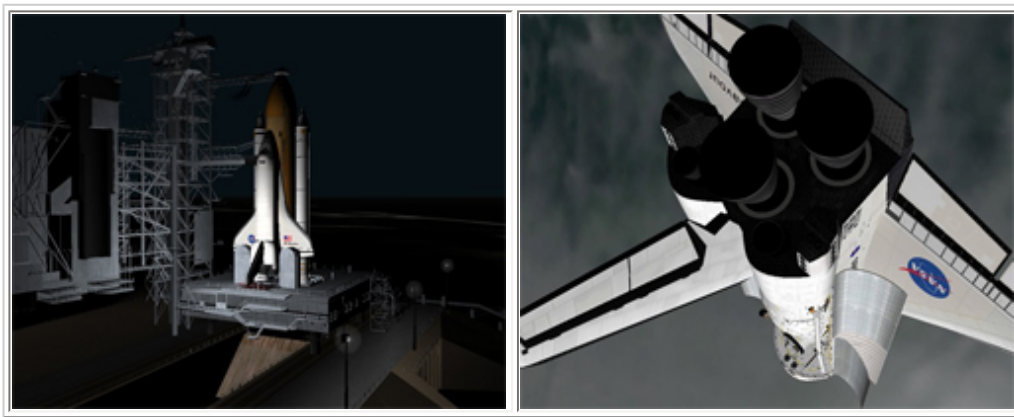
SSM07 comes to the customer as a single, executable file that is acquired directly from the Exciting Simulations website. There is minimal fuss in the process – buy, download, and install pretty much sums up the experience. Please note that this initial download nets you v1.18 of the simulation. At the time of writing, a patch was available in the free downloads section that brought the product up to the v1.25 standard, the version that was reviewed.

As for documentation, a Commander's Handbook installs to your hard drive, a 91-page PDF document that is definitely two-sides of the coin. It attempts to walk the fine line of informing a wide audience; from fledgling astronauts just starting off, to those who have more intimate detail on actual space flight. It goes into good detail on the typical mission profile of the Space Shuttle and provides an introduction on the basic craft's systems and their operation, both in real-world theory, as well as in sim. I felt it was a fairly good compromise, although space vets may miss the pages and pages of shuttle-specific checklists that were not included (the good news is that those checklists are being generated and are being released as separate downloads on the website). If you're curious as to what you'll be getting into before purchasing, all these reference items, plus a Quick Start Manual, can be obtained free of charge from the website before you take the plunge.

What's In It

SSM07 is certainly not the first Space Shuttle simulator – there have been numerous programs that have attempted to capture the flavor of the STS (Space Transportation System - its official type designation), but few I have run across have tried to capture the full mission experience with any real degree of fidelity (to date, the only one I am aware of is the STS expansion for Orbiter, a program which I have no practical experience). It is in this world that SSM07 attempts to sink its teeth, a full fledged STS simulation that covers the shuttle's operations from launch to recovery.

Let's start with the graphics, shall we? Earth scenery is good, with an overall 15m/pixel rendering of the planet with a higher 1m/pixel reserved for the shuttle's launch and landing facilities. You won't see every single structure at the Kennedy Space Center (KSC), but enough is presented to give the user a true flavor of the site. But the highlight is the centerpiece of this sim – the five shuttles that were built for space flight. (Columbia, Challenger, Atlantis, Discovery, and Endeavor), and any payloads or orbital facilities they'll work with. All are spectacular in appearance, are chocked full of animations, and hold up extremely well to zoomed-in scrutiny. Another exterior visual worth mentioning is the spectacular lighting effects, which makes for memorable sunrises/sunsets from orbit, as well as impressive night launches.



The quality and accuracy applies within as well, with a VC flightdeck present (the lower deck is not modeled). Sadly, the controls in the VC world did not appear to be interactive, but I could not truly fault that restriction. SSM is replete with what appears to be every panel on the flightdeck in 2D representation.



