Files and Folders in DeltaV.zip :

/IPO.doc (Industry Proposal Outline - NASA JSC-COTS-2)
/DeltaV.doc (this document in Microsoft Word format)
/DeltaV_Flight_Instructions.doc (typical flying instructions)

/Config/DeltaV.cfg (Orbiter configuration file)

/Config/Spacecraft/spacecraft3.cfg
/Config/Spacecraft/K-LC-34.cfg

/Doc/DeltaV.txt (this document)

/Meshes/DeltaV.msh (Orbiter mesh)
/Meshes/K-LC-34.msh

/Modules/DeltaV.dll
/Modules/Spacecraft3.dll

/Orbitersdk/samples/DeltaV/... (MVC++ files)

/Scenarios/DeltaV/DeltaV.scn (Orbiter scenario file)

/Textures/DeltaIV_common_tex.dds (generic Delta IV Medium)
(and other KSC and Pad 34 stuff)

Unzip into your Orbiter Directory.

The Delta V is a Space Shuttle Main Engine (SSME)
Single Stage to Orbit (SSTO) demonstration vehicle.

1.89 MN Liftoff - 2.28 MN Maximum - 1.52 MN at 67%.

It must be flown at full 109% power to get off the pad.

Engine is pressure compensated and must be throttled
back to 67 percent to prevent over acceleration. Even
then it pulls a maximum of 8 gees at engine cutoff, so
you'll need to bring along a water bed for a cushion.

It is extremely easy to fly with no rotational drag.
I like to adjust my flight to an ApR of less than 7000
and a PeR of less than 6450, to prevent unwanted reentry
or ApP decay, if the final trajectory is too flat. Try to
keep it at or around 100 km at engine cutoff, and not too flat.

I haven't added any thrusters or animations, just the default,
but ultimately this vehicle would have thrust vector control
for the pitch, and elapsed time, pitch and pitch rate in the
HUD, between the existing velocity and altitude readout boxes,
plus, of course, a full Delta Glider IV cockpit and avionics.

The main engine would be still controlled by keyboard, since
once you use it, you don't have it available for use anymore,
but the hover and retros would be four square around the main,
with a thrust each of about 1000 lbs, controlled by sliders.
The engine itself is designed to be detached and removed, and
transferred via arm into the nosecone for reentry and recovery.

The basic components of the DeltaV system are as follows :

The engine (detachable SSME)

The cryogenic tankage (no foam insulation!)

- engine thrust structure
- pressurization tanks
- residual fuel tanks
- plumbing (fill, drain, and piping to and from the SSME)
- hydrogen tank (common bulkhead for liquid or regolith)
- oxygen tank (full tank for the CELSS habitat)
- docking hatch (with airlock built into the tank)
- attachment points
    - main engine thrust (single point)
    - auxiliary engines - hover and retro (4 points)
    - six fold clustering points fore and aft (12 point)
    - nose cone aeroshield reentry vehicle (six point)
    - capsule cockpit (six point within the nosecone)
    - optional escape reentry tower (three point on nosecone)

Nose cone aeroshield reentry vehicle

Mini capsule cockpit (full Delta Glider IV layout)

Full solar panel sunshade (along the entire length)

Thermal radiators (along the entire length)

Robotic arm for engine retrieval (along the entire length)

Docking Node Airlock Observatory (payload for the next mission)

Here is what is known about the Space Shuttle Main Engine (SSME) :

Hydrogen powered single stage to orbit (SSTO) requires 10:1 fuel/mass ratio.

The vehicle weight is adjusted to the maximum possible for SSME operations.

Given its simple shape, low thrust to weight ratio and very high acceleration, this vehicle is ideal for testing various CFD and ascent profile optimization, with real time guidance, navigation and control. The entire flight clocks in at well under six minutes with eight gees.

SSME Specifications

Design Altitude = 60,000 feet
Nozzle Mach Number = 5.05 (calculated)
Throat Area = 93 square inches
Nozzle Area = 50.265 square feet
Chamber Pressure = 2747 psi at 100% power
Exit Pressure = 1.049 psi (calculated)
Burn Time = 520 seconds
Vacuum Isp = 452.5 seconds
Vacuum Thrust per Engine = 490,850 pounds at 104.5% of Design Thrust

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

100% thrust (sea level / vacuum): 1670 kN / 2090 kN (375,000 lbf / 470,000 lbf)
104.5% thrust (sea level / vacuum): 1750 kN / 2170 kN (393,800 lbf / 488,800 lbf)
109% thrust (sea level / vacuum): 1860 kN / 2280 kN (417,300 lbf / 513,250 lbf)

http://en.wikipedia.org/wiki/SSME_energy_and_power_relationships
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241.8 kJ

At FPL (104.5% RPL) the oxygen flow rate into the SSME is about 935 lb/s (424 kg/s),
while the hydrogen flow rate is about 155 lb/s (70.3 kg/s).

The energy release per mole (32 g) of O2 is 483.6 kilojoules,
thus at a flow rate of 424.33 kg/s (424,330 g/s or 13,260.3 mol/s)
we have an energy release rate of approximately 6.4127 GJ/s (GW).