

Launch Services Program presents...

National Aeronautics and
Space Administration



NuSTAR

The Nuclear Spectroscopic Telescope Array (NuSTAR) is an explorer mission that will allow astronomers to study the universe in high energy X-rays. NuSTAR will be the first focusing hard X-ray telescope to orbit Earth and will dramatically improve sensitivity and imaging capability over previous space missions that have observed this region of the electromagnetic spectrum.

By focusing higher energy X-rays, NuSTAR will help to answer fundamental questions about the Universe including:

- How are black holes distributed through the cosmos?
- How were heavy elements forged in the explosions of massive stars?
- What fuels the most extreme active galaxies?

NuSTAR's X-ray telescope will undertake a broad range of scientific investigations. For example, NuSTAR will observe the Milky Way to search for the remnants of exploded stars, such as white dwarfs, neutron stars, and black holes that radiate at high energies. Using the penetrating power of high-energy X-rays NuSTAR will peer deep into dusty galaxies to find the billion solar mass black holes that reside in the galactic centers. Other targets range from galaxy clusters – the largest-known gravitationally bound structures in the Universe – to our own Sun.

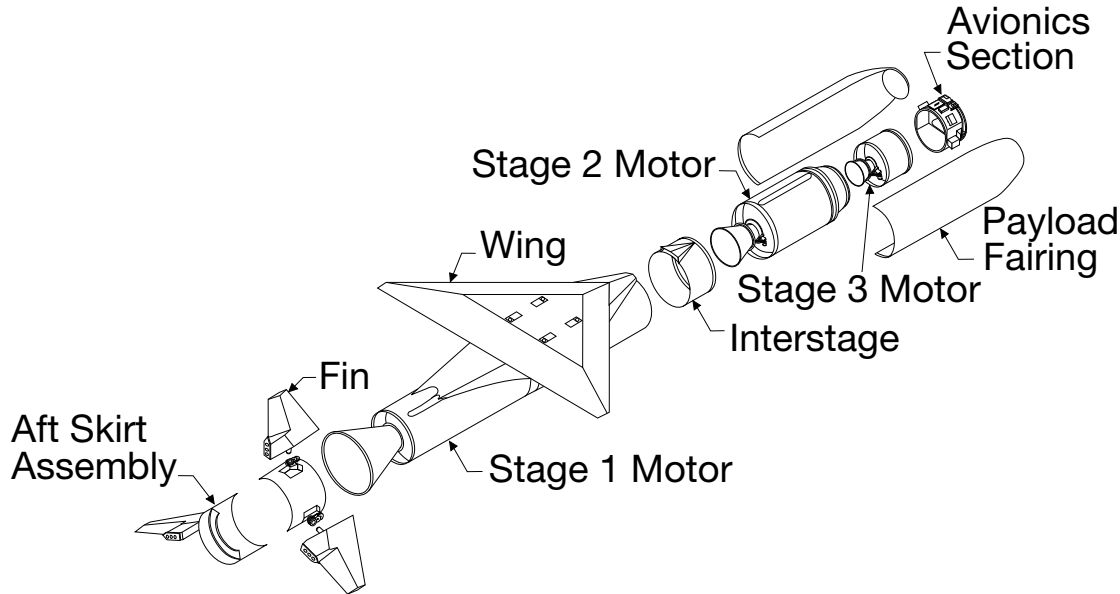
LAUNCH VEHICLE: Pegasus XL

LAUNCH LOCATION: Kwajalein Atoll

LAUNCH DATE: 2012

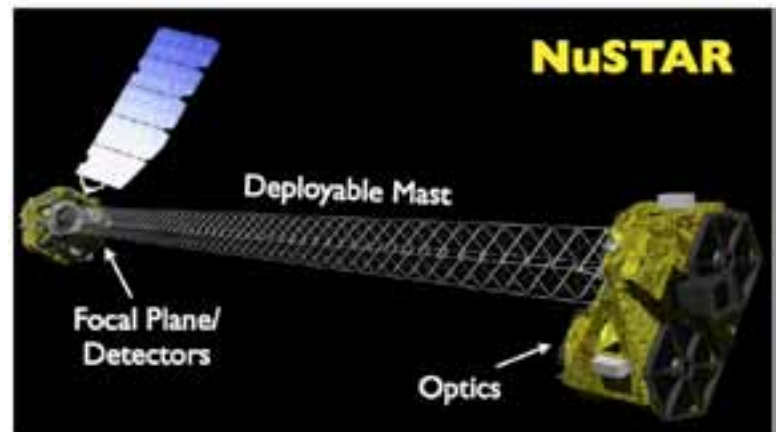
Nuclear Spectroscopic Telescope Array-(NuSTAR)

NuSTAR will launch into a low-Earth, near-equatorial orbit on a Pegasus XL rocket from Kwajalein Atoll in the Marshall Islands. The Pegasus launch vehicle, built by Orbital Sciences Corporation, relies on a unique air-launch system with the rocket released at approximately 40,000 feet from the "Stargazer" L-1011 aircraft. The rocket then free-falls in a horizontal position for five seconds before igniting its three-stage rocket motor.



Drawing Courtesy of: Orbital Sciences Corporation

The NuSTAR instrument consists of two co-aligned grazing incidence telescopes with specially coated optics and newly developed detectors that extend sensitivity to higher energies as compared to previous missions such as Chandra and XMM. After launching into orbit on a small rocket, the NuSTAR telescope extends to achieve a 10-meter focal length. The observatory will provide a combination of sensitivity, spatial, and spectral resolution factors of 10 to 100 improved over previous missions that have operated at these X-ray energies.



Drawing Courtesy of: Caltech/Jet Propulsion Laboratory

NuSTAR is scheduled to launch into low-Earth equatorial orbit in 2012.

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