The 2D panels are the meat and potatoes in operating the shuttles in SSM07, and believe me, there are a lot of meat and potatoes! I was caught off guard by the seeming inclusion of every single switch, knob, display, and indicator that was present (including caution and warning lights, there were 340 of them on the pilot's side panels alone!!!). Not everything is usable, but the vast majority of the controls can be clicked, and a good percentage of those do serve of purpose.

A plethora of systems, such as FREON COOLING LOOP, IMU ALIGNMENT, HYDRAULIC AUTO SHUTDOWN to name a few, (along with their redundant backups) are functional, needed to accomplish the mission, and therefore await your control. TrackIR users will be real happy for the convenience of easier panning about this place (yes, you read right – TrackIR is supported). They really mapped out the orbiter's flightdeck, so there's a lot of familiarization to be done. The only thing I might think was missing were little patches of simulated Velcro.

Now before you click off this review due to a sudden urge NOT to delve into something so utterly complex that you think it'll send your head spinning, let me assure you that it's not as bad as it looks. Read on.

A Little Help, Please

Of all the items that provide some sanity-saving grace in SSM07, the definable difficulty level is easily at the top of the list. EASY starts the fledgling astronaut off with such provisions as detailed in-sim procedures, flashing pointers that route you to the right switch/knob, and helpful sim pauses for events that are very time critical. These items are invaluable for the novice, and really help with getting familiar with shuttle procedures without running the risk of "newb-induced-failure". Step up the difficulty as you garner experience and these helpful tidbits are phased out; by HARD level, you'd better have the manual and optional checklists by your side and keep to the established timetables.

Running a close second would be the highly automated nature of STS space flight. Under normal circumstances, many of the orbiter's maneuvers, from launch to reentry, are largely handled by the craft's onboard computers. If you wish to move to the same orbit as the ISS, for example, predetermined codes are punched in to bring up the target's coordinates, aligning the shuttle for intercept, and setting the OMS burn time & duration. This degree of automation takes a huge amount of workload off the simmer's hands. And before you start worrying about what seems to amount

to a huge cheat in this simulation, be advised that this is actually the way things are done in modern space flight.



STS mission durations go into days. So it wasn't a complete surprise to this reviewer that handy time acceleration features are included. The easiest and nearly always available one is a basic 50X time acceleration that helps to pass a couple of hours in almost as many minutes, while a NEXT EVENT time skip is there for the lengthier pauses in the mission (it's availability tends to come in between major mission objectives). By far the most valuable time-related item you'll find is the Save/Load Game function, allowing you to cut and run when necessary, then come back at a more appropriate time.

Other helpful things that are available in-sim are a Mission Control window that provides an overview of the basic mission objectives/progression, and finally, two external 'camera view' modes. Besides allowing you the obvious ability to admire the shuttle orbiting high above the Earth, these 'camera-views' also serves well in the capacity of aiding the user in accomplishing mission goals.

Playing Astronaut

The obvious goal of the program is to allow the user to experience first hand what it is like to take to orbit aboard the STS, and SSM07 does so through eight historical scenarios, ranging from the maiden STS-1 flight of Columbia to Atlantis' STS-117. These eight missions vary terms of mission duration and objectives, but all contain the six basics mission phases – prelaunch, launch, orbital insertion, execution of the mission objective(s), deorbit & reentry, and landing. Exciting Simulations promises more are on the way for future release.

Now I am not implying that the repetitive nature of STS mission profiles make for something boring. SSM07 has a couple of things that greatly offset the requirement of having to do some of the same things all over again. The one that really deserves mention is the recreation of what seems to be, at least in the humble opinion of this reviewer, amazingly faithful shuttle procedures.

Let's take for example orbital insertion, which is a little more involved in the sim than just picking the parameters of the orbit you seek, firing up the engines, and getting there. In SSM07, there's the matter of deploying the KU antenna, firing up the Star Tracker, IMU alignment, getting the OMS pods humming, all of which the real STS has. Throw in the requirements of managing half a dozen other key systems that the shuttle again has and needs to both function in space and keep her crew alive, and it ups the ante in the form of credibility. Space missions are inherently complex, and SSM07 mirrors that complexity quite nicely.



