Lunar Orbit Station (LOrbS™)
Version 1.0
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Andy44

Overview

The LOrbS™ is the third "node" in the Lunar Transfer System, the first being the Earth surface base (Cape Canaveral) and the second being the Prefab Space Station in LEO. It serves as a waypoint between the lunar surface-LO leg and LEO-Moon leg of the journey. Payload modules traveling from Earth to the Moon or back can be stored here temporarily while they await pick-up by a Lunar Transfer Vessel or a Lunar Space Shuttle. It is also a home away from home for the crews of the LTV and LSS, and a place for translunar passengers to get a stretch while they await their connection. This station is a bit smaller than the Prefab Station due to the requirement to keep the mass down. This is to be an "away" port for the LTV, while the LEO station is meant to be the "home" port.

The key features of the station include the inflatable habitation module, which provides modest comfort while keeping the mass down, and ample docking ports for vessels and cargo modules.

On the port side docking arm is an extendable tunnel docking port for a Lunar Transfer Vessel, which should be used with the LTV's nose docking port to provide maximum radiation protection for the station's occupants with respect to the LTV's nuclear reactor.

On the Starboard docking arm there are five docking ports. The 3 on the end and on the outboard sides are intended for use by the Simple Tank payload and other cargo modules which do not require a pressurized docking port, and are plumbed to provide fuel replenishments for docked vehicles. The two inboard berths are pressurized for use with passenger modules. In general, any vessel which fits inside a Space Shuttle payload bay and has a docking port on the end will fit into one of these berths.

The forward docking port on the hab module is for the Lunar Space Shuttle (LSS). The docking port on the aft side of the hub is both the hard point for the Lunar Orbit Tug (LOrT™, see below) and an expansion port for future modules.

The station begins life folded up to fit inside the launch vehicle fairing, and the hab module is deflated. Once in orbit, you can deploy the stowed sections of the station. If you wish to build a scenario with the station already deployed and operational, copy the entry from one of the included scenarios which specifies that state.

The station has a 25,000 kg fuel tank, which is largely artificial to make it easier for users to transfer fuel between the any docked vessels. Fuel Management MFD won't "through-pump" fuel from one docked vessel to another, so you must first transfer it into the station and from there into the receiving vessel. That 25 tonnes should be considered part of the station's overall mass for launch purposes.

The station has no main, retro, or hover engines. It does have an adequate RCS system to control attitude and to help keep it in the correct orbit. It's much easier to do linear thrusting with fewer, lighter vessels docked, of course, to avoid Jim Lovell's "elephant-on-my-back" effect.

Key command notes

Shft-Numpd-1: From a post-launch, stowed position, deploy structures and solar arrays.

Shft-Ctl-Numpd-1: Stows all the above components. This is unrealistic, and shouldn't be used, but its there if you want it. Make sure the solar arrays are returned to the parked position first or they will get messed up.

G: Rotates the solar arrays about the pitch axis 360°. Hitting G again stops the rotation. Should help you get good sunlight on the panels.

Ctl-G: Rotates the solar arrays the opposite direction; they will stop at the original park position.

Add-ons Required/Recommended

Spacecraft3.dll is required for this addon to work. It is included with this download package.

You may use the NOVA-class launch vehicle of your choice, of course, but the one chosen for the included launch scenario is the Nova-SSTO.

Other scenarios require the Lunar Transfer Vessel and various payload modules; however you can always edit the scenario file to remove or replace those add-ons with the vessel of your choice. Any payload module that has Space Shuttle attachment points and an end docking port should work with this add-on, but I make no guarantees for anyone else's payloads. For pumping fuel between the various vessels you will want the Fuel Management MFD.

Spacecraft3.dll is here for those who want to visit vinka's website:
http://users.swing.be/vinka/

Fuel Managment MFD, found on Avsim:
http://library.avsim.net/search.php?SearchTerm=fuelmfd-031129.zip&CatID=orbiter&Go=Search

The Lunar Transfer Vessel and various payload modules, which you can find on Orbithangar by searching my username (Andy44):

http://www.orbithangar.com/searchauth.php?search=andy44

The Nova-SSTO last seen on Sourceforge:
http://sourceforge.net/project/showfiles.php?group_id=58685&package_id=124522

For bug reports, criticism, or even praise please use Orbiter-Forum:
http://orbiter-forum.com/

Notes on operating the LOrbS™

The station has solar panels on the +Y truss arm complex, and radiators on the -Y side of the docking arms, so you will want to make sure the -Y side of the station avoids steep sun angles.

I tend to orient the station by pointing the +Z (the center of the HUD when you are in the cockpit) towards the plane of the ecliptic near the sun, and rolling "wings level" with the ecliptic. This way the solar arrays can rotate to face the sun, and the splash plate antenna on the -Y comm gear section could rotate to find the Earth (this antenna movement is not modeled). Maybe you could find a better attitude for operations.

