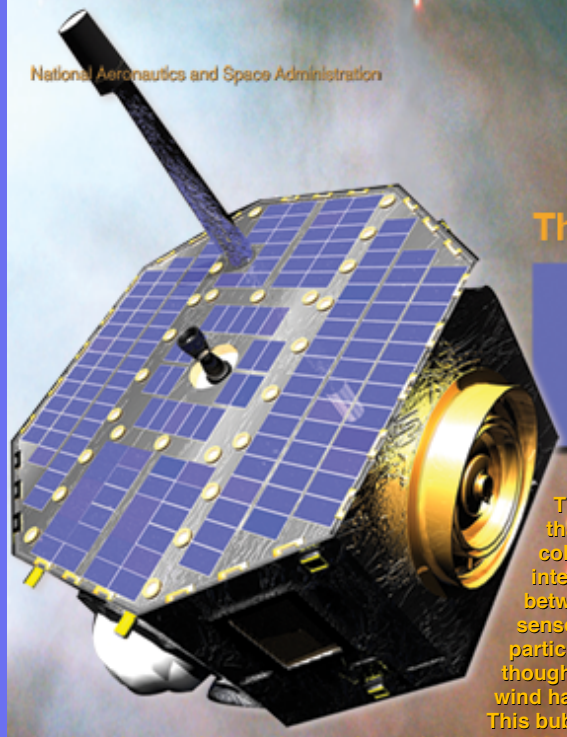
National Aeronautics and Space Administration

NASA

The Launch Services Program Presents . . .