In was in fact within this complexity that I found myself so immersed. Space flight is an exacting science; one only has to do the most basic research to find that each and every step in a manned space mission is tediously mapped out, and executed in same fashion (airline pilots have it easy with their preflight checklists). SSM07 demands this exactness from the very start, which is why I am utterly convinced that Exciting Simulations put some honest effort and a lot of research into this recreation.

The high complexity does much to offset the repetition of prelaunch, launch, orbital insertion, deorbit & reentry, and landing, the basic five phases that has some degree of consistency in every STS mission. It's in the varying objectives of the different missions which one finds diversity and additional challenge. STS-1, for example, is purely a test flight, where you take Columbia up for the proverbial spin-around-the-block. From that point on, things get more and more interesting as the missions progress; a visit to the ISS, deploying satellites, repairing ones already in orbit, and even a space walk or two. While certain missions are more difficult than others (each is rated as one to three stars in difficulty), and all will test your nerves and skills.

The only thing remotely unrealistic about SSM07's STS recreation is that nothing goes wrong - weather delays, system failures and emergencies are not modeled. Some might be disappointed in this fact, but again, the goal of the sim is to play Space Shuttle astronaut, which is kind of hard to do if the orbiter never leaves the pad due to a thunderstorm or a faulty O2 sensor (trust me when I say that there's already enough to worry about in the malfunction-free environment of the sim). Likewise, SSM07 is not a free-for-all simulator; you cannot just go off into orbit and do as you please (I've been told you can try, but chances are you may not get far without the sim's Mission Control's blessing). The objectives are binding, and as NASA would require of it's astronauts, the simulation expects you to carry them out.

STS-31

Suit up and strap in as we further get a grasp of SSM07. Let's delve into one of the selectable missions, STS-31, in order to appreciate what this sim is really like.

The mission starts off at T-minus 1:50:00 with the shuttle Discovery on the pad at KSC. It may seem like a lot of time to just sit there, but it can get a little busy at times as you'll be setting things up for the launch; such as cabin leak checks, flight plan loading, APU start, and so forth. Just remember to accomplish your checks in a timely fashion; you have a launch window to meet, and the mission will scrub if you're late.



Launch is recreated in magnificent fashion. The main engines fire up, and if you happen to glance out the left window at the launch gantry, you can actually see that the shuttle stack bends forward from the force of the output of those three engines. Things then sways back to pure vertical, and then the SRB's go off, kicking the shuttle off the pad on a pillar of flame.

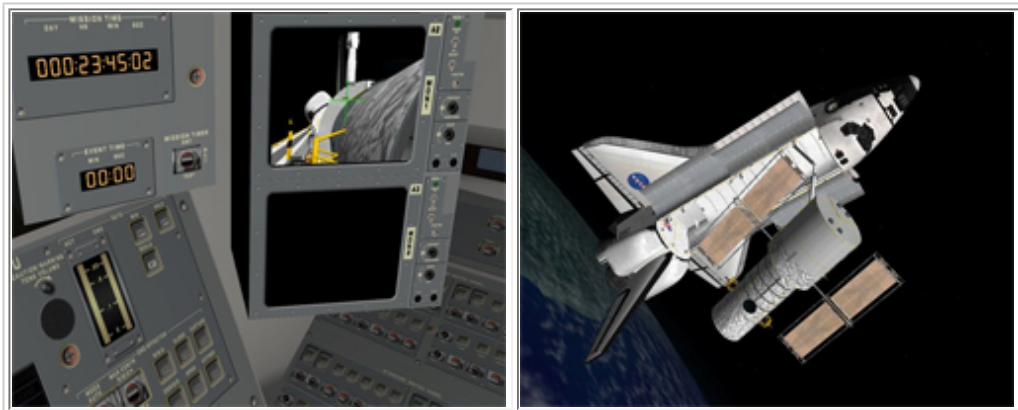
The whole STS process of rolling and heading downrange is well known to the masses, so let's get to how well SSM07 mimics it; it's about as close as I've ever gotten to the real experience. The cabin shakes in your perspective from the power of six million pounds of thrust. Turn up your speakers and the din of those engines can be overwhelming. If applicable, think of your neighbors before you truly indulge, because it's two minutes plus of thunder. Somewhere in the background, you can just make out Houston's applicable altitude, speed and event callouts.