LOrbS™ Specifications

Reaction Control System: Chemical jets, Exhaust Velocity 2600.975 m/s

Dry Mass: 150,000 kg
Max Propellant Mass: 25,000 kg

Docking port 1: LSS berth +Z

Docking port 2: Lunar Transfer Vessel berth -X

Docking port 3: unpressurized berth +X

Docking ports 4-5: pressurized payload module berths

Docking ports 6-7: unpressurized payload module berths

Docking port 8: propulsion dock/expansion port

Known problems

Spacecraft3.dll does not support com/nav transponder and IDS radio systems, which makes rendezvous and docking more difficult. I was going to include a config-file with XPDR and IDS frequencies, but such config/sc3 combinations don't work with CVEL launch vehicles, so I decided to release it as a basic sc3 vessel. If an opportunity to get around these constraints arises, I may update it.
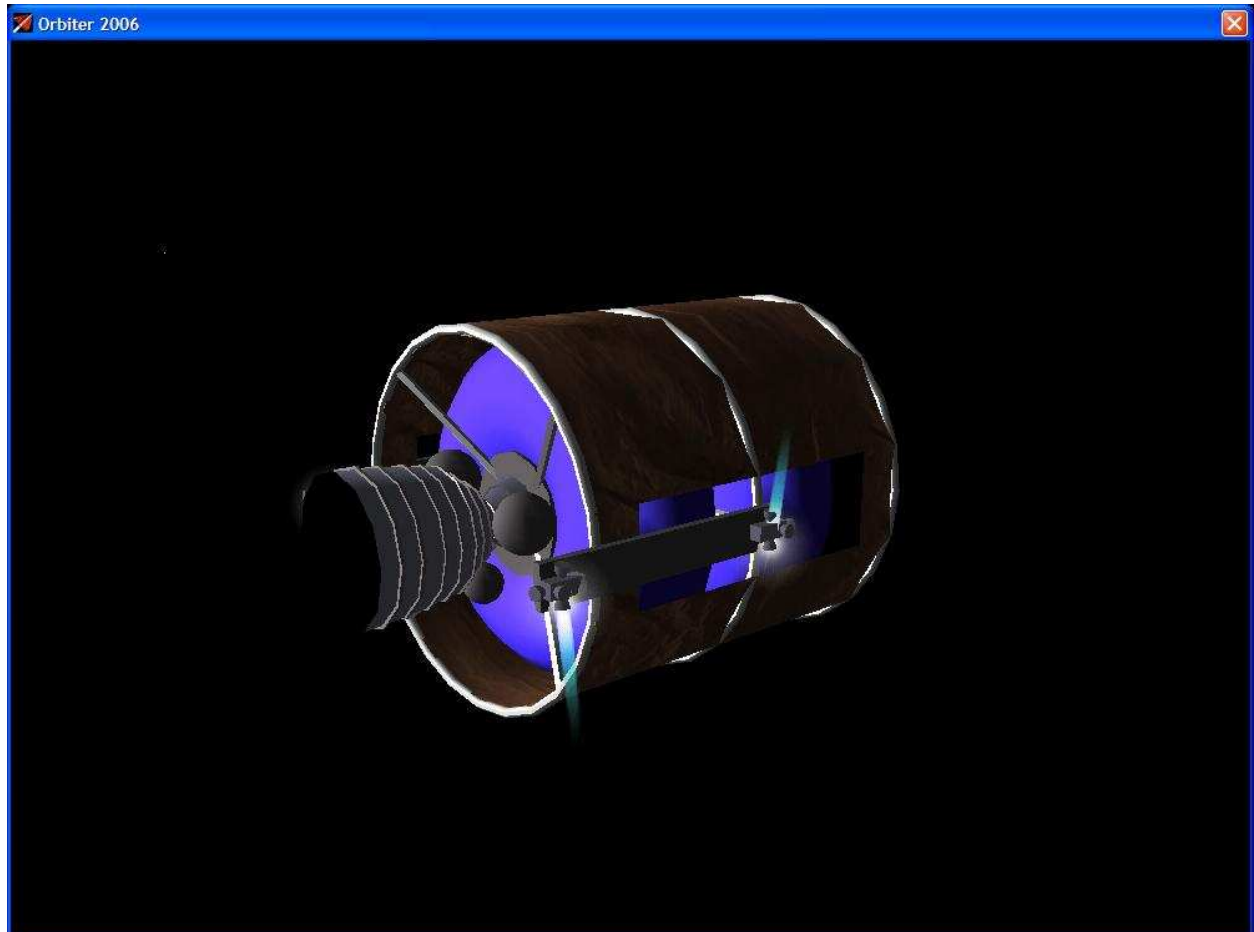
Thanks to Vinka for his DLL, Steve Glanville for Anim8or, Urwumpe for his mesh exporter, Dr. Martin Schweiger, and all the Orbiterheads out there who are reading this. Enjoy!

Lunar Orbit Tug (LOrT™)
Version 1.0
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Overview

The LOrT™ is part of the Lunar Transfer System. It serves as the primary propulsion module for the Lunar Orbit Station (LOrbS™) as well as a reusable, general purpose tug for moving objects around in cislunar space. LOrT™ is essentially an unmanned upper stage.