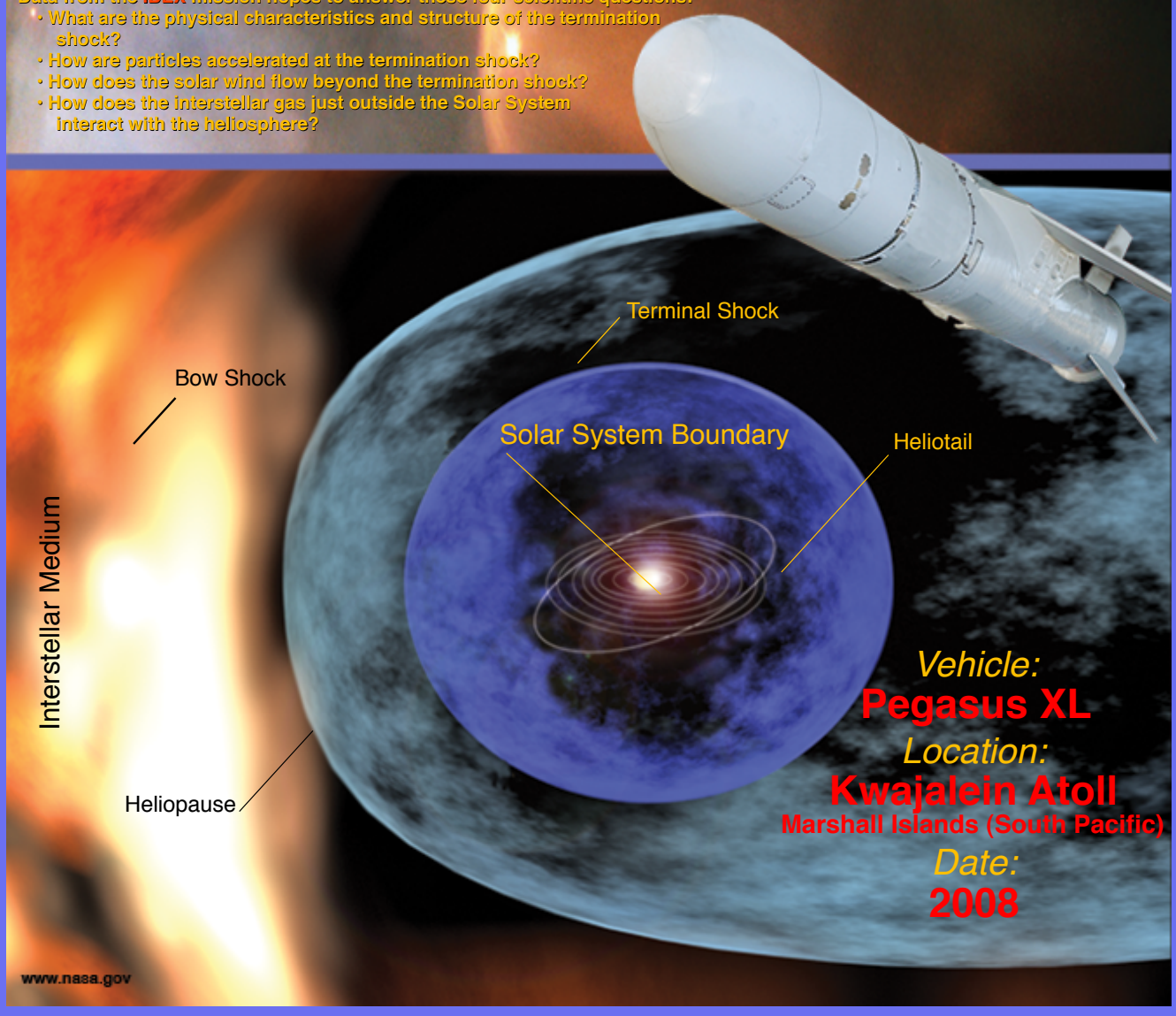
IBEX



The Interstellar Boundary Explorer (IBEX) spacecraft is a small satellite that will orbit the Earth in a highly elliptical orbit every five to eight days collecting energetic neutral atom (ENA) particles that are generated in the interaction region between our Solar System and the interstellar gas found between stars in our Milky Way Galaxy. As the particles are collected, the sensors and spacecraft will keep track of the energy and direction of the particles, which will allow IBEX to map out this interaction region, even though it is billions of miles away, well beyond the orbit of Pluto. The solar wind has blown a bubble in interstellar space that is called the heliosphere. This bubble is divided by a termination shock, where the solar wind slows down to subsonic speed due to interactions with the local interstellar gas. The interplay between the heliosphere and interstellar space is important because it affects the amount of potentially dangerous cosmic radiation reaching the Earth.

Data from the IBEX mission hopes to answer these four scientific questions:

- What are the physical characteristics and structure of the termination shock?
- How are particles accelerated at the termination shock?
- How does the solar wind flow beyond the termination shock?
- How does the interstellar gas just outside the Solar System interact with the heliosphere?