At about two minutes, the SRB's have done their duty, so it's time to lose them. Same goes for the external tank some six and a half minutes later, at which point the crew you've been riding along with have suddenly vanished. Maybe they all went to the lower deck to take a nap – their absence make for looking around in the VC a lot easier; I

barely missed them. It's now time to bring the navigational systems and OMS engines online and fine tune your orbit. One trip around the Earth and a few more configuration changes later, you're finally parked upstairs and ready to carry out your mission. If you're fast enough, you'll have a good several hours to admire the scenery below, the stars above, and the lovely sight of a sunset and/or sunrise from orbit.



In the STS-31 mission, NASA deployed the Hubble Telescope, and to be honest, I have never appreciated just how much effort is involved in such a job. You watch these satellites get pulled out of the cargo bay on TV and think to yourself, "No Sweat." Then again, I never knew what I never knew. Just the task of getting the Shuttle's Remote Manipulator System (the robotic arm) into the right spot to grapple the telescope is a chore, especially if you rely on the actual view astronauts would use from the rear of the flightdeck (had I been in charge of the real thing's deployment, 2.5 billion USD very well might've gone to waste). Precision (grapples position and all it's angles) and patience (lots and lots of patience) are definitely the key here. However, with all the effort comes the huge reward of pure satisfaction when you finally get Hubble out of the bay and safely deployed into orbit.



Sometime after Hubble's safely in orbit, it's time to button up and come home. More system management as you close up the radiators & bay doors, retract the KU antenna, and flip several dozen other pertinent switches in preparation for the return to Earth. Modes and commands are entered into the onboard computers, you manually align the orbiter and at the appropriate time, the OMS engines come alive. Hey look, the crew's elected to come out of their lower deck hiding. It's just as well – Discovery's on her way home.



Reentry is a well simulated experience. We've all seen NASA videos showing this phase from the flightdeck, and it's a fair déjà vu in SSM007. The outside world goes from black to a gradually increasing red hue, and the turbulence starts to shake your surrounding as the orbiter enters the increasingly dense air of the atmosphere. The friction generated plasma envelops the bottom of the orbiter and trails far behind as Discovery screams through the upper atmosphere at approximately 17,000 mph. Be thankful for the computers that maintain the appropriate angle through the fiery descent, as well as controlling the hypersonic S-turn maneuvers designed to help the shuttle bleed off speed.



At 80,000 ft, you're 70 nm out from Edwards, and in full manual control of the orbiter. Approach and landings in the shuttle are a great challenge for any stick out there, as we're talking about bringing in a 100 ton machine from high altitude in for a landing without any engine power whatsoever. This translates to one chance to get it right, and one chance only, so energy management is crucial. Once again, SSM07 provides everything you need to pull this stunt off, with VERT 1/2 (vertical guidance) & SPEC 50 (horizontal guidance) displays providing all the information you need on how well (or badly) you're doing (admittedly, it took me a few tries before I finally got the hang of things).



Practice does make perfect, though. You hit the HAC (Heading Alignment Cone) at 35,000 ft at 400 kts and bank Discovery around for final. You're a little higher than the manual calls for at the HAC interception, but you can adjust your path accordingly (any lower is definitely a no-no). Rolling out on final at 14,500 ft, you realize you're a touch high so you push the nose over and steepen the approach. Even when they nail their altitudes, shuttle astronauts are literally diving at the runway at this point; they just might be using less speed brake input for airspeed control than we are today.