The LOrT™ has a single docking port on the nose. LOrT™ is used for course corrections en route to the moon, and to insert the LOrbS™ into lunar orbit after arrival at the moon. Thereafter it stays docked to the expansion port of the LOrbS™, where it will be refueled and stay available for various duties.

In the event an expansion module is attached to the LOrbS™ expansion port, the LOrT™ will be relocated on the back (-Z) of the expansion module.

Key command notes

There are no special key commands for the LOrT™.

Add-ons Required/Recommended

This add-on is included with the LOrbS™ add-on.

LOrT™ Specifications

Reaction Control System: Chemical jets, Exhaust Velocity 3432.3275 m/s
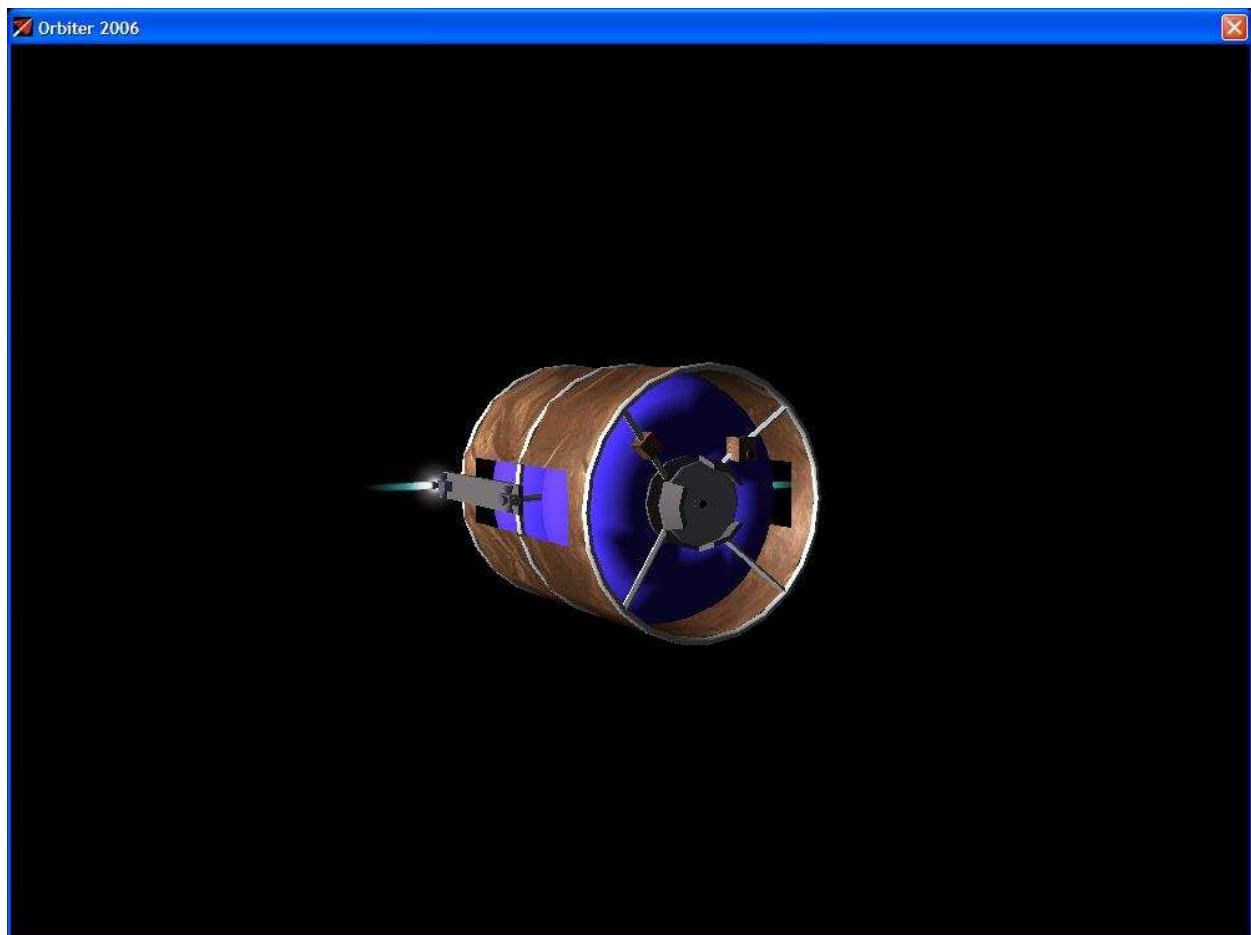
Dry Mass: 3,000 kg
Max Propellant Mass: 72,000 kg

Docking port 1: payload port +Z

Known problems

Spacecraft3.dll does not support com/nav transponder and IDS radio systems, which makes rendezvous and docking more difficult. I was going to include a config-file with XPDR and IDS frequencies, but such config/sc3 combinations don't work with CVEL launch vehicles, so I decided to release it as a basic sc3 vessel. If an opportunity to get around these constraints arises, I may update it.

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