This addon is zipped from the root directory, so just unzip into your presumably functional Orbiter Space Flight Simulator directory, and all of the files should unzip into their correct locations.

The supplied mp3, which runs for the duration of the six (6) minute flight, should be placed into your OrbiterSound mp3 directory, with the proper settings (OrbiterSound in all views, no mp3 playlist or any other mp3s present in the mp3 directory, etc.) You should be all ready at this point.

Turn on your Orbiter force vectors (CNTL F9, tab to forces, and then check all the boxes), and RIGHT CLICK and DRAG to orient the vehicle frame with the launch vehicle pointed upwards.

The Delta V is extremely simple to fly with no rotational drag. Just launch with CNTL PLUS (+) and wait for the vehicle to clear the pad, and then after a few seconds, use UP ARROW to apply a one or two (1-2) second burst of pitch thrust, to start the vehicle into slow pitch motion. Use F1 to switch between flight view and cockpit view, and keep an eye on your altitude. Your drag vector should appear, and drag start increasing, and when you reach approximately eight (8) kilometers of altitude, apply continuous pitch thrust with UP ARROW to start very slow pitch rotation. You should be approaching approximately five (5) degrees from vertical at some point, and certainly no more than ten (10) degrees, before you will need to apply continuous pitch acceleration.

Drag will max out, and then begin dropping, and then begin climbing again as you accelerate upwards. Drag should begin to drop off as you approach 45 degrees of pitch and turn over and reverse pitch thrust. This is roughly the point at which your Falcon 1 boosters will fall off (160 seconds) if you've attached any. Drag will eventually drop to zero as you approach horizontal.

Continue pitch acceleration until the vehicle reaches 45 degrees pitch, and then quickly reverse pitch to DOWN ARROW. This should occur at roughly 30 kilometers. Continue pitch reverse acceleration until the vehicle reaches a pitch of ten (10) degrees above the horizon, and then quit pitch rate steady at ten (10) degrees and wait for your momentum vector to begin to catch up with your pitch. Stop pitch deceleration should occur at roughly 50 to 70 kilometers of altitude.

Keep an eye on your acceleration, and when your momentum vector starts to catch up with your pitch, apply another brief burst of pitch with UP ARROW, to begin your slow drift down to the horizon. You don't want to actually reach the horizon at engine cutoff, though, because you still want to ascend to apogee.

As acceleration passes through three (3) gees (30 m/s^2) begin throttle back with short bursts of CNTL MINUS (-).

As the vehicle slowly drifts from ten (10) degrees pitch down to five (5) degrees of pitch, throttle back intermittently, keeping acceleration at or just above three (3) gees (30 m/s^2). This throttle back operation should begin to occur at roughly 70 kilometers of altitude.

Once the SSME throttle stop is reached at 1.52 Mega Newtons (MN) of thrust, discontinue throttle back. This is your minimum thrust limit. Switch from global frame to absolute direction with two taps of the F2 key. You should now have an excellent view of the Bahamas passing by on the starboard side of the spacecraft, or simply in the background. Continue your flight.

You should be passing through 85 to 90 kilometers at this point, and five (5) degrees pitch above the horizon. Discontinue slow pitch rotation with a short burst or bursts of DOWN ARROW, and fine adjust as necessary with CNTL UP ARROW and CNTL DOWN ARROW.

Continue monitoring acceleration and pitch. You should be approaching and passing roughly 100 kilometers at five (5) degrees pitch or less, with your momentum vector at three (3) degrees or less above the horizon, and you should be at 7000 m/s and seven (7) gees very shortly. Clearly you are experiencing extreme space at this point, and you are now probably on the verge of passing out.

You need to watch these values very closely and count them up from 70 to 75 one by one, second by second now at this point. 0 – 7.0 gees, 7000 m/s - 1 – 2 – 3 – 4 - 5 – 7.5 gees and 7500 m/s.

As acceleration exceeds 7.5 gees (75 m/s^2) and relative velocity exceeds 7500 meters per second, quickly shut down the space shuttle main engine with the STAR (*) key, with your altitude at or above 100 kilometers. How far above 100 kilometers you are at engine cutoff, and how far above the horizon your momentum vector is, determines how much drag will erode your final apoapsis value, usually dropping off by a few kilometers. Ideally you want to keep this loss to zero, which is higher than about 115 kilometers. Your final residual fuel value will be 2.2 to 2.5 percent, depending on your final apoapsis and velocity. Ideally you also want to keep your momentum vector pinned to your pitch vector during the entire duration of the flight, but this is often not possible in practice, as this example illustrates. This is just nice and easy rotation. Normally main engine cutoff would be automatic to account for shutdown and purging, but if you count carefully, you can hit it within a few meters per second. I usually aim for 7550 m/s. If you pass out, all bets are off. Use the autopilot! Trade drag, dynamic pressure and heating for horizontal velocity.

For any particular orbit or apoapsis besides straight east from Cape Canaveral, use your Launch MFD. This is a particularly simple way to get to an equatorial spaceport or the Hubble station.

The use of multiple Falcon 1 type launch assist boosters will help lower the terminal gee forces at main engine cutoff, down to a more reasonable range of five (5) to six (6) gees, and some further reductions in terminal gee forces may be achieved by lowering the throttle stop of the SSME or by varying your throttle back acceleration profile. Thirty (30) percent throttle yields a three (3) gee maximum force, but will require an entirely more modern engine, a second generation SSME.

Launch profile optimization algorithms performed in real world simulations which accurately model the environmental conditions and structural limitations, will reveal subtle variations from this intrinsically fundamental high energy cryogenic fight profile, which has been developed to reach low earth orbit with the minimum amount of fuel and the maximum amount of payload (which in most realistic cases is the vehicle itself) and at the lowest possible acceleration while minimizing stress, vibration and oscillation, producing the smoothest possible ride into space.

We will smoove you into space. Enjoy your spacecraft. You paid for it. It’s yours now. Good luck!

Disclaimer : No roosting chickens were roasted during the launch of this rocket.
The evening after launch, we plan to have a nice cookout in the flame duct, though.

Flight Callouts :

Launch

Clear – Clear of the tower and launch pad.

Start Pitch – Start slow pitch rate.

Drag – Drag vector appears.

Full Pitch – Start pitch acceleration (8 kilometers).

Drag Max – Maximum drag.

Reverse Pitch – Reverse pitch acceleration. (45 degrees, 30 km)

Slow Pitch – Stop reverse pitch acceleration – Continue slow pitch. (10 degrees, 50 km)

Throttle Back – Begin throttle back operation. (3 gees, 70 km, 10 degrees or less)

Throttle Stop – Stop throttle back operation. (3 gees, 5 degrees)

Countup – Begin main engine shutoff sequence. (7 gees, 7000 m/s, 3 degrees or less)

(Countup - Reverse Countdown - 1 2 3 4 5)

Main Engine Cutoff – Stop main engine. (7.5 gees, 7500 m/s, 3 degrees or less, 100 km or more)

OMS Burn

Recommended Orbiter Core Programs :

Orbiter 060929
Orbiter SDK

Recommended Orbiter Addon Programs :

OrbiterSound
Earth Level 10
Kennedy Space Center Medium Resolution
Launch MFD
High Resolution Earth MFD Map

DeltaV SSTO Launch Vehicle
This vehicle addon is compiled for older (pre-XP) Windows operating systems.