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NORTHROP GRUMMAN

IBEX

Interstellar Boundary Explorer

As part of a Southwest Research Institute team led by Principal Investigator Dr. David McComas, Northrop Grumman was selected in 2005 to develop, build and launch a small spacecraft for NASA's Interstellar Boundary Explorer (IBEX) mission.

The IBEX satellite orbits the Earth every eight days on a highly-elliptical path that takes it to an apogee of 320,000 kilometers (approximately 80 percent of the distance to the Moon) to make the first comprehensive map of the boundary between our Solar System and interstellar space. Measuring this interstellar interaction is important for understanding our protection from galactic cosmic rays – energetic particles from beyond the Solar System – that could pose health risks to future astronauts exploring deep space.

IBEX was launched on October 19, 2008, aboard Northrop Grumman's Pegasus® launch vehicle from the Kwajalein Atoll launch site in the central Pacific Ocean. The spacecraft incorporated an on-board solid rocket motor and hydrazine propulsion system to propel it to a high-altitude orbit beyond Earth's magnetosphere, as required by IBEX's scientific instrument.

Spacecraft

The IBEX spacecraft is based on Northrop Grumman's highly reliable LEOStar-1 spacecraft platform, subsystems and supporting software, which has a proven track record of success on a total of 45 missions. The payload consists of two narrow angle image sensors (IBEX-Hi and IBEX-Lo) and a Combined Electronics Unit (CEU).

Facts At A Glance

- IBEX's orbit takes it up to 200,000 miles from Earth
- Six months into its mission, IBEX surveyed the entire sky to reveal the structure of the edges of our solar system

Mission

NASA Small Explorer (SMEX) Program

Customer

Southwest Research Institute – San Antonio, Texas

Specifications

Spacecraft

Mass:	<110 kg (243 lb.)
Redundancy:	Single String
Solar Array:	116 W body mounted solar cells
Power:	<85 W
Stabilization:	Sun-pointing major axis spinner
Pointing:	4428 arcsec control 155 arcsec knowledge
Data Storage:	2 Gbit
Data Downlink:	S-band: 0.32 Mbps
Orbit:	7,000 km perigee altitude, 50 Earth-radii apogee altitude
Mission Life:	24 months (baseline mission)

Payload

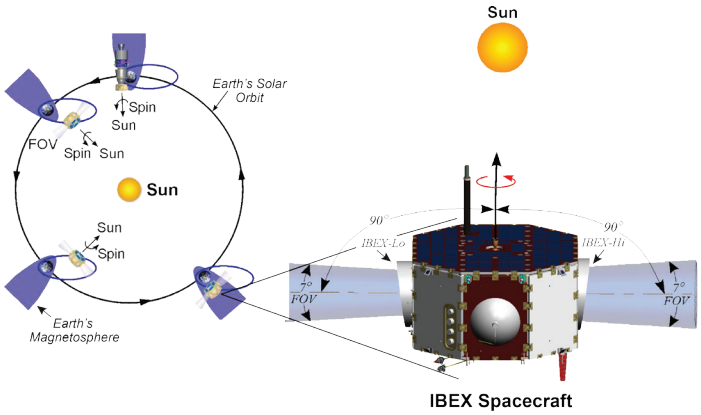
Two single pixel image sensors (IBEX-Hi and IBEX-Lo)
Combined Electronics Unit (CEU)

Launch

Launch Vehicle:	Pegasus® XL
Site:	Reagan Test Site, Kwajalein Atoll, Marshall Islands
Date:	October 19, 2008

IBEX Mission

In its elliptical orbit around the Earth, the IBEX spacecraft is pointed towards the sun, and spins continuously. Two narrow angle image sensors (IBEX-Hi and IBEX-Lo) are positioned perpendicular to the spin axis. These special imagers detect neutral atoms from the solar system's outer edge, enabling scientists to map the boundary between our Solar System and interstellar space.



IBEX Spacecraft

Mission Partners

Southwest Research Institute

Principal investigator, mission management, science instruments and operations

Northrop Grumman

Spacecraft and launch vehicle design, fabrication, test, launch operations, and mission operations

Additional Partners

Lockheed Martin Advanced Technology Center

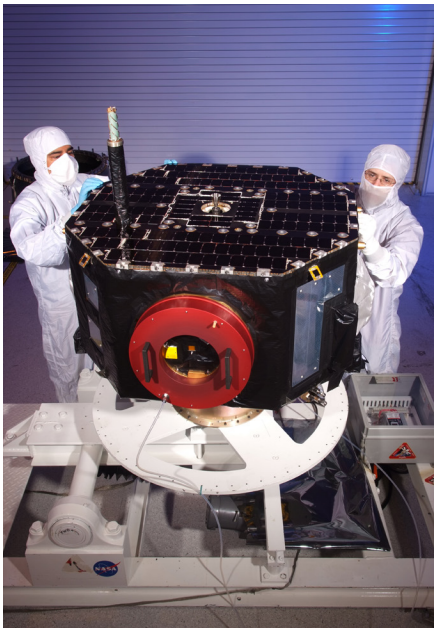
Applied Physics Laboratory

Los Alamos National Laboratory

Alliant Techsystems

University of New Hampshire

Adler Planetarium and Astronomy Museum


IBEX in Northrop Grumman's Dulles, Virginia satellite manufacturing facility

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