Technical Description for Lambdasat

The Lambdasat is a small satellite which follows the established requirements of 1U nanosatellites (cubesat) which are defined in the CubeSat Design Specification rev.12 published on August 1st, 2009 by the California Polytechnic State University. It demonstrates technology for two-way communication with the ground systems for operations. It carries a new science experiment which measures the radiation effects on the grapheme material in real environment in Low Earth Orbit (LEO). Another technology that carries is an AIS receiver for tracking all the vessels inside its footprint around the globe. The communication consist of an Iridium Short Burst Data (SBD) modem which is the 9602 and makes use of the Iridium constellation, and in parallel, the use of two of UHF receiver and transmitter for uploading commands and downloading additional data (in coordination with the Iridium modem). All these electronics are placed and operated by one power system and a main computer which have designed and built for the specific satellite (Lambdasat). They provide rad hard effectiveness for the satellite.

In addition, the Lambdasat is planned to be deployed from the International Space Station (ISS) on June 1 – Jun 30. The planned operations to put the satellite in orbit are the same with those from similar satellites which have been deployed form the ISS in the past.

The satellite will fly on Orbital-2, stowed inside NRCSD (Nanoracks Cubesat Deployer). The satellite is stowed in a common transfer bag (soft stow) during the launch. Once it arrives in the ISS, it will be placed into the NRCSD (Nanoracks Cubesat Deployer) and will remain there until its deployment. This mechanism is a cubical launcher which with the support of a spring will eject the satellite out to the space.

The orbit of Lambdasat will be at 413.2 Km apogee and 381.3 km perigee on an inclination from the equator of 51.6 degrees. The deployer from the ISS will provide to the satellite a velocity of 5cm/sec at an angle of 45 degrees relative to the NRSD into a circular orbit initially approximately 300 or 400 km relative to Earth's surface.

One very important requirement which follows strictly the Lambdasat is that all the electronics are off during the launch and there is a 40 minute timer which will turn on the operations of the satellite after the launch. His orbital lifetime will be for approximately 74.095 days after launch and will get burned at the final phase of its mission.

Launch vehicle and launch site: Orbital-2, KDC

Proposed launch date: May 1

Mission duration: Until de-orbit

Launch and deployment profile, including all parking, transfer and operational orbits with apogee, perigee and inclination:

Lambdasat will be transferred to the ISS with a launch vehicle of Orbital-2. It will be carried in a soft stow bag by a crew member and will be inserted to the NRCSD (Nanoracks Cubesat Deployer). The design and built of Lambdasat follows all the established requirements based

on the CubeSat Design Specification rev.12 published on August 1st, 2009 by the California Polytechnic State University with JEM requirements ant the NR-SRD-029: Interface Control Document Between NanoRacks CubeSats And NanoRacks CubeSat Deployer. The deployer mechanism will launch the satellite at a velocity of 5 m/sec and at an angle of 45 degrees relative to the NRCSD (Nanoracks Cubesat Deployer) into a circular orbit approximately 300-400 km relative to the Earth's surface.

The orbit of the Lambdasat is going to end with the burn of the satellite. The satellite is going to be affected from the gravity of Earth , because it uses only a passive magnetic system and not an active system. It means that no propulsion is used and also, it does not actively change orbits.

The same orbit has been used again from other cubesats and the likelihood of any impact with the ISS is very minimal.

The Lambdasat orbit parameters:

Apogee: 413.2 km

Perigee: 381.3 km

Inclination: 51.6 degrees