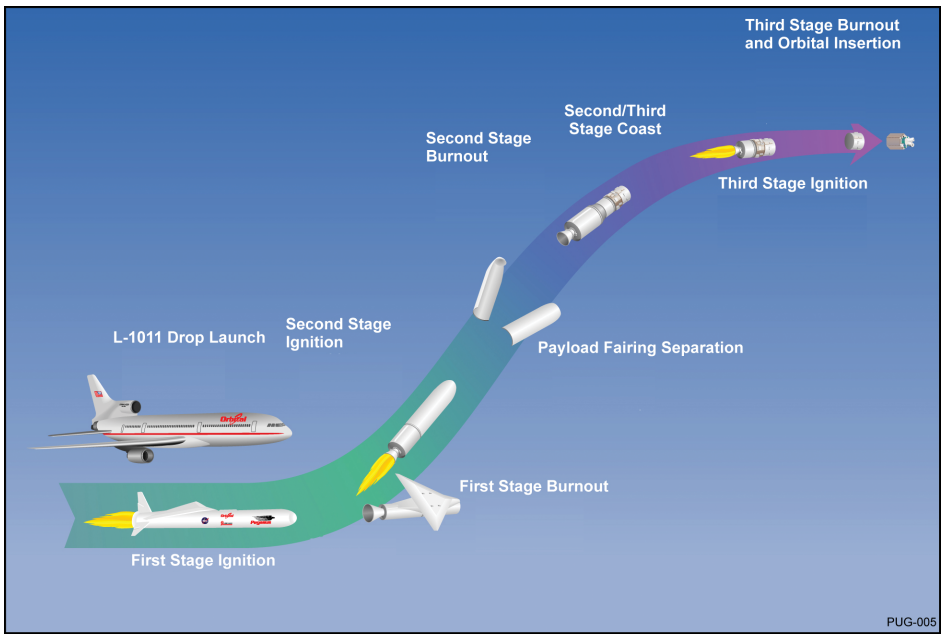


Vehicle:
Pegasus XL
Location:
Kwajalein Atoll
Marshall Islands (South Pacific)
Date:
2008

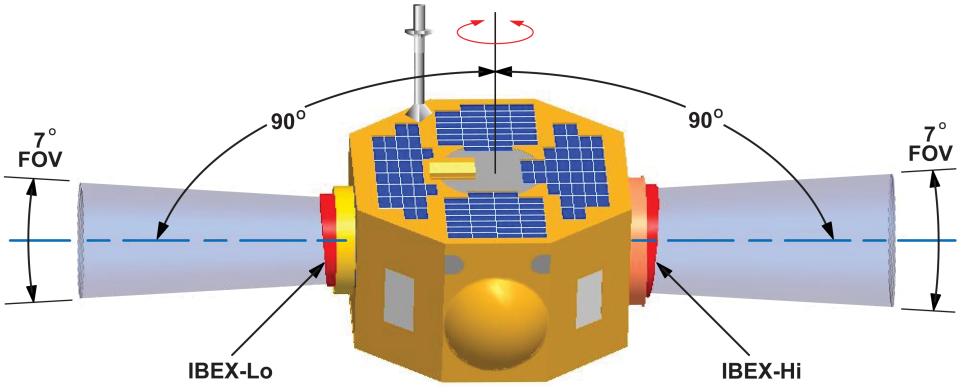
www.nasa.gov

IBEX

NASA's Interstellar Boundary Explorer (IBEX) spacecraft will be launched from Kwajalein Island in the fall of 2008. Kwajalein is part of the Republic of Marshall Islands located 2,100 nautical miles southwest of Honolulu, Hawaii. The IBEX spacecraft is launched on the Pegasus rocket that is carried aloft by Orbital's L-1011 aircraft ("Stargazer") to a drop point approximately 100 miles north of Kwajalein. The Pegasus rocket is then dropped from the L-1011 aircraft where it free falls in a horizontal position for five seconds before igniting its first stage motor. By launching near the equator, Pegasus takes advantage of the energy of the Earth's rotation, which is greater near the equator than at higher latitudes. The IBEX's spacecraft also has its own rocket motor which will take it up to an orbit altitude of 200,000 miles from Earth. Six months into the mission, IBEX will have observed the entire sky and reveal the global structure of the heliosheath and termination shock for the first time.



Drawing courtesy of Orbital Sciences



Drawing courtesy of Southwest Research Institute

You see IBEX-Hi and IBEX-Lo to the right and left of the spacecraft on the diagram; the grayish tube that extends from the instruments represents the 7 degree Field Of View (FOV) that the instruments "see." IBEX-Hi and IBEX-Lo are the only two instruments onboard the spacecraft. The imagers detect neutral atoms from the solar system's outer boundaries and galactic medium. IBEX-Hi detects particles from 300 electron Volts to 6 kiloelectron Volts (the higher range), and IBEX-Lo detects particles from 10 electron Volts to 2 kiloelectron Volts (the lower range). Both instruments view perpendicular to the spin axis at 90 degrees. After launch, IBEX will make the first global observations of the Sun's interaction with the interstellar medium. These interactions have never been studied before and are important because they shield out dangerous cosmic radiation.

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