Implicit trust in the HUD cues and shuttle pilot's callouts make for success. Granted, you just might feel a tinge of panic when you note just how fast the airspeed bleeds off as you flare and drop the gear, but just hold the angle and trust Discovery in her ability to carry herself to the runway. If you managed your energy right, the sink rate will flatten out and you'll hear the tires screech as the orbiter finally touches down safely. Deploy the chute and get on the brakes - a minute later, Discovery's mission is complete.



Recent Developments

At the time of writing, Exciting Simulations informed this reviewer that a new service pack, v1.27, was in the final stages of beta testing, and might be fully available by the time of this article's publication. It's primary purpose is to integrate support of Nvidia's Dual Display or Matrox's TripleHead2Go. These two items really widen out the views, providing some truly spectacular panoramas and wide angle 2D/VC views. While I do not have the necessary hardware to try either of these features out, Exciting Simulations provided me the following screenshots.



Also contained within is a new limited go-to-switch help feature, designed to assist the user in locating the next pertinent control in question amongst a sea of many. It should further smooth out the transition from 'silver pin' astronauts to 'gold pin' ones.

Shortcomings

I was surprised considering the scope of this sim, that I didn't find any technical or game play issues. Granted, SSM07 has already undergone several patches before it came to my PC, but it was still something that raised my eyebrow a notch. The developers really did a great job ensuring everything worked as advertised and without a hitch.

Outside of the technical aspect of SSM07, there were only two minor inconsistencies not noted in the manual that I found, both of which are visual in nature, and done intentionally on the part of Exciting Simulations. First was the modeled appearance of Columbia, which was not rendered with her signature all black wing chimes on the upper surface of the forward wing (she was the only orbiter to have them, and possessed them throughout her career). The second was that the theme of markings used on the entire fleet are the most recent one in use; purists will be quick to note that this livery did not appear in the fleet until 1998 at the earliest, that Challenger never sported it, and that Columbia had her own unique scheme until the STS-109 mission. Once again, these shortcomings are intentional as the developers opted to focus their efforts more on the operational aspect of STS missions, and I was advised that both items are under consideration for possible correction in the future.

The last item is not so much a shortcoming as it is a warning. SSM07 may not be for everyone. Granted, it's not a hard sim to master; the in-game checklists / control prompts provided at the easier difficulty levels and vast amount of information of the website practically ensure success. However, as previously stated, this is a simulator that requires meticulous exactitude, and a lot of patience, especially when dealing with such acts as grappling a satellite from orbit.

Performance

Also remarkable, was the smooth performance of this program. Running with all video options set to MAX or ON, SSM07 ran at an extremely good clip on my average PC, with an FPS of approximately 35-37. The highest frame rate of 50 was attained in 2D panel views, with a noted low of 24 when viewing multiple flightdeck CRTs in VC mode during the approach for landing.

In Closing

It's always a pleasure when I have a hard time conveying just how good a program is. SSM07 just blew me away with it's attention to detail in every and all aspects of the Space Shuttle. It's visual and audio recreation of the orbiter is top-notch, and the simulation of the STS operations from launch to landing, from my personal experience, has no equal. The ever present factor of gravity was the only thing keeping me grounded to reality; the immersion that SSM07 provides into this specific realm felt that convincing. It's definitely given me a new appreciation for what all astronauts do when they break the bonds of Earth.

Short and sweet, it's hard not for me to believe that SSM07 is definitely a must for any space simulation fan, STS or otherwise.



Test System

CPU: Pentium Duo Core 4400 – 2 GHz
RAM: 2.0 GB
Video: NVidia 6800XT PCI-e X2 (SLI),
256MB each
Sound – SB Audigy
Joystick – MS Sidewinder FF2

Flying Time:

60 hours

What I Like About Space Shuttle Mission 2007

- Outstanding visual recreation of the Space Shuttle, both inside and out.
- Highly credible, if not outright accurate, simulation of STS spaceflight.
- Great mission objective variety, with new missions on the drawing board.
- Scalable gameplay difficulty and other user-friendly features.

What I Don't Like About Space Shuttle Mission 2007

- Nothing at